

Ocean Abundance Projections and Prospective Harvest Levels for Klamath River Fall Chinook, 2008 Season

Klamath River Technical Advisory Team
25 February 2008

Executive Summary

Predictor performance for 2007 and forecasts for 2008 are:

	Age	2007			2008 Forecast
		Preseason	Postseason	Pre/Post	
Ocean Abundance	3	515,400	521,400	0.99	31,600
	4	26,100	32,500	0.80	157,200
	5	4,700	2,900	1.63	1,900
Proportion Natural	3	0.52	0.61	0.85	0.62
	4	0.60	0.87	0.69	0.65
	5	0.72	0.68	1.06	0.72
Ocean Harvest Rate	4	0.16	0.21	0.76	---
Ocean Fall Harvest	3	---	0	---	---
	4	---	3741	---	---
	5	---	780	---	---

The implications of the 2008 forecast ocean abundances, proportions natural, and the 2007 ocean fall harvest for fisheries management in 2008 were explored with the Klamath Ocean Harvest Model (KOHM) under two hypothetical management scenarios: (A) no additional ocean fisheries (commercial and recreational) from Jan–Aug 2008 between Cape Falcon and Point Sur (an estimated 4521 Klamath River fall Chinook were harvested in the ocean during the Sept–Nov 2007 period) and no Klamath River fisheries (tribal and recreational) in 2008, and (B) status quo regulations: the 2007 ocean fishery seasons and quotas, the 2007 river recreational allocation of 26% (of nontribal harvest), and a tribal allocation of 50% (of total harvest). The results are:

Sector	KOHM Forecasts	
	(A) No-fishing in 2008	(B) 2007 Regulations
Adult Spawners		
Natural Areas	74,300	26,900
Hatcheries	40,900	14,900
Adult Harvest		
Ocean Commercial	3,700	23,900
Ocean Recreational	800	4,700
River Recreational	0	10,000
Tribal	0	38,600
Age-4 Ocean Harvest Rate	0.02	0.17
Spawner Reduction Rate	0.03	0.65

With no further fishing in 2008 on the current stock, the expected number of natural area adult spawners would be 74,300, with an expected age-4 ocean harvest rate of 2% (due to ocean harvest that already occurred in the Sept–Nov 2007 period). A repeat of 2007 fishery regulations would be expected to result in 26,900 natural

area adult spawners and an age-4 ocean harvest rate of 17%. These forecasts are provided for informational purposes only; the Pacific Fishery Management Council (PFMC) will adopt 2008 ocean salmon fishery management regulations in April 2008.

Introduction

The PFMC's (1988) fishery management plan for Klamath River fall Chinook (Amendment 9) permits a natural spawner reduction rate via fisheries of no more than $2/3$, with a minimum escapement of 35,000 natural area adult spawners (Prager and Mohr 2001). Natural area adult spawners are defined as age-three or older fall Chinook that spawn outside of the hatchery environment, regardless of their origin. The KOHM is used by the PFMC to forecast the impacts of ocean and river fisheries on Klamath River fall Chinook, and to evaluate whether a given management option is expected to meet the fishery management plan's biological goals for Klamath River fall Chinook. The KOHM requires forecasts of Klamath River fall Chinook ocean abundance and proportion of natural spawners by age, along with the estimated harvest of these fish in the previous calendar year's September through December (fall) ocean fisheries. This report presents these forecasts and estimates for the 2008 management year. For informational purposes, KOHM forecasts of harvest and spawner escapement also are presented under two hypothetical management scenarios: (A) no ocean or river fisheries in 2008, and (B) status quo regulations: the 2007 ocean fishery seasons and quotas, the 2007 river recreational allocation of 26% (of nontribal harvest), and a tribal allocation of 50% (of total harvest). Historical records of ocean abundance, harvest, harvest rates, river escapement, and predictor performance are also compiled. These records differ from those presented in KRTAT reports issued prior to 2002 for reasons described in KRTAT (2002) and Goldwasser et al. (2001).

Data and Analytical Methods

The age-composition of the 2007 river run of Klamath River fall Chinook salmon used in this report is from the KRTAT (2008). For the 2007 run, an unusually small number of coded-wire tags were recovered in three Yurok fisheries operating in the lower Klamath River. To adjust for this abnormally low number of recoveries, an additional CWT expansion method was developed. The method is described in Appendix A.

Ocean Abundance Forecast

The age-specific ocean abundance predictors are based on the use of a sibling regression. The age a September 1 ocean abundance estimates for brood years 1979-2003 were regressed against the age $a-1$ river run-size estimates of their respective cohorts (Table 1, Figure 1). By convention, September 1 is the date that immature Klamath River fall Chinook remaining in the ocean are incremented one year in age. The regressions were fit using least-squares with the y-intercept constrained to zero, which gives the biologically reasonable expectation that an age $a-1$ river run-size of zero predicts an age a ocean abundance of zero. This procedure is consistent with recommendations of the PFMC's Salmon Technical Team, and Scientific and Statistical Committee.

Ocean abundance has been forecast preseason since 1985 using methods similar to those described above (Tables 2 and 3). Postseason ocean abundance estimates were calculated using cohort reconstruction methods that accommodate spatial and/or temporal variations in maturity, straying, and fishery impact rates applied separately to the hatchery and natural components of the stock. The postseason estimates for 2006 (age-three) and 2007 (age-three, age-four) are preliminary, as their respective cohorts are incomplete (Table 1).

The 2007 age-three ocean abundance forecast was 0.99 times its postseason estimate (Table 2); the age-three predictor has underestimated abundance in 14 of the 23 previous years. The 2007 age-four ocean abundance forecast was 0.80 times its postseason estimate (Table 2); the age-four predictor has underestimated abundance in 9 of the 23 previous years. The 2007 age-five ocean abundance forecast was 1.63 times its postseason estimate (Table 2); the age-five predictor has underestimated abundance in 13 of the 21 previous years.

Proportion of Natural Spawners Forecast

The age-specific proportion of natural area spawners is also forecast using sibling regression. In this case, the age *a* observed proportion natural for calendar years 1997-2007 were regressed against the age *a-1* observed proportion natural of their respective cohorts (Table 4, Figure 2). Data for calendar years prior to 1996 were not used because: (1) at this time the hatcheries did not always have an open-door policy (some fish were denied entry into the hatcheries and presumably spawned in natural areas); and (2) the proportion natural time-series (Figure 2a) indicates a shift-point near 1995-1996. The regressions were fit using ordinary least-squares for age-three and age-four. For age-five, the slope of the relationship was insignificant, and the arithmetic mean was used as the predictor.

