CHAPTER II - CHINOOK SALMON ASSESSMENT

CHINOOK STOCKS SOUTH OF CAPE FALCON

SACRAMENTO RIVER FALL CHINOOK SALMON

Predictor Description

The Council's Salmon FMP sets the escapement goal for Sacramento River fall Chinook as a range from 122,000 to 180,000 adults. This stock comprises approximately 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, and has varied significantly since it was first calculated in 1970 (Table II-1). From 1970–1986 it tracked ocean harvest and ranged from 0.50–0.73. From 1987–1995 it held steady at 0.70–0.79, while ocean harvest declined to a low in 1992. From 1996–2005 it again tracked ocean harvest, declining to a low of 0.26 in 2001 before rebounding to 0.62 in 2004. The CVI was 0.46 in 2005.

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-2 return to forecast the CVI (Figure II-1).

Predictor Performance

For the 1985–2004 period, the CVI preseason forecast ranged from 0.49 to 1.63 times its postseason value (Table II-2). The 2005 CVI preseason forecast of 1,678,300 fish was nearly twice (1.99 times) its postseason estimate of 843,300 fish (Table II-2).

2006 Stock Status

A total of 23,800 age-2 Chinook are estimated to have returned to the Central Valley in 2005, forecasting a 2006 CVI of 632,500 adult Chinook (Figure II-1), which is 0.38 times the 2005 preseason forecast and is the lowest forecast since 1996 but similar to the 2001 forecast.

Evaluation of 2005 Regulations on 2006 Stock Abundance

A repeat of 2005 regulations is expected to result in a CVI harvest index similar to the average of the last five years (41%). Applying the complement of this fraction (1-0.41) to the 2006 CVI forecast of 632,500 fish and multiplying that quantity by the typical percentage of Central Valley adult Chinook spawners that are Sacramento River fall run fish (five-year average 96%), yields a 2006 adult escapement forecast of 359,200 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-3, age-4, and age-5 fish to that year's river run size estimates of age-2, age-3, and age-4 fish, respectively (Table II-3). Historical abundance estimates were derived from a cohort

analysis of CWT information (brood years 1979-2001). The y-intercept of the regressions is constrained to zero, which gives the biologically reasonable expectation that a river run size of zero predicts an ocean abundance remainder of zero for the same cohort. The abundance of age-2 fish is not forecasted because no precursor to age-2 fish of that brood is available. Ocean fisheries harvest small numbers of age-2 Klamath River fall Chinook.

Predictor Performance

Since 1985, the preseason ocean abundance forecasts for age-3 fish have ranged from 0.32 to 2.71 times the postseason estimates; for age-4 fish from 0.47 to 2.6 times the postseason estimates; and for the adult stock as a whole from 0.34 to 2.03 times the postseason estimates (Table II-4). The September 1, 2004 age-3 forecast (185,700) was 0.89 times its postseason estimate (209,500); the age-4 forecast (48,900) was 1.4 times its postseason estimate (34,800); and the total adults forecast (239,800) was 0.95 times its postseason estimate (251,700) (Table II-4).

Management of Klamath River fall Chinook harvest since 1986 has attempted to achieve specific harvest rates on fully-vulnerable age-4 and age-5 fish in ocean and river fisheries (Table II-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. Tribal and recreational river fisheries have been managed on the basis of adult Chinook quotas.

The Council's FMP conservation objective 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 2005 were expected to result in 35,000 natural spawning adults and an age-4 ocean harvest rate of 7.7%. Postseason estimates of these quantities were 27,300 natural spawning adults and an age-4 ocean harvest rate of 23.9% (Table II-6).

2006 Stock Status

The forecast September 1, 2005 (preseason) ocean abundance of Klamath River fall Chinook salmon is 44,100 age-3, 63,700 age-4, and 2,200 age-5 fish (Figure II-3). The forecast number of adults is thus 110,000 and is comparable to the 1992 forecast of 96,000 adults (the lowest on record; Table II-4). Last year's preseason forecast was 185,700 age-3, 48,900 age-4, and 5,200 age-5 fish.

Late-season ocean fisheries in 2005 (September-November) were estimated to have harvested 0 age-3, 4,269 age-4, and 1,867 age-5 Klamath River fall Chinook. This harvest will be deducted from the ocean fishery's allocation in determining the 2006 allowable ocean harvest.

Evaluation of 2005 Regulations on 2006 Stock Abundance

A repeat of 2005 fishery regulations, including a river recreational harvest allocation of 15% (of the nontribal adult harvest) and a tribal allocation of 50% (of the overall adult harvest), would be expected to result in 18,700 natural area adult spawners and an age-4 ocean harvest rate of 12.2%. These "expected" numbers were derived from contact rate per unit effort and effort per day predictors based on long-term time series of these quantities. Were these predictors to be more heavily weighted toward recent year data, the forecast number of spawners and harvest rate would be even less optimistic.

If the ocean fishery (recreational and commercial) was closed from January through August 2006 between Cape Falcon and Point Sur, and the Klamath River fishery (tribal and recreational) was closed in 2006, the expected number of natural area adult spawners would be 29,200, with an expected age-4 ocean

harvest rate of 6.7% (due to ocean harvest that already occurred in the September through November 2005 period).

If the postseason estimate of natural area adult spawners in 2006 is less than 35,000, it would be the third consecutive year of failing to meet the FMP conservation objective for this stock. Under the terms of the Salmon FMP, this would trigger an overfishing concern and require the Council to undertake an overfishing review, which would likely lead to the development a rebuilding plan for this stock.

OTHER CALIFORNIA COASTAL CHINOOK STOCKS

Other California coastal streams that support fall Chinook stocks, which contribute to ocean fisheries off Oregon and California, include the Smith, Little, Mad, Eel, and Mattole rivers, and Redwood Creek. These stocks are included in the California coastal Chinook ESU, which is listed as threatened under the ESA. Current information is insufficient to forecast the ocean abundance of these stocks, however, the NMFS ESA consultation standard restricts the Klamath River fall Chinook age-4 ocean harvest rate to no more than 16.0% to limit impacts on these stocks. As indicated in the previous section, the postseason estimate of this rate for 2005 is 23.9%, exceeding both the preseason expectation of 7.7% and the 16.0% maximum ESA consultation standard. The harvest rate also exceeded the ESA standard in 2003 (22.7%) and 2004 (50.8%), prompting NMFS to reinitiate ESA consultation in 2005. If the ocean fishery was closed from January through August 2006 between Cape Falcon and Point Sur, the expected age-4 ocean harvest rate for 2006 would be 6.7% (due to ocean harvest that already occurred in the September through November 2005 period).

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 ocean fisheries off British Columbia, Canada and Southeast Alaska, and to a much lesser degree in Council area and terminal area (state waters) fisheries off Washington and Oregon. CWT analysis indicates populations from five major 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 2006 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 2005 Ocean Salmon Fisheries*, Chapter II, Table II-4 and Figure II-3). Natural fall Chinook stocks from both the NOC and MOC dominate production from this subgroup. Also present in lesser numbers are naturally-produced spring Chinook stocks from several rivers, and hatchery fall and/or spring Chinook released in the Trask, Nestucca, Salmon, Alsea, and Elk Rivers.

North Oregon Coast

Since 1986, the Salmon River Hatchery production has been CWT'd for use primarily as an indicator stock for the NOC stock component. Because these fish are harvested in fisheries north of the Council management area, the STT has not reviewed the procedure by which this indicator stock is used in estimating annual stock status. The annual spawner counts have been decreasing since 2002 despite excellent parental escapements indices in 2001 to 2004 (*Review of 2005 Ocean Salmon Fisheries*, Appendix B, Table B-11). If this trend continues, the 2006 NOC stock abundance is expected to be less than the 2005 abundance.

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 2006 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.

The annual spawner counts have been decreasing since 2002 despite excellent parental escapements indices in 2001 to 2004 (*Review of 2005 Ocean Salmon Fisheries*, Appendix B, Table B-11). If this trend continues, the 2006 MOC stock abundance is expected to be less than the 2005 abundance.

Based on the density index of total spawners, the generalized expectation for NOC and MOC stocks in 2006 is below recent years average abundance. However, 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 2005 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 2006 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 2005 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-3 fish. Mature Chinook enter the rivers primarily during April and May and generally prior to annual ocean fisheries. Quantitative abundance predictions are not made for these stocks.

Rogue River Fall Chinook

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

Annual predictions of Rogue River fall Chinook abundance indices are used for ocean impact modeling in the Klamath Ocean Harvest Model (KOHM). The Rogue River fall Chinook ocean abundance indices is 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-3, age-4, and age-5 fish to carcass counts of age-2, age-3 and age-4 fish, respectively, of the previous year. The inriver age composition estimates are based on scale sampling of carcasses. Since 1979, Klamath River fall Chinook ocean exploitation rates, for CWT'd fish, have been used as surrogate for Rogue River fall Chinook since such information is not available and the ocean distribution of Rogue and Klamath fall Chinook are thought to be similar. Carcass surveys, however, were not conducted in 2005 and the 2006 Rogue River index was forecast as the 2005 escapement into the lower Rogue River, (estimated from the seining and sampling project at Huntley Park), multiplied by the ratio of lower river escapement to the carcass survey based Rogue River Index the following year. The ratio used was the lowest recorded over the 1990-2004 period and was chosen because it is the most precautionary with respect the recent trend in declining returns. The 2006 Rogue River fall Chinook prediction is 3,800 (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 2005 Regulations on 2006 Stock Abundance

Given the 2005 regulations and the projected 2006 Oregon coastal Chinook stock abundances, which are expected to be lower than recent years averages, the aggregate Oregon coastal Chinook goal of 150,000 to 200,000 naturally spawning adults is expected to be met.

CHINOOK STOCKS NORTH OF CAPE FALCON

Columbia River Fall Chinook

Predictor Description and Past Performance

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

Preseason estimates of Columbia River fall Chinook stock abundance, used by the STT to assess the Council's adopted fishery regulations, are based on age-specific and stock-specific forecasts of annual ocean escapement (return to the Columbia River). These forecasts are developed by 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 2006 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 2005 Ocean Salmon Fisheries* (Appendix B, Tables B-15 through B-20). The 2005 returns for the five fall Chinook stocks listed in this report may differ somewhat from those provided in the *Review of 2005 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 recent 10-year average March preliminary preseason estimates as a percentage of the postseason estimates for the URB, LRW, LRH, SCH, and MCB stock estimates are 0.91, 0.85, 0.72, 0.86, and 0.91 respectively. The only March preliminary preseason estimate to show a consistent bias was LRH, which has been under predicted the past 12 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 harvest, which has varied during the last 20 years. The STT combines the initial inriver run size (ocean escapement) 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.

2006 Stock Status

The preliminary forecast for 2006 URB fall Chinook ocean escapement is 253,900 adults. If the forecast is realized, it would be about 95% of last year's return and about 1.1 times greater than the recent 10-year average of 228,830.

No preseason forecast for 2006 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 2006 is forecast at 16,600 adults. If the forecast is realized, it would be about 98% of last year's return and about 1.1 times greater than the recent 10-year average return of 15,340.

The preliminary forecast for 2006 ocean escapement of LRH fall Chinook is for a return of 55,800 adults, which would be 71% of last year's return and 70% of the recent 10-year average of 83,810.

Ocean escapement of SCH fall Chinook in 2006 is forecast at 50,000 adults. If the forecast is realized, it would be about 54% of last year's return and about 60% of the recent 10-year average of 88,620.

The preliminary forecast for the 2006 ocean escapement of MCB fall Chinook is 88,300 adults. If the forecast is realized, it would be about 90% of last year's return and about 1.1 times the recent 10-year average of 79,480. The MCB Chinook are returns from hatchery releases and natural spawn of bright fall Chinook stock in the area downstream from McNary Dam.

Evaluation of 2005 Regulations on 2006 Stock Abundance

Applying 2005 regulations to the projected 2006 abundance of Columbia River fall Chinook would result in ocean escapements of all five major stock units meeting spawning escapement goals. Compared to 2005, ocean escapement in 2006 is expected to be about the same for URB and LRW, slightly lower for MCB and much lower for LRH and SCH.

Washington Coastal Chinook

Predictor Description and Past Performance

Because Council fisheries have only minor impacts on Washington coastal Chinook stocks, preseason abundance estimates are not provided and these stocks are not included in the preseason fishery impact assessment reports prepared by the STT.

2006 Stock Status

The 2006 Willapa Bay hatchery fall Chinook ocean escapement abundance forecast is 29,565, which is up from the 2005 prediction of 17,400. The 2006 natural fall Chinook ocean escapement abundance forecast is 1,880, down from last year's 3,200 prediction.

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-4 adults. Puget Sound Chinook were listed as threatened under the ESA in March 1999. Southern U.S. fisheries that impact Puget Sound Chinook are constrained by terms of a Resource Management Plan (RMP), and are exempted from ESA Section 9 take prohibitions under Limit 6 of the 4(d) rule.