The 2007 proportion natural forecast for age-three, -four, and -five fish was 0.52, 0.60, 0.72, respectively, and the corresponding post-season estimates are 0.61, 0.87, 0.68, respectively (Table 4).

Historical Harvest Levels and Rates

Historical (1986-2007) ocean and river harvest levels and rates of age-three and age-four Klamath River fall Chinook are listed in Table 5. The 2007 age-four ocean harvest rate (preliminary) postseason estimate of 21.0% is greater than the preseason forecast of 16.0% (PFMC 2007).

2007 Ocean Fishery Fall Harvest

Klamath River fall Chinook ocean harvests during the 2007 fall period are estimated postseason through expansion of the coded-wire tags (all release types) recovered in those fisheries. Each coded-wire tag recovery is expanded for sampling and mark-rate, and then to account for the harvest of natural-origin fish, further expanded by the estimated basin-wide escapement (hatchery- plus natural-origin) per hatchery-origin fish observed in the river run just prior to these fall fisheries (same brood and calendar year).

2008 Forecasts

The 2008 forecasts of ocean stock abundance and proportion natural area spawners are (Figures 1 and 2):

<i>Age</i>	<i>Abundance</i>	<i>Proportion Natural</i>
3	31,600	0.62
4	157,200	0.65
5	1,900	0.72

For the 2007 ocean fall fisheries, the natural production multipliers for the coded-wire tag recoveries are:

<i>Age (a)</i>	<i>Total Escapement (a-1)</i>	<i>Hatchery-origin Escapement (a-1)</i>	<i>Natural-production Multiplier (a)</i>
3	1,661	350	4.75
4	112,207	60,737	1.85
5	16,712	4,547	3.68

The fishery-area-month-age-specific estimated harvests are presented in Table 6. These estimated fall landings will be accounted for in ocean fisheries harvest allocation in 2008, and the associated harvest impacts will be deducted from the September 1 ocean abundance forecasts.

KOHM principal forecast results under two management scenarios: (A) no additional ocean fisheries (commercial and recreational) from Jan–Aug 2008 between Cape Falcon and Point Sur (an estimated 4521 Klamath River fall Chinook were harvested in the ocean during the Sept–Nov 2007 period) and no Klamath River fisheries (tribal and recreational) in 2008, and (B) status quo regulations: the 2007 ocean fishery seasons and quotas, the 2007 river recreational allocation of 26% (of nontribal harvest), and a tribal allocation of 50% (of total harvest); are provided in Appendices B and C, respectively.

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Acknowledgements

The Klamath River Technical Advisory Team thanks Allen Grover and Jennifer Simon of the California Department of Fish and Game, and Michael O'Farrell of the National Marine Fisheries Service, for their expert assistance in producing this report.

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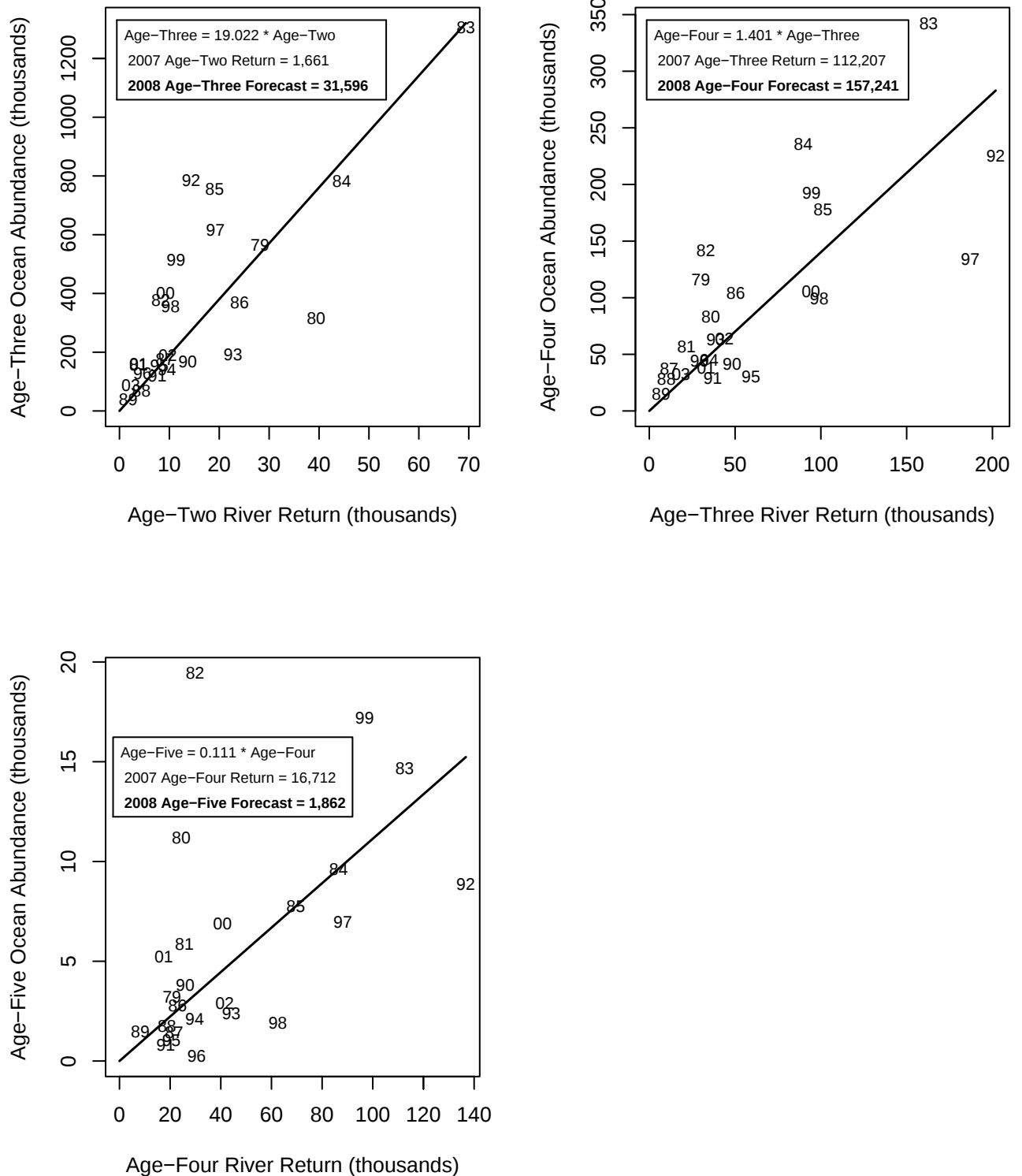


Figure 1. Regression estimators for Klamath River fall Chinook ocean abundance (Sept. 1) based on that year's river return of same cohort. Numbers in plots denote brood years.

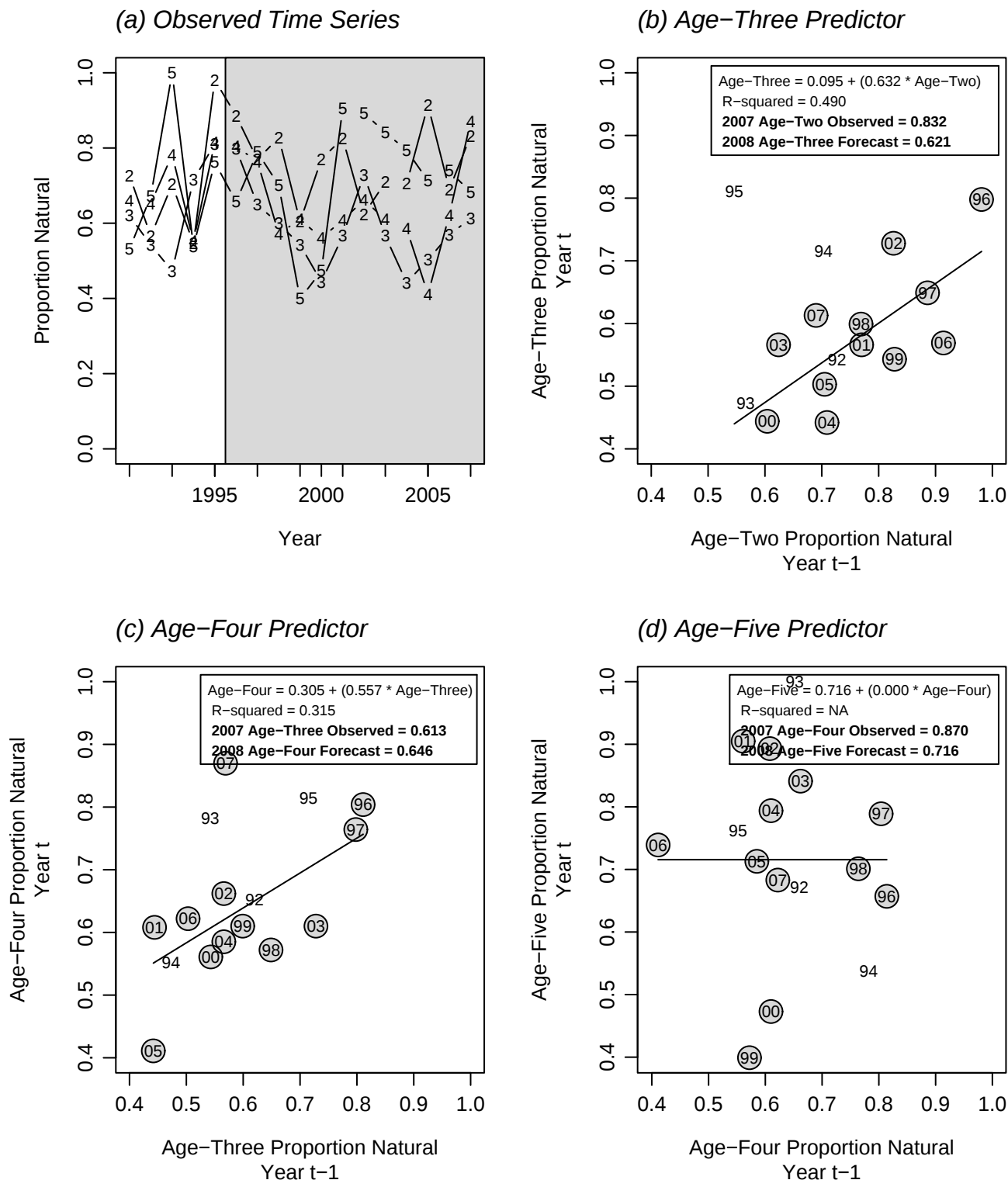


Figure 2. Age-specific proportion of natural area spawners. Panel (a): observed time-series; numbers in plot denote age; shaded area depicts data used for predictor. Panels (b)–(d): age-specific predictor based on previous-year observed proportion for same cohort; numbers in plots denote years 1992–2007; shaded circles indicate years used for predictor; age-three and age-four are regression predictors; age-five predictor is arithmetic mean.

Table 1. Klamath River fall Chinook ocean abundance (thousands), ocean harvest rate, and river-run size estimates (thousands) by age.

Calendar Year(t)	Ocean Abundance Sept1(t-1)			Annual Ocean Harvest Rate Sept1(t-1) thru Aug31(t)		Klamath Basin River Run (t)				Total Adults
	Age 3	Age 4	Total	Age 3	Age 4	Age 2	Age 3	Age 4	Age 5	
1981	493.2	57.0	550.2	0.21	0.53	28.2	64.1	14.4	1.8	80.3
1982	566.2	133.4	699.6	0.30	0.52	39.4	30.1	33.9	2.6	66.6
1983	316.5	116.3	432.9	0.19	0.60	3.8	35.9	20.7	0.9	57.5
1984	156.6	83.4	240.0	0.08	0.38	8.3	21.7	24.4	1.1	47.2
1985	376.5	56.6	433.1	0.11	0.24	69.4	32.9	25.7	5.8	64.4
1986	1,305.8	141.8	1,447.6	0.18	0.46	44.6	162.9	29.8	2.3	195.0
1987	782.0	342.6	1,124.6	0.16	0.43	19.1	89.7	112.6	6.8	209.1
1988	756.9	235.5	992.4	0.20	0.39	24.1	101.2	86.5	3.9	191.6
1989	370.3	177.7	548.0	0.15	0.36	9.1	50.4	69.6	4.3	124.3
1990	176.1	104.1	280.3	0.30	0.55	4.4	11.6	22.9	1.3	35.9
1991	69.4	37.2	106.6	0.03	0.18	1.8	10.0	21.6	1.1	32.7
1992	39.5	28.2	67.7	0.02	0.07	13.7	6.9	18.8	1.0	26.7
1993	168.5	15.0	183.5	0.05	0.16	7.6	48.3	8.2	0.7	57.2
1994	119.9	41.7	161.6	0.03	0.09	14.4	37.0	26.0	1.0	64.0
1995	784.3	28.7	813.0	0.04	0.14	22.8	201.9	18.3	2.6	222.8
1996	192.3	225.5	417.8	0.05	0.16	9.5	38.8	136.7	0.3	175.8
1997	140.4	62.8	203.3	0.01	0.06	8.0	35.0	44.2	4.6	83.7
1998	154.8	44.9	199.7	0.00	0.09	4.6	59.2	29.7	1.7	90.6
1999	129.4	30.5	159.8	0.01	0.09	19.2	29.2	20.5	1.3	51.0
2000	617.6	44.3	661.9	0.06	0.10	10.2	187.1	30.5	0.5	218.1
2001	357.1	133.9	491.0	0.03	0.09	11.3	99.1	88.2	0.2	187.4
2002	514.5	99.5	614.0	0.02	0.15	9.2	94.6	62.5	3.7	160.8
2003	401.1	192.6	593.7	0.08	0.21	3.8	94.3	96.8	0.9	191.9
2004	160.2	105.3	265.6	0.12	0.34	9.7	33.2	40.7	5.3	79.2
2005	190.6	38.2	228.8	0.02	0.20	2.3	43.8	17.5	3.9	65.2
2006	88.7 ^{a/}	63.4	152.1	0.01 ^{a/}	0.10	26.9	18.5	41.6	1.3	61.4
2007	521.4 ^{b/}	32.5 ^{a/}	553.9	---- ^{c/}	0.21 ^{a/}	1.7	112.2	16.7	1.6	130.5