2006 Stock Status

Spring Chinook

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

Summer/Fall Chinook

Preliminary information for Puget Sound summer/fall stocks indicates the total 2006 return will be 213,400, slightly lower than the 2005 preseason forecast of 214,900. The 2006 natural Chinook return forecast of 62,400 is slightly lower than the 2005 forecast of 64,600. Changes in the abundance of individual stocks from various production areas are detailed in Table I-1.

Natural stocks from Puget Sound have experienced improved survival in recent years, but not to the extent that it can be labeled as a trend. While recent returns are slightly below the previous three year average, they are still well above those observed from 1999 to 2001. Fishery management for Puget Sound Chinook has changed from an escapement goal basis to the use of stock specific exploitation rates and "critical abundance thresholds." This new approach is evaluated on an annual basis through the RMP.

Evaluation of 2005 Regulations on 2006 Stock Abundance

Council fisheries north of Cape Falcon have only a minor impact on most stocks that originate in Washington coastal and Puget Sound rivers. These stocks have northerly marine distribution patterns and are therefore impacted primarily by Canadian and Alaskan fisheries. An evaluation of 2005 Council area regulations on projected 2006 abundance would not provide a useful comparison of ocean escapement.

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 +	CVI Harvest
Year	Troll	Sport	Total	Fall	Other[a/]	Total	Escapement)	Index (%)[b/]
1970	226.8	111.1	337.9	186.3	55.6[c/]	241.9	579.8	58
1971	150.7	166.3	317.0	196.2	65.4	261.6	578.6	55
1972	229.8	187.6	417.4	104.6	47.6	152.3	569.7	73
1973	422.5	180.9	603.4	225.4	34.0	259.4	862.8	70
1974	282.7	141.6	424.3	207.3	42.3	249.6	673.9	63
1975	234.4	92.7	327.1	162.3	56.5	218.9	546.0	60
1976	237.9	68.6	306.4	172.0	45.6	217.7	524.1	58
1977	263.8	76.6	340.4	165.6	43.0	208.6	549.1	62
1978	291.0	65.9	356.9	129.8	19.9	149.7	506.6	70
1979	234.1	108.5	342.6	171.9	10.9	182.9	525.5	65
1980	294.3	77.1	371.4	148.4	34.0	182.4	553.8	67
1981	289.9	73.8	363.7	196.9	21.8	218.7	582.4	62
1982	418.4	122.5	540.9	182.4	38.9	221.3	762.2	71
1983	178.2	53.0	231.2	129.9	14.4	144.3	375.4	62
1984	221.7	78.7	300.3	205.8	16.9	222.7	523.0	57
1985	212.3	121.8	334.1	312.7	20.7	333.4	667.4	50
1986	502.5	114.8	617.3	262.9	41.3	304.1	921.4	67
1987	446.8	152.8	599.7	202.8	21.6	224.4	824.1	73
1988	830.5	130.4	960.9	244.9	26.6	271.5	1,232.4	78
1989	363.8	130.9	494.7	155.0	18.0	173.0	667.7	74
1990	336.2	112.6	448.8	105.7	14.0	119.7	568.6	79
1991	254.6	62.1	316.7	118.3	16.4	134.6	451.3	70
1992	160.3	66.7	227.0	82.6	4.2	86.8	313.8	72
1993	259.7	99.3	359.0	139.6	6.0	145.7	504.6	71
1994	290.4	165.8	456.2	169.5	6.6	176.0	632.2	72
1995	670.6	354.6	1,025.2	302.2	16.5	318.6	1,343.8	76
1996	348.8	129.3	478.1	307.6	12.9	320.5	798.6	60
1997	482.2	208.4	690.6	368.0	46.6	414.6	1,105.2	62
1998	221.6	114.4	336.0	254.0	55.8	309.8	645.8	52
1999	259.7	76.4	336.1	408.9	21.4	430.3	766.4	44
2000	447.6	146.4	594.0	459.9	34.6	494.5	1,088.5	55
2001	172.6	59.9	232.5	575.5	73.8	649.3	881.7	26
2002	312.9	134.7	447.6	804.4	40.4	844.8	1,292.3	35
2003	239.0	69.7	308.7	541.6	46.3	588.0	896.7	34
2004	362.9	175.1	538.0	296.7	34.9	331.6	869.6	62
2005[d/]	287.5	104.1	391.7	404.0	47.6[e/]	451.6	843.3	46

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 five-year average escapements used for these components

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	667.4	0.79
1986	546.5	921.4	0.59
1987	592.9	824.1	0.72
1988	707.1	1,232.4	0.57
1989	625-885	667.7	0.94-1.33
1990	500-900	568.6	0.88-1.58
1991	466.0	451.3	1.03
1992	452.0	313.8	1.44
1993	501.0	504.6	0.99
1994	503.0	632.2	0.80
1995	654.0	1,343.8	0.49
1996	533.0	798.6	0.67
1997	849.0	1,105.2	0.77
1998	1,051.0	645.8	1.63
1999	847.7	766.4	1.11
2000	790.4	1,088.5	0.73
2001	649.4	881.7	0.74
2002	825.4	1,292.3	0.64
2003	1,108.1	896.7	1.24
2004	831.8	869.6	0.96
2005	1,678.3	843.3	1.99
2006	632.5	-	-

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	28.2	64.1	14.4	1.8	80.3
1982	566.4	133.4	699.8	0.30	0.52	39.4	30.1	33.9	2.6	66.6
1983	317.2	116.3	433.5	0.19	0.60	3.8	35.9	20.7	0.9	57.5
1984	157.1	83.7	240.8	0.08	0.38	8.3	21.7	24.4	1.1	47.2
1985	375.3	56.7	432.1	0.11	0.24	69.4	32.9	25.7	5.8	64.4
1986	1,308.7	141.2	1,449.9	0.18	0.46	44.6	162.9	29.8	2.3	195.0
1987	783.0	343.6	1,126.6	0.16	0.43	19.1	89.7	112.6	6.8	209.1
1988	758.6	236.2	994.8	0.20	0.39	24.1	101.2	86.5	3.9	191.6
1989	368.0	178.1	546.1	0.15	0.36	9.1	50.4	69.6	4.3	124.3
1990	176.8	103.3	280.1	0.30	0.55	4.4	11.6	22.9	1.3	35.9
1991	69.6	37.3	106.9	0.03	0.18	1.8	10.0	21.6	1.1	32.7
1992	39.6	28.3	67.9	0.02	0.07	13.7	6.9	18.8	1.0	26.7
1993	168.9	15.1	183.9	0.05	0.16	7.6	48.3	8.2	0.7	57.2
1994	120.3	41.8	162.2	0.03	0.09	14.4	37.0	26.0	1.0	64.0
1995	784.2	28.8	813.0	0.04	0.14	22.8	201.9	18.3	2.6	222.8
1996	191.0	225.9	416.9	0.05	0.16	9.5	38.8	136.7	0.3	175.8
1997	140.8	63.0	203.8	0.01	0.06	8.0	35.0	44.2	4.6	83.7
1998	154.7	45.0	199.7	0.00	0.09	4.6	59.2	29.7	1.7	90.6
1999	129.7	30.3	160.0	0.01	0.09	19.2	29.2	20.5	1.3	51.0
2000	618.7	44.5	663.2	0.06	0.10	10.2	187.1	30.5	0.5	218.1
2001	358.2	134.2	492.4	0.03	0.09	11.3	99.1	88.2	0.2	187.4
2002	565.7	100.0	665.7	0.03	0.15	9.2	94.6	62.5	3.7	160.8
2003	540.7	220.2	760.9	0.09	0.23	3.8	94.3	96.8	0.9	191.9
2004	159.2[a/]	166.5	325.8	0.13	0.51	9.7	33.2	40.7	5.3	79.2
2005	209.5[b/]	34.8[a/]	244.3	NA[c/]	0.24[a/]	2.3	43.9	17.5	3.9	65.3

a/ Preliminary: incomplete cohort data (age-5 unavailable).

b/ Preliminary: incomplete cohort data (age-4 and age-5 unavailable).

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

TABLE II-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-3	
1985	113,000	276,000	0.41
1986	426,000[b/]	1,308,678	0.33
1987	511,800	783,001	0.65
1988	370,800	758,625	0.49
1989	450,600	367,979	1.22
1990	479,000	176,803	2.71
1991	176,200	69,609	2.53
1992	50,000	39,637	1.26
1993	294,400	168,858	1.74
1994	138,000	120,329	1.15
1995	269,000	784,221	0.34
1996	479,800	190,977	2.51
1997	224,600	140,784	1.60
1998	176,000	154,679	1.14
1999	84,800	129,696	0.65
2000	349,600	618,688	0.57
2001	187,200	358,169	0.52
2002	209,000	565,734	0.37
2003	171,300	540,668	0.32
2004[c\]	72,100	159,242	0.45
2005[c\]	185,700	209,493	0.89
2006	44,100	-	-
		Age-4	
1985	56,875	57,500	0.99
1986	66,250	141,173	0.47
1987	206,125	343,562	0.60
1988	186,375	236,159	0.79
1989	215,500	178,110	1.21
1990	50,125	103,324	0.49
1991	44,625	37,308	1.20
1992	44,750	28,261	1.58
1993	39,125	15,091	2.59
1994	86,125	41,821	2.06
1995	47,000	28,827	1.63
1996	268,500	225,886	1.19
1997	53,875	63,019	0.85
1998	46,000	45,039	1.02
1999	78,750	30,259	2.60
2000	38,875	44,462	0.87
2001	247,000	134,245	1.84
2002	143,800	99,993	1.44
2003	132,400	220,224	0.60
2004	134,500	166,527	0.81
2005[c\]	48,900	34,791	1.40
2006	63,700	-	-

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-5	
1985	NA	11,231	NA
1986	NA	5,881	NA
1987	5,250	19,531	0.27
1988	13,250	14,725	0.90
1989	10,125	9,658	1.05
1990	7,625	7,806	0.98
1991	1,500	2,786	0.54
1992	1,250	1,448	0.86
1993	1,125	1,767	0.64
1994	500	1,468	0.34
1995	2,000	3,817	0.52
1996	1,125	789	1.43
1997	7,875	8,891	0.89
1998	3,250	2,399	1.35
1999	2,000	2,114	0.95
2000	1,375	860	1.60
2001	1,250	259	4.83
2002	9,700	6,963	1.39
2003	6,500	2,062	3.15
2004	9,700	28,878	0.34
2005	5,200	7,433	0.70
2006	2,200	-	-
		Total Adults	
1985	169,875	344,731	0.49
1986	492,250	1,455,732	0.34
1987	723,175	1,146,094	0.63
1988	570,425	1,009,509	0.57
1989	676,225	555,747	1.22
1990	536,750	287,933	1.86
1991	222,325	109,703	2.03
1992	96,000	69,346	1.38
1993	334,650	185,716	1.80
1994	224,625	163,618	1.37
1995	318,000	816,865	0.39
1996	749,425	417,652	1.79
1997	286,350	212,694	1.35
1998	225,250	202,117	1.11
1999	165,550	162,069	1.02
2000	389,850	664,010	0.59
2001	435,450	492,673	0.88
2002	362,500	672,690	0.54
2003	310,200	762,954	0.41
2004[c\]	216,300	354,647	0.61
2005[c\]	239,800	251,717	0.95
2006	110,000	-	-

a/ Original preseason forecasts for years 1985-2001 were for May 1 (t); converted to Sept. 1 (t-1) forecasts by dividing the assumed May 1 (t) number by the Sept. 1 (t-1) through May 1 (t) survival rate in those years: 0.5 age-3, 0.8 age-4, 0.8 age-5.
b/ A scalar of 0.75 was applied to the jack count 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	1,308,678	141,173	0.28	0.50	0.46	0.67	72,000	37,700	304,887	46,154
1987	511,800	206,125	783,001	343,562	0.28	0.53	0.43	0.44	121,200	78,200	277,753	73,265
1988	370,800	186,375	758,625	236,159	0.31	0.53	0.39	0.52	114,100	65,400	255,138	73,854
1989	450,600	215,500	367,979	178,110	0.30	0.49	0.36	0.70	128,100	67,600	125,330	54,340
1990	479,000	50,125	176,803	103,324	0.30	0.49	0.55	0.36	85,100	31,200	114,697	11,459
1991	176,200	44,625	69,609	37,308	0.13	0.28	0.18	0.45	16,700	12,800	9,904	13,581
1992	50,000	44,750	39,637	28,261	0.06	0.15	0.07	0.27	4,200	4,200	3,150	6,787
1993	294,400	39,125	168,858	15,091	0.12	0.43	0.16	0.49	20,100	22,500	11,386	12,808
1994	138,000	86,125	120,329	41,821	0.07	0.20	0.09	0.29	10,400	14,300	8,916	13,524
1995	269,000	47,000	784,221	28,827	0.07	0.32	0.14	0.19	13,500	18,500	32,243	21,637
1996	479,800	268,500	190,977	225,886	0.17	0.66	0.16	0.39	88,400	129,100	45,141	69,241
1997	224,600	53,875	140,784	63,019	0.10	0.43	0.06	0.26	17,600	26,500	8,684	17,764
1998	176,000	46,000	154,679	45,039	0.07	0.29	0.09	0.30	10,200	14,800	5,025	17,897
1999	84,800	78,750	129,696	30,259	0.10	0.28	0.09	0.45	12,300	18,100	5,114	16,942
2000	349,600	38,875	618,688	44,462	0.11	0.53	0.10	0.25	24,000	32,400	42,389	35,066
2001	187,200	247,000	358,169	134,245	0.14	0.61	0.09	0.29	45,600	105,300	21,830	50,780
2002	209,000	143,800	565,734	99,993	0.13	0.57	0.15	0.26	30,000	70,900	31,639	35,069
2003	171,300	132,400	540,668	220,224	0.16	0.50	0.23	0.28	30,600	52,200	101,688	39,715
2004	72,100	134,500	159,242	166,527	0.15	0.38	0.51	0.48	26,500	35,800	124,528	29,807
2005[d/]	185,700	48,900	209,493	34,791	0.08	0.16	0.24	0.19	7,100	9,600	15,181	9,552
2006	44,100	63,700	-	-	-	-	-	-	-	-	-	-