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

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

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

Table 2. 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/}	Postseason Estimate	Pre/Postseason
	Sept 1 (t-1)	Sept 1 (t-1)	
Age-Three			
1985	113,000	276,000	0.41
1986	426,000 ^{b/}	1,305,782	0.33
1987	511,800	782,032	0.65
1988	370,800	756,908	0.49
1989	450,600	370,328	1.22
1990	479,000	176,133	2.72
1991	176,200	69,442	2.54
1992	50,000	39,485	1.27
1993	294,400	168,473	1.75
1994	138,000	119,913	1.15
1995	269,000	784,279	0.34
1996	479,800	192,290	2.50
1997	224,600	140,421	1.60
1998	176,000	154,819	1.14
1999	84,800	129,355	0.66
2000	349,600	617,573	0.57
2001	187,200	357,085	0.52
2002	209,000	514,524	0.41
2003	171,300	401,092	0.43
2004	72,100	160,243	0.45
2005	185,700	190,568	0.97
2006	44,100	88,652	0.50
2007 ^{c/}	515,400	521,412	0.99
Age-Four			
1985	56,875	57,500	0.99
1986	66,250	141,772	0.47
1987	206,125	342,555	0.60
1988	186,375	235,535	0.79
1989	215,500	177,655	1.21
1990	50,125	104,131	0.48
1991	44,625	37,172	1.20
1992	44,750	28,181	1.59
1993	39,125	15,028	2.60
1994	86,125	41,736	2.06
1995	47,000	28,725	1.64
1996	268,500	225,526	1.19
1997	53,875	62,830	0.86
1998	46,000	44,889	1.02
1999	78,750	30,468	2.58
2000	38,875	44,346	0.88
2001	247,000	133,869	1.85
2002	143,800	99,464	1.45
2003	132,400	192,598	0.69
2004	134,500	105,346	1.28
2005	48,900	38,239	1.28
2006	63,700	63,446	1.00
2007 ^{c/}	26,100	32,494	0.80

Table 2. Comparisons of preseason forecast and postseason estimates for ocean abundance of adult Klamath River fall Chinook (Page 2 of 2).

Preseason Forecast ^{a/}		Postseason Estimate	Pre/Postseason
Year (t)	Sept 1 (t-1)	Sept 1 (t-1)	
Age-Five			
1985 ^{d/}	--	11,187	--
1986 ^{d/}	--	5,855	--
1987	5,250	19,443	0.27
1988	13,250	14,669	0.90
1989	10,125	9,627	1.05
1990	7,625	7,776	0.98
1991	1,500	2,774	0.54
1992	1,250	1,444	0.87
1993	1,125	1,759	0.64
1994	500	1,462	0.34
1995	2,000	3,805	0.53
1996	1,125	787	1.43
1997	7,875	8,859	0.89
1998	3,250	2,389	1.36
1999	2,000	2,106	0.95
2000	1,375	1,051	1.31
2001	1,250	258	4.84
2002	9,700	6,970	1.39
2003	6,500	1,917	3.39
2004	9,700	17,196	0.56
2005	5,200	6,893	0.75
2006	2,200	5,242	0.42
2007	4,700	2,886	1.63
Total Adults			
1985 ^{d/}	169,875	344,687	0.49
1986 ^{d/}	492,250	1,453,409	0.34
1987	723,175	1,144,030	0.63
1988	570,425	1,007,112	0.57
1989	676,225	557,610	1.21
1990	536,750	288,040	1.86
1991	222,325	109,388	2.03
1992	96,000	69,110	1.39
1993	334,650	185,260	1.81
1994	224,625	163,111	1.38
1995	318,000	816,809	0.39
1996	749,425	418,603	1.79
1997	286,350	212,110	1.35
1998	225,250	202,097	1.11
1999	165,550	161,929	1.02
2000	389,850	662,970	0.59
2001	435,450	491,212	0.89
2002	362,500	620,958	0.58
2003	310,200	595,607	0.52
2004	216,300	282,785	0.76
2005	239,800	235,700	1.02
2006	110,000	157,340	0.70
2007 ^{c/}	546,200	556,792	0.98

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.

d/ Age-5 preseason ocean abundance forecast unavailable.

Table 3. Summary of management objectives and predictor performance for Klamath River fall Chinook.

Year (t)	Preseason Ocean Abundance Forecast ^{a/}		Postseason Ocean Abundance Estimate		Preseason Age-4 Harvest Rate Forecast ^{b/}		Postseason Age-4 Harvest Rate Estimate ^{c/}		Preseason Adult Harvest Forecast		Postseason Adult Harvest Estimate	
	Sept 1 (t-1)		Sept 1 (t-1)		Forecast ^{b/}		Rate Estimate ^{c/}		Harvest Forecast		Harvest Estimate	
	Age-3	Age-4	Age-3	Age-4	Ocean	River	Ocean	River	Ocean	River	Ocean	River
1986	426,000	66,250	1,305,782	141,772	0.28	0.50	0.46	0.67	72,000	37,700	304,512	46,154
1987	511,800	206,125	782,032	342,555	0.28	0.53	0.43	0.44	121,200	78,200	277,104	73,265
1988	370,800	186,375	756,908	235,535	0.31	0.53	0.39	0.52	114,100	65,400	254,444	73,854
1989	450,600	215,500	370,328	177,655	0.30	0.49	0.36	0.70	128,100	67,600	125,523	54,340
1990	479,000	50,125	176,133	104,131	0.30	0.49	0.55	0.36	85,100	31,200	114,911	11,459
1991	176,200	44,625	69,442	37,172	0.13	0.28	0.18	0.45	16,700	12,800	9,871	13,581
1992	50,000	44,750	39,485	28,181	0.06	0.15	0.07	0.27	4,200	4,200	3,140	6,787
1993	294,400	39,125	168,473	15,028	0.12	0.43	0.16	0.49	20,100	22,500	11,354	12,808
1994	138,000	86,125	119,913	41,736	0.07	0.20	0.09	0.29	10,400	14,300	8,889	13,524
1995	269,000	47,000	784,279	28,725	0.07	0.32	0.14	0.19	13,500	18,500	32,230	21,637
1996	479,800	268,500	192,290	225,526	0.17	0.66	0.16	0.39	88,400	129,100	45,147	69,241
1997	224,600	53,875	140,421	62,830	0.10	0.43	0.06	0.26	17,600	26,500	8,657	17,764
1998	176,000	46,000	154,819	44,889	0.07	0.29	0.09	0.30	10,200	14,800	5,012	17,897
1999	84,800	78,750	129,355	30,468	0.10	0.28	0.09	0.45	12,300	18,100	5,126	16,942
2000	349,600	38,875	617,573	44,346	0.11	0.53	0.10	0.25	24,000	32,400	42,336	35,066
2001	187,200	247,000	357,085	133,869	0.14	0.61	0.09	0.29	45,600	105,300	21,783	50,780
2002	209,000	143,800	514,524	99,464	0.13	0.57	0.15	0.26	30,000	70,900	29,436	35,069
2003	171,300	132,400	401,092	192,598	0.16	0.50	0.21	0.28	30,600	52,200	71,124	39,715
2004	72,100	134,500	160,243	105,346	0.15	0.38	0.34	0.48	26,500	35,800	64,264	29,807
2005	185,700	48,900	190,568	38,239	0.08	0.16	0.20	0.19	7,100	9,600	13,228	10,001
2006	44,100	63,700	88,652	63,446	0.11	0.23	0.10	0.18	10,000	10,000	10,457	10,345
2007 ^{d/}	515,400	26,100	521,412	32,494	0.16	0.63	0.21	0.56	30,200	51,400	28,551	33,282

a/ Original preseason forecast 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 Aug 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 (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 Aug 31(t). River harvest rate is the fraction of the river run harvested by river fisheries.

d/ Preliminary.

Table 4. Numbers of hatchery and natural adult fall Chinook spawners in the Klamath Basin by age.^{a/}

Year	Hatchery Spawners					Natural Area Spawners					Proportion Natural				
	Age 2	Age 3	Age 4	Age 5	Adults	Age 2	Age 3	Age 4	Age 5	Adults	Age 2	Age 3	Age 4	Age 5	Adults
1985					22,500					25,700					0.53
1986					32,900					113,400					0.78
1987					29,100					101,700					0.78
1988					33,500					79,400					0.70
1989					22,000					43,900					0.67
1990					8,100					15,600					0.66
1991	270	2,426	3,827	232	6,485	718	3,956	7,430	263	11,649	0.73	0.62	0.66	0.53	0.64
1992	3,948	2,576	4,627	157	7,360	5,143	3,051	8,657	321	12,029	0.57	0.54	0.65	0.67	0.62
1993	1,619	20,797	846	0	21,643	3,825	18,629	3,039	190	21,858	0.70	0.47	0.78	1.00	0.50
1994	5,200	8,864	8,016	192	17,072	6,245	22,230	9,879	224	32,333	0.55	0.71	0.55	0.54	0.65
1995	335	34,737	2,716	406	37,859	17,324	148,639	11,856	1,298	161,793	0.98	0.81	0.81	0.76	0.81
1996	792	4,360	15,649	24	20,033	6,174	17,232	64,048	46	81,326	0.89	0.80	0.80	0.66	0.80
1997	1,272	10,484	7,560	618	18,662	4,225	19,343	24,493	2,308	46,144	0.77	0.65	0.76	0.79	0.71
1998	595	20,411	8,588	220	29,219	2,855	30,509	11,462	517	42,488	0.83	0.60	0.57	0.70	0.59
1999	6,857	10,046	4,081	200	14,327	10,447	11,927	6,396	133	18,456	0.60	0.54	0.61	0.40	0.56
2000	1,909	87,643	9,833	136	97,612	6,394	70,042	12,565	122	82,729	0.77	0.44	0.56	0.47	0.46
2001	1,631	31,306	23,802	4	55,112	7,747	40,908	36,889	38	77,835	0.83	0.57	0.61	0.90	0.59
2002	2,331	15,867	11,177	137	27,181	3,867	42,557	21,932	1,146	65,635	0.62	0.73	0.66	0.89	0.71
2003	864	35,403	26,295	84	61,782	2,102	46,116	41,084	444	87,644	0.71	0.57	0.61	0.84	0.59
2004	1,981	14,505	8,205	271	22,981	4,730	11,469	11,567	1,043	24,079	0.70	0.44	0.59	0.79	0.51
2005	101	18,583	8,187	929	27,699	1,068	18,778	5,705	2,307	26,790	0.91	0.50	0.41	0.71	0.49
2006	6,462	6,791	12,495	235	19,521	14,382	8,969	20,528	664	30,161	0.69	0.57	0.62	0.74	0.61
2007	214	34,017	852	122	34,991	1,061	53,788	5,680	263	59,731	0.83	0.61	0.87	0.68	0.63

a/ Age structure of hatchery and natural area spawners not available prior to 1991.

Table 5. Harvest levels and rates of age-three and age-four Klamath River fall Chinook. (Page 1 of 2)