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

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

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

d/ Postseason estimates are preliminary.

TABLE II-6. Harvest levels and rates of age-3 and age-4 Klamath River fall Chinook. (Page 1 of 2)

	Ocean Fisheries (Sept. 1 (t-1) - Aug. 31 (t))							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-3										
1986	35,726	4,888	40,614	74,098	123,256	197,354	237,968	8,100	18,100	26,200
1987	17,258	5,090	22,348	42,935	56,448	99,383	121,731	11,400	11,400	22,800
1988	16,038	5,175	21,213	24,373	108,253	132,626	153,839	12,500	15,600	28,100
1989	6,413	11,715	18,128	15,287	23,587	38,874	57,002	2,700	900	3,600
1990	81	4,374	4,455	36,725	11,050	47,775	52,230	1,300	1,400	2,700
1991	0	1,024	1,024	344	811	1,155	2,179	2,123	1,277	3,400
1992	0	0	0	975	0	975	975	970	251	1,221
1993	0	824	824	835	6,438	7,273	8,097	5,426	2,917	8,343
1994	43	606	649	0	3,400	3,400	4,049	4,543	965	5,508
1995	0	999	999	12,210	14,807	27,017	28,016	11,840	5,536	17,376
1996	0	0	0	0	9,248	9,248	9,248	12,363	3,661	16,024
1997	0	233	233	622	1,218	1,840	2,073	2,166	2,736	4,902
1998	0	6	6	297	466	763	769	2,231	5,781	8,012
1999	63	180	243	1,266	434	1,700	1,943	4,981	1,748	6,729
2000	405	3,288	3,693	8,745	25,250	33,995	37,688	22,458	4,893	27,351
2001	113	105	218	2,769	6,097	8,866	9,084	17,885	7,294	25,179
2002	259	919	1,178	1,905	11,637	13,542	14,720	11,734	6,258	17,992
2003	288	1,117	1,405	3,328	45,574	48,902	50,307	6,996	5,061	12,057
2004	457	1,084	1,541	11,285	8,392	19,677	21,218	4,679	2,051	6,730
2005[a/]	0	705	705	951	3,209	4,160	4,865	4,361	1,301	5,662
Age-4										
1986	7,764	1,116	8,880	23,462	31,994	55,456	64,336	17,000	2,900	19,900
1987	21,791	4,440	26,231	71,328	48,956	120,284	146,515	41,000	8,500	49,500
1988	11,899	3,607	15,506	27,021	50,411	77,432	92,938	38,600	6,200	44,800
1989	6,077	9,760	15,837	32,513	16,650	49,163	65,000	41,000	7,700	48,700
1990	3,971	2,894	6,865	39,451	10,527	49,978	56,843	6,000	2,200	8,200
1991	0	1,005	1,005	1,519	4,149	5,668	6,673	7,593	2,016	9,609
1992	171	55	226	1,786	12	1,798	2,024	4,360	723	5,083
1993	0	0	0	852	1,621	2,473	2,473	3,786	243	4,029
1994	0	1,126	1,126	1,170	1,502	2,672	3,798	6,666	818	7,484
1995	0	243	243	1,886	1,778	3,664	3,907	2,957	480	3,437
1996	774	3,469	4,243	10,352	20,770	31,122	35,365	43,959	9,080	53,039
1997	3	173	176	464	3,004	3,468	3,644	8,734	2,586	11,320
1998	0	106	106	4,076	0	4,076	4,182	7,164	1,822	8,986
1999	15	378	393	1,656	691	2,347	2,740	8,789	494	9,283
2000	118	897	1,015	2,491	1,079	3,570	4,585	6,733	756	7,489
2001	1,316	1,608	2,924	5,845	3,937	9,782	12,706	20,759	4,819	25,578
2002	1,938	827	2,765	3,268	9,419	12,687	15,452	11,929	4,063	15,992
2003	1,057	1,157	2,214	10,355	37,530	47,885	50,099	22,754	4,592	27,346
2004	3,326	2,833	6,159	27,463	50,985	78,448	84,607	17,623	1,751	19,374
2005[a/]	264	338	602	5,679	2,040	7,719	8,321	3,025	256	3,281

TABLE II-6. Harvest levels and rates of age-3 and age-4 Klamath River fall Chinook. (Page 2 of 2)

	Ocean Fisheries (Sept. 1 (t-1) - Aug. 31 (t))							River Fisheries (t)		
	KMZ			North of	South of		Ocean			
Year (t)	Troll	Sport	Subtotal	KMZ	KMZ	Subtotal	Total	Net	Sport	Total
					HARVEST RATE					
Age-3										
1986	0.03	0.00	0.03	0.06	0.09	0.15	0.18	0.05	0.11	0.16
1987	0.02	0.01	0.03	0.05	0.07	0.13	0.16	0.13	0.13	0.25
1988	0.02	0.01	0.03	0.03	0.14	0.17	0.20	0.12	0.15	0.28
1989	0.02	0.03	0.05	0.04	0.06	0.11	0.15	0.05	0.02	0.07
1990	0.00	0.02	0.03	0.21	0.06	0.27	0.30	0.11	0.12	0.23
1991	0.00	0.01	0.01	0.00	0.01	0.02	0.03	0.21	0.13	0.34
1992	0.00	0.00	0.00	0.02	0.00	0.02	0.02	0.14	0.04	0.18
1993	0.00	0.00	0.00	0.00	0.04	0.04	0.05	0.11	0.06	0.17
1994	0.00	0.01	0.01	0.00	0.03	0.03	0.03	0.12	0.03	0.15
1995	0.00	0.00	0.00	0.02	0.02	0.03	0.04	0.06	0.03	0.09
1996	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.32	0.09	0.41
1997	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.06	0.08	0.14
1998	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.10	0.14
1999	0.00	0.00	0.00	0.01	0.00	0.01	0.01	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	0.00	0.00	0.00	0.01	0.02	0.02	0.03	0.18	0.07	0.25
2002	0.00	0.00	0.00	0.00	0.02	0.02	0.03	0.12	0.07	0.19
2003	0.00	0.00	0.00	0.01	0.08	0.09	0.09	0.07	0.05	0.13
2004[a/]	0.00	0.01	0.01	0.07	0.05	0.12	0.13	0.14	0.06	0.20
2005[a/]	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.10	0.03	0.13
Age-4										
1986	0.05	0.01	0.06	0.17	0.23	0.39	0.46	0.57	0.10	0.67
1987	0.06	0.01	0.08	0.21	0.14	0.35	0.43	0.36	0.08	0.44
1988	0.05	0.02	0.07	0.11	0.21	0.33	0.39	0.45	0.07	0.52
1989	0.03	0.05	0.09	0.18	0.09	0.28	0.36	0.59	0.11	0.70
1990	0.04	0.03	0.07	0.38	0.10	0.48	0.55	0.26	0.10	0.36
1991	0.00	0.03	0.03	0.04	0.11	0.15	0.18	0.35	0.09	0.45
1992	0.01	0.00	0.01	0.06	0.00	0.06	0.07	0.23	0.04	0.27
1993	0.00	0.00	0.00	0.06	0.11	0.16	0.16	0.46	0.03	0.49
1994	0.00	0.03	0.03	0.03	0.04	0.06	0.09	0.26	0.03	0.29
1995	0.00	0.01	0.01	0.07	0.06	0.13	0.14	0.16	0.03	0.19
1996	0.00	0.02	0.02	0.05	0.09	0.14	0.16	0.32	0.07	0.39
1997	0.00	0.00	0.00	0.01	0.05	0.06	0.06	0.20	0.06	0.26
1998	0.00	0.00	0.00	0.09	0.00	0.09	0.09	0.24	0.06	0.30
1999	0.00	0.01	0.01	0.05	0.02	0.08	0.09	0.43	0.02	0.45
2000	0.00	0.02	0.02	0.06	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	0.02	0.01	0.03	0.03	0.09	0.13	0.15	0.19	0.06	0.26
2003	0.00	0.01	0.01	0.05	0.17	0.22	0.23	0.24	0.05	0.28
2004	0.02	0.02	0.04	0.16	0.31	0.47	0.51	0.43	0.04	0.48
2005[a/]	0.01	0.01	0.02	0.16	0.06	0.22	0.24	0.17	0.01	0.19

a/ Preliminary.

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

Return	Inriver Run Index in Thousands of Fish[a/]					Ocean Impact Rate by Age[b/]		Ocean Population Index in Thousands of Fish[c/]			
Year	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	8.3
1996	0.1	0.4	1.8	0.1	2.4	0.05	0.16	2.4	2.7	0.1	5.3
1997	0.1	0.3	1.0	0.3	1.7	0.01	0.06	5.2	1.5	0.3	7.1
1998	0.0	0.5	2.8	0.3	3.6	0.00	0.09	3.8	3.9	0.3	8.1
1999	0.2	0.3	1.6	0.5	2.6	0.01	0.09	1.5	2.7	0.6	4.7
2000	0.2	2.0	0.8	0.6	3.6	0.06	0.10	9.9	0.9	0.6	11.4
2001	0.8	2.3	4.2	0.0	7.3	0.03	0.09	13.9	5.9	0.0	19.8
2002	0.9	4.0	7.1	0.8	12.7	0.02	0.15	36.1	9.0	0.9	46.0
2003	0.9	2.3	12.0	0.4	15.6	0.08	0.21	14.1[e/]	25.1[e/]	0.5	40.0
2004	0.4	0.6	4.9	2.9	8.8	0.11	0.54	18.1[e/]	7.7[e/]	1.8	27.6
2005	NA	NA	NA	NA	NA	NA	NA	7.2[e/]	2.1[e/]	0.9	10.2[f/]
2006	-	-	-	-	-	-	-	NA	NA	NA	3.8[f/]

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 2004 predicted from regression equations; postseason estimates are not available.

d/ Excludes age-6 fish.

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

f/ Preseason forecast.

g/ Spawning surveys were not conducted in 2005.

TABLE II-8. Predicted and postseason returns of Columbia River adult fall Chinook in thousands of fish. (Page 1 of 3)

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

TABLE II-8. Predicted and postseason returns of Columbia River adult fall Chinook in thousands of fish. (Page 2 of 3)

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

TABLE II-8. Predicted and postseason returns of Columbia River adult fall Chinook in thousands of fish. (Page 3 of 3)

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

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 1979-2000).

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.

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	0.95	0.5	0.3	1.67	0.0	0.1	-	6.6	14.9	0.44
1999	27.0	40.9	0.66	2.3	0.3	7.67	0.0	0.0	-	7.6	5.2	1.46
2000	19.0	33.5	0.57	5.0	0.1	50.00	0.0	0.2	-	7.3	17.2	0.42
2001	34.9	63.9	0.55	1.6	0.1	16.00	0.0	0.1	-	9.1	14.0	0.65
2002	52.8	53.4	0.99	1.6	0.7	2.29	0.0	0.0	-	13.8	19.9	0.69
2003	45.8	30.3	1.51	1.6	0.2	8.00	0.0	0.2	-	13.7	9.9	1.38
2004	34.2	17.2[/b]	1.83	0.8	0.0	NA	0.5	0.0	-	20.3	24.4[/b]	0.83
2005	14.5	NA	NA	0.4	NA	NA	0.7	NA	NA	23.4	NA	NA
2006	16.9	-	-	0.4	-	-	0.6	-	-	24.1	-	-
	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	1.18	6.2	1.5	4.13	6.0	6.1	0.98	5.0	8.4	0.60
2001	1.7	1.4	1.21	4.1	0.7	5.86	5.8	8.4	0.69	5.5	5.1	1.08
2002	2.0	1.6	1.25	6.8	2.6	2.62	6.7	7.3	0.92	5.8	4.4	1.32
2003	2.0	1.0	2.00	9.4	0.2	47.00	5.5	5.6	0.98	6.0	7.5	0.80
2004	2.2	1.5[/b]	1.47	10.1	6.2[/b]	1.63	15.7	17.1[/b]	0.92	7.6	5.8[/b]	1.31
2005	2.0	NA	NA	9.9	NA	NA	14.2	NA	NA	9.2	NA	NA
2006	1.6	-	-	9.6	-	-	8.7	-	-	10.0	-	-