Year(t)	Ocean Fisheries (Sept 1(t-1) through Aug 31(t))						Ocean Total	River Fisheries (t)		
	KMZ			North of	South of	Subtotal		Net	Sport	Total
	Troll	Sport	Subtotal	KMZ	KMZ					
HARVEST (numbers of fish)										
Age-Three										
1986	35,630	4,876	40,506	73,913	122,913	196,826	237,332	8,100	18,100	26,200
1987	17,231	5,083	22,314	42,875	56,362	99,237	121,551	11,400	11,400	22,800
1988	15,996	5,164	21,160	24,312	107,949	132,261	153,421	12,500	15,600	28,100
1989	6,462	11,793	18,255	15,368	23,750	39,118	57,373	2,700	900	3,600
1990	81	4,357	4,438	36,578	11,006	47,584	52,022	1,300	1,400	2,700
1991	0	1,022	1,022	343	810	1,153	2,175	2,123	1,277	3,400
1992	0	0	0	971	0	971	971	970	251	1,221
1993	0	822	822	833	6,424	7,257	8,079	5,426	2,917	8,343
1994	42	604	646	0	3,387	3,387	4,033	4,543	965	5,508
1995	0	999	999	12,211	14,808	27,019	28,018	11,840	5,536	17,376
1996	0	0	0	0	9,312	9,312	9,312	12,363	3,661	16,024
1997	0	232	232	620	1,215	1,835	2,067	2,166	2,736	4,902
1998	0	6	6	298	466	764	770	2,231	5,781	8,012
1999	63	180	243	1,262	433	1,695	1,938	4,981	1,748	6,729
2000	404	3,282	3,686	8,730	25,206	33,936	37,622	22,458	4,893	27,351
2001	113	105	218	2,765	6,088	8,853	9,071	17,885	7,294	25,179
2002	220	783	1,003	1,623	9,912	11,535	12,538	11,734	6,258	17,992
2003	173	679	852	2,026	27,312	29,338	30,190	6,996	5,061	12,057
2004	403	971	1,374	9,902	7,337	17,239	18,613	4,679	2,051	6,730
2005	0	568	568	889	2,381	3,270	3,838	4,394	1,641	6,035
2006 ^{a/}	0	465	465	31	332	363	828	2,388	13	2,401
2007 ^{a/}	719	7,518	8,237	4,111	8,649	12,760	20,997	17,422	5,356	22,778
Age-Four										
1986	7,797	1,120	8,917	23,560	32,131	55,691	64,608	17,000	2,900	19,900
1987	21,727	4,427	26,154	71,123	48,812	119,935	146,089	41,000	8,500	49,500
1988	11,867	3,598	15,465	26,950	50,278	77,228	92,693	38,600	6,200	44,800
1989	6,062	9,735	15,797	32,428	16,608	49,036	64,833	41,000	7,700	48,700
1990	4,000	2,916	6,916	39,760	10,608	50,368	57,284	6,000	2,200	8,200
1991	0	1,001	1,001	1,513	4,135	5,648	6,649	7,593	2,016	9,609
1992	171	55	226	1,781	12	1,793	2,019	4,360	723	5,083
1993	0	0	0	849	1,615	2,464	2,464	3,786	243	4,029
1994	0	1,124	1,124	1,168	1,499	2,667	3,791	6,666	818	7,484
1995	0	242	242	1,879	1,771	3,650	3,892	2,957	480	3,437
1996	773	3,464	4,237	10,336	20,738	31,074	35,311	43,959	9,080	53,039
1997	3	172	175	463	2,995	3,458	3,633	8,734	2,586	11,320
1998	0	105	105	4,062	0	4,062	4,167	7,164	1,822	8,986
1999	15	381	396	1,667	696	2,363	2,759	8,789	494	9,283
2000	117	895	1,012	2,484	1,076	3,560	4,572	6,733	756	7,489
2001	1,312	1,604	2,916	5,830	3,927	9,757	12,673	20,759	4,819	25,578
2002	1,938	827	2,765	3,226	9,416	12,642	15,407	11,929	4,063	15,992
2003	834	918	1,752	8,154	30,002	38,156	39,908	22,754	4,592	27,346
2004	1,422	1,215	2,637	11,667	21,960	33,627	36,264	17,623	1,751	19,374
2005	247	317	564	5,355	1,910	7,265	7,829	3,048	304	3,352
2006	196	725	921	4,267	984	5,251	6,172	7,569	42	7,611
2007 ^{a/}	259	2,248	2,507	1,945	2,361	4,306	6,813	8,923	471	9,394

Table 5. Harvest levels and rates of age-three and age-four Klamath River fall Chinook. (Page 2 of 2)

Year(t)	Ocean Fisheries (Sept 1(t-1) through Aug 31(t))						Ocean Total	River Fisheries (t)		
	KMZ			North of	South of	Net		Sport	Total	
	Troll	Sport	Subtotal	KMZ	KMZ					Subtotal
HARVEST RATE ^{b/}										
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	0.05	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	0.02	0.12	0.07	0.19
2003	0.00	0.00	0.00	0.01	0.07	0.07	0.08	0.07	0.05	0.13
2004	0.00	0.01	0.01	0.06	0.05	0.11	0.12	0.14	0.06	0.20
2005	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.10	0.04	0.14
2006 ^{a/}	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.13	0.00	0.13
2007 ^{a/}	0.00	0.01	0.02	0.01	0.02	0.02	0.04	0.16	0.05	0.20
Age-Four										
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	0.00	0.01	0.04	0.16	0.20	0.21	0.24	0.05	0.28
2004	0.01	0.01	0.03	0.11	0.21	0.32	0.34	0.43	0.04	0.48
2005	0.01	0.01	0.01	0.14	0.05	0.19	0.20	0.17	0.02	0.19
2006	0.00	0.01	0.01	0.07	0.02	0.08	0.10	0.18	0.00	0.18
2007 ^{a/}	0.01	0.07	0.08	0.06	0.07	0.13	0.21	0.53	0.03	0.56

a/ Preliminary data (incomplete cohort).

b/ Ocean harvest rates are the fraction of Sept 1(t-1) ocean abundance harvested in these fisheries. River harvest rates are the fraction of the river run (t) harvested in these fisheries.

Table 6. Fall 2007 (September - November) ocean landings of Klamath River fall Chinook by fishery, age, and KOHM area.^{a/}

COMMERCIAL FISHERY										
KOHM area	Age 3			Age 4			Age 5			Total
	Sept	Oct	Nov	Sept	Oct	Nov	Sept	Oct	Nov	
NO	--	--	--	--	--	--	--	--	--	0
CO	--	--	--	148	--	--	36	--	--	184
KO	--	--	--	133	--	--	129	--	--	262
KC	--	--	--	2,742	--	--	474	--	--	3,216
FB	--	--	--	--	--	--	--	--	--	0
SF	--	--	--	39	--	--	--	--	--	39
MO	--	--	--	--	--	--	--	--	--	0
Total	0	0	0	3,062	0	0	639	0	0	3,702

SPORT FISHERY										
KOHM area	Age 3			Age 4			Age 5			Total
	Sept	Oct	Nov	Sept	Oct	Nov	Sept	Oct	Nov	
NO	--	--	--	32	--	--	44	--	--	76
CO	--	--	--	96	--	--	44	--	--	140
KO	--	--	--	197	20	--	52	--	--	269
KC	--	--	--	335	--	--	--	--	--	335
FB	--	--	--	--	--	--	--	--	--	0
SF	--	--	--	--	--	--	--	--	--	0
MO	--	--	--	--	--	--	--	--	--	0
Total	0	0	0	659	20	0	141	0	0	820

^{a/} KOHM areas are as follows: NO=Newport & Tillamook; CO=Coos Bay; KO=Klamath Management Zone in Oregon; KC=Klamath Management Zone in California; FB=Fort Bragg; SF=San Francisco; and MO=Monterey.