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
	South Puget Sound Hatchery			**South Puget Sound Natural**			**Strait of Juan de Fuca Hatchery**			**Strait of Juan de Fuca Natural**		
1993	61.8	36.8	1.68	26.5	19.8	1.34	0.7	0.2	3.50	3.1	2.4	1.29
1994	52.7	48.9	1.08	18.0	29.9	0.60	3.9	1.6	2.44	1.0	0.5	2.00
1995	49.6	74.5	0.67	21.7	34.5	0.63	3.0	0.1	30.00	0.9	2.7	0.33
1996	51.9	58.3	0.89	19.0	35.8	0.53	2.8	0.2	14.00	0.9	3.1	0.29
1997	65.1	46.5	1.40	18.2	20.6	0.88	2.2	0.3	7.33	0.8	3.5	0.23
1998	67.8	54.5	1.24	21.8	27.7	0.79	1.7	1.7	1.00	0.9	1.9	0.47
1999	59.4	83.6	0.71	19.6	17.0	1.15	1.9	0.7	2.71	0.9	2.7	0.33
2000	77.5	55.8	1.39	17.5	13.9	1.26	2.0	1.2	1.67	1.1	1.7	0.65
2001	73.7	96.4	0.76	16.2	20.2	0.80	0.0	1.7	-	3.5	2.0	1.75
2002	90.8	85.0	1.07	16.9	21.5	0.79	0.0	0.0	-	3.6	3.7	0.97
2003	86.6	75.9	1.14	19.6	15.3	1.28	0.0	0.0	-	3.4	4.7	0.72
2004	86.5	74.6[/b]	1.16	17.5	28.5[/b]	0.61	0.0	1.4[/b]	NA	3.5	4.1[/b]	0.85
2005	83.1	NA	NA	17.7	NA	NA	0.0	NA	NA	4.2	NA	NA
2006	85.8	-	-	21.3	-	-	0.0	-	-	4.2	-	-
	Hood Canal Hatchery and Natural											
1993												
1994	11.7	4.8	2.44									
1995	11.5	3.8	3.03									
1996	3.9	9.4	0.41									
1997	9.0	8.2	1.10									
1998	2.7	7.9	0.34									
1999	6.7	16.3	0.41									
2000	14.0	29.6	0.47									
2001	19.2	21.3	0.90									
2002	25.3	19.3	1.31									
2003	24.0	31.5	0.76									
2004	29.6	34.5[/b]	0.86									
2005	30.5	NA	NA									
2006	30.2	-	-									

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.

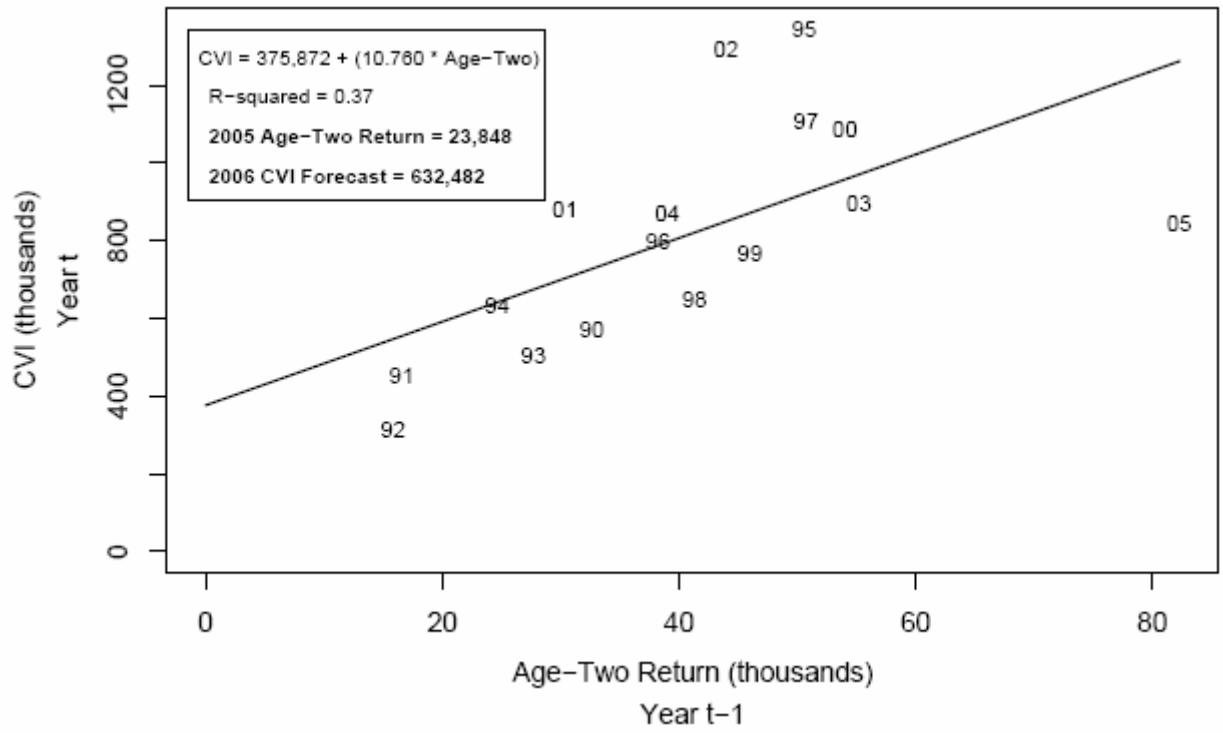

FIGURE II-1. Regression estimator for CVI based on previous year's river return of age-two Central Valley Chinook, 1990-2005. Years shown are CVI year. Numbers in plot denote calendar year t.

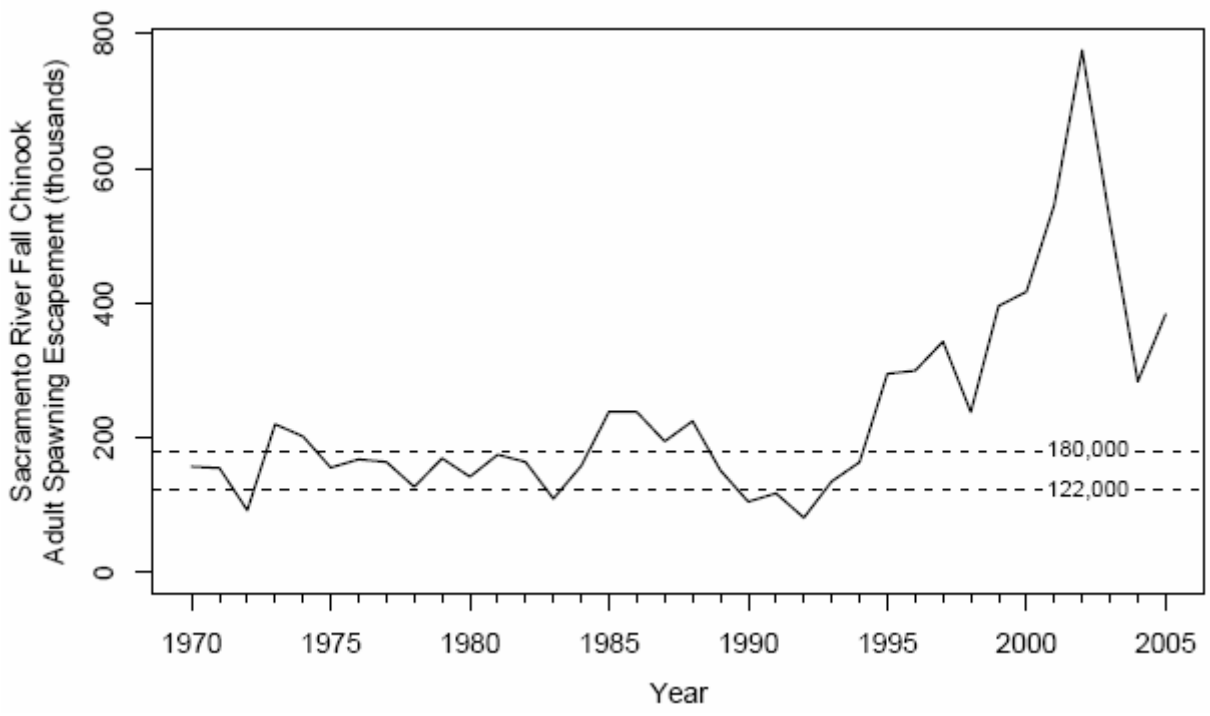

FIGURE II-2. Spawning escapements of adult Sacramento River fall Chinook, 1970-2005, and the goal range for the stock of 122,000 to 180,000 adult fish.

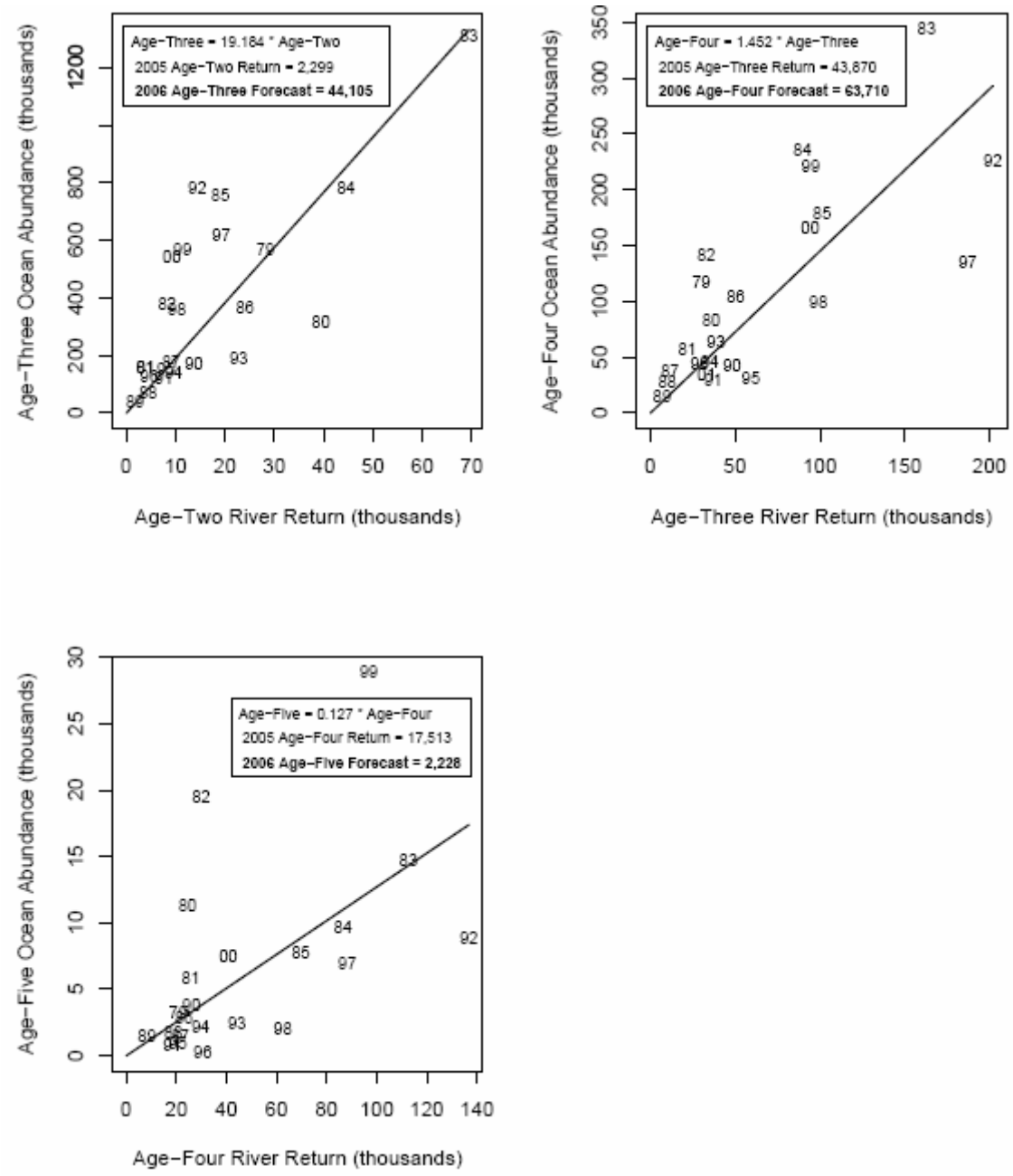

FIGURE II-3. Regression estimators for Klamath River fall Chinook ocean abundance (September 1) based on that year's river return of same cohort. Numbers in plots denote brood years.