Appendix A. Yurok fisheries coded-wire tag expansion

For the 2007 run, an unusually small number of coded-wire tags (CWTs) were recovered from the three Yurok fisheries (estuary, middle Klamath, and upper Klamath) operating in the lower Klamath River (below the confluence of the Klamath and Trinity rivers at Weitchpec). Most notably, the number of CWTs recovered per sampled fish (hereafter, CWT rate) in the Yurok estuary fishery was nearly an order of magnitude lower than the CWT rate expected for this fishery, based on data from fisheries and sampling programs upstream in both the Klamath and Trinity Basins. To adjust for this, a CWT expansion was calculated and applied to the observed Yurok CWT rate.

The age-specific CWT rate (t_a) for areas upstream of the Yurok fisheries was calculated from the estimated river run size in the upper Klamath and the Trinity rivers, and the total number of CWT returns:

$$t_a = \frac{T_a}{R_a} \quad a = 3, 4.$$

Here, T_a is the age-specific, total number of CWTs recovered, and R_a is the age-specific total run size estimate, for the upper Klamath and Trinity rivers combined. This calculation reflects the age-specific CWT rate that should be observed in the lower Klamath River where the Yurok fisheries operate.

To calculate the expected CWT rate in the Yurok fisheries, age-structure information from the Yurok catch must be paired with t_a .

$$p_3 = H_3 / \sum_a H_a \quad a = 2, 3, 4, 5$$

$$p_{4,5} = (H_4 + H_5) / \sum_a H_a \quad a = 2, 3, 4, 5$$

H_a is the age-specific harvest for the three Yurok fisheries, p_3 is the proportion of age-3 fish and $p_{4,5}$ is the lumped proportion of age-4 and -5 fish in the total catch.

The total, expected CWT rate ($\hat{t}$) for the Yurok fisheries was then calculated in the following manner:

$$\hat{t} = (t_3 \cdot p_3) + (t_4 \cdot p_{4,5}).$$

This CWT rate is the expected rate for the catch in each of the three Yurok fisheries. However, the observed CWT rate for the catch in the three Yurok fisheries ($\hat{t}_{obs, f}$) differed, and thus a different CWT expansion was needed for each of these fisheries. The CWT expansion calculated for the Yurok fisheries reflects the relative differences between $\hat{t}_{obs, f}$ and $\hat{t}$:

$$\text{CWT expansion}_f = \hat{t} / \hat{t}_{obs, f} \quad f = \text{estuary, middle Klamath, and upper Klamath Yurok fisheries.}$$

Absent fishing:	119142
Hatcheries:	42251
Natural areas:	76891

Total:	4521
River:	0
Ocean:	4521

Non-tribal:	4521		
River:	0	0.000	(objective: 0)
Ocean troll:	3702		
CA / OR:	0.880 / 0.120		
Ocean sport:	820		
KMZ:	604	0.134	
Age-four o.harv.rate:	0.024		(objective: <= 0.16)

[illegible]

MO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
Total	800	20	0	0	0	0	0	0	0	0	0	0	0	820	NA	NA

Chinook Harvest (All Stocks): Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	200	300	100	NA	NA	NA	0	0	0	0	0	0	600
CO	500	500	600	NA	NA	NA	0	0	0	0	0	0	1600
KO	400	200	50	NA	NA	NA	NaN	NaN	0	0	0	0	650
KC	8800	NA	NA	NA	NA	NA	NA	NA	0	0	0	0	8800
FB	200	NA	NA	NA	NA	NA	NA	NaN	0	0	0	0	200
SF	2100	400	NA	NA	NA	NA	NA	NaN	0	0	0	0	2500
MO	100	NA	NA	NA	NA	NA	NA	NaN	0	0	0	0	100
Total	12300	1400	750	NA	NA	NA	0	0	0	0	0	0	14450

Chinook Harvest (All Stocks): Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	500	400	NA	NA	NA	NA	NaN	NaN	0	0	0	0	900
CO	200	0	NA	NA	NA	NA	NaN	NaN	0	0	0	0	200
KO	300	500	NA	NA	NA	NA	NA	NA	0	0	0	0	800
KC	1800	NA	NA	NA	NA	NA	NA	NaN	0	0	0	0	1800
FB	0	0	0	NA	NA	NaN	NaN	0	0	0	0	0	0
SF	300	400	300	NA	NA	0	0	0	0	0	0	0	1000
MO	100	0	NA	NA	NA	NaN	0	0	0	0	0	0	100
Total	3200	1300	300	NA	NA	0	0	0	0	0	0	0	4800

Klamath Contribution Rates: Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	0.000	0	0	NA	NA	NA	0.228	0.065	0.169	0.057	0.119	0.135
CO	0.369	0	0	NA	NA	NA	0.190	0.117	0.108	0.137	0.219	0.268
KO	0.654	0	0	NA	NA	NA	0.000	0.000	0.180	0.255	0.312	0.293
KC	0.365	NA	NA	NA	NA	NA	NA	NA	0.772	0.490	0.451	0.460
FB	0.000	NA	NA	NA	NA	NA	0.171	0.171	0.338	0.412	0.311	0.122
SF	0.019	0	NA	NA	NA	NA	NA	0.000	0.119	0.183	0.145	0.047
MO	0.000	NA	NA	NA	NA	NA	NA	0.000	0.041	0.053	0.088	0.004

Klamath Contribution Rates: Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	0.152	0.00	NA	NA	NA	NA	0.000	0.000	0.051	0.010	0.056	0.115
CO	0.698	NaN	NA	NA	NA	NA	0.000	0.000	0.166	0.032	0.072	0.042
KO	0.832	0.04	NA	NA	NA	NA	NA	NA	0.044	0.070	0.172	0.342
KC	0.186	NA	NA	NA	NA	NA	NA	0.000	0.170	0.209	0.164	0.261
FB	NaN	NaN	NaN	NA	NA	0.000	0.000	0.043	0.093	0.106	0.080	0.035
SF	0.000	0.00	0	NA	NA	0.007	0.001	0.029	0.012	0.033	0.015	0.001
MO	0.000	NaN	NA	NA	NA	0.000	0.001	0.014	0.004	0.005	0.012	0.013

Season Effort: Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
CO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
KO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
SF	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
MO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
Total	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0

Season Effort: Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
CO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
KO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
SF	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
MO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
Total	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0

Quota Effort: Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FB	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Quota Effort: Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FB	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Total Effort: Troll

Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Total

NO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
CO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
KO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
SF	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
MO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
Total	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0

Total Effort: Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
CO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
KO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
SF	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
MO	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
Total	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0

Days open: ocean troll, type 0

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
CO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	0	0	0
SF	NA	NA	NA	NA	0	0	0	0	0	0	0	0
MO	NA	NA	NA	NA	0	0	0	0	0	0	0	0

Days open: ocean troll, type 1

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
CO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	0	0	0
SF	NA	NA	NA	NA	0	0	0	0	0	0	0	0
MO	NA	NA	NA	NA	0	0	0	0	0	0	0	0

Days open: ocean troll, type 2

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
CO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	0	0	0
SF	NA	NA	NA	NA	0	0	0	0	0	0	0	0
MO	NA	NA	NA	NA	0	0	0	0	0	0	0	0

Days open: ocean sport, type 0

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	0	0	0	0	0	0	0	0

CO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	0	0	0
SF	NA	NA	NA	NA	0	0	0	0	0	0	0	0
MO	NA	NA	NA	NA	0	0	0	0	0	0	0	0

Days open: ocean sport, type 1

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
CO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	0	0	0
SF	NA	NA	NA	NA	0	0	0	0	0	0	0	0
MO	NA	NA	NA	NA	0	0	0	0	0	0	0	0

Chinook Quotas (All Stocks): ocean troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FB	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Chinook Quotas (All Stocks): ocean sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FB	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Size limits: ocean

	fishery	month	area	limit
1		10	9	NO 28
2		10	10	NO 28
3		10	4	NO 28
4		10	5	NO 28
5		10	6	NO 28
6		10	7	NO 28
7		10	8	NO 28
8		10	9	CO 28
9		10	10	CO 28
10		10	4	CO 28
11		10	5	CO 28
12		10	6	CO 28
13		10	7	CO 28
14		10	8	CO 28

15	10	9	KO	28
16	10	4	KO	28
17	10	5	KO	28
18	10	6	KO	28
19	10	7	KO	28
20	10	8	KO	28
21	10	9	KC	28
22	10	9	FB	27
23	10	4	FB	27
24	10	8	FB	28
25	10	9	SF	27
26	10	10	SF	27
27	10	5	SF	27
28	10	7	SF	28
29	10	8	SF	28
30	10	9	MO	27
31	10	5	MO	27
32	10	7	MO	28
33	10	8	MO	28
34	40	9	NO	24
35	40	10	NO	24
36	40	3	NO	24
37	40	4	NO	24
38	40	5	NO	24
39	40	6	NO	24
40	40	7	NO	24
41	40	8	NO	24
42	40	9	CO	24
43	40	10	CO	24
44	40	3	CO	24
45	40	4	CO	24
46	40	5	CO	24
47	40	6	CO	24
48	40	7	CO	24
49	40	8	CO	24
50	40	9	KO	24
51	40	5	KO	24
52	40	6	KO	24
53	40	7	KO	24
54	40	8	KO	24
55	40	9	KC	24
56	40	5	KC	24
57	40	6	KC	24
58	40	7	KC	24
59	40	8	KC	24

Allocation objective:
Tribes: 0
River Recreational: 0

Appendix C. KOHM: Summary Output. Fri Feb 22 10:39:34 2008
2008 stock projections; 2007 regulations.

Klamath Escapement

Absent fishing: 119142
Hatcheries: 42251
Natural areas: 76891

With fishing
Mature adults: 94391
Strays: 301
Klamath Basin: 94090
Spawners: 41841
Hatcheries: 14905
Natural areas: 26936
Reduction rate: 0.650

Klamath Harvest

Total: 77277
River: 48684
Ocean: 28592

Tribal: 38638 0.500 (objective: 0.500)

Non-tribal: 38638
River: 10046 0.260 (objective: 0.260)
Ocean troll: 23915
CA / OR: 0.639 / 0.361
Ocean sport: 4678
KMZ: 3215 0.112
Age-four o.harv.rate: 0.168 (objective: <= 0.16)

Klamath Harvest: ocean troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total	%CA
NO	0	0	0	0	0	0	0	198	693	248	337	844	2319	NA
CO	184	0	0	0	0	0	0	363	600	578	1127	1675	4527	NA
KO	262	0	0	0	0	0	0	0	85	407	499	528	1781	NA
KC	3216	0	0	0	0	0	0	0	0	0	0	0	3216	17.5
FB	0	0	0	0	0	0	0	343	0	0	0	1900	2243	12.2
SF	39	0	0	0	0	0	0	0	1683	0	5249	283	7254	39.5
MO	0	0	0	0	0	0	0	0	1165	0	1389	20	2574	14.0
Total	3702	0	0	0	0	0	0	903	4226	1233	8601	5250	23915	NA

Klamath Harvest: ocean sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total	%CA	%CA.rec
NO	76	0	0	0	0	0	0	0	1	1	30	84	192	NA	NA
CO	140	0	0	0	0	0	0	0	3	24	71	43	281	NA	NA
KO	250	20	0	0	0	0	0	0	10	94	265	492	1131	NA	NA
KC	335	0	0	0	0	0	0	0	229	418	517	585	2084	11.4	67.8
FB	0	0	0	0	0	0	0	7	60	171	208	46	492	2.7	16.0
SF	0	0	0	0	0	0	0	61	34	130	147	6	378	2.1	12.3

MO	0	0	0	0	0	0	0	0	40	11	20	44	6	119	0.7	3.9
Total	800	20	0	0	0	0	0	0	108	348	858	1282	1261	4678	NA	NA

Chinook Harvest (All Stocks): Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	200	300	100	NA	NA	NA	0	3032	4097	4322	2832	6228	21111
CO	500	500	600	NA	NA	NA	0	3112	5582	4226	5155	6242	25917
KO	400	200	50	NA	NA	NA	NaN	NaN	472	1600	1600	1800	6122
KC	8800	NA	NA	NA	NA	NA	NA	NA	0	0	0	0	8800
FB	200	NA	NA	NA	NA	NA	NA	NaN	0	0	0	15521	15721
SF	2100	400	NA	NA	NA	NA	NA	NaN	14179	0	36269	6057	59005
MO	100	NA	NA	NA	NA	NA	NA	NaN	28647	0	15841	5105	49692
Total	12300	1400	750	NA	NA	NA	0	6144	52976	10148	61697	40953	186368

Chinook Harvest (All Stocks): Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	500	400	NA	NA	NA	NA	NaN	NaN	16	119	534	729	2298
CO	200	0	NA	NA	NA	NA	NaN	NaN	21	752	982	1022	2978
KO	300	500	NA	NA	NA	NA	NA	NA	234	1342	1537	1438	5351
KC	1800	NA	NA	NA	NA	NA	NA	NaN	1345	1998	3151	2244	10539
FB	0	0	0	NA	NA	NaN	NaN	170	640	1617	2587	1286	6301
SF	300	400	300	NA	NA	0	0	2089	2777	3997	9863	6621	26346
MO	100	0	NA	NA	NA	NaN	0	2896	2799	4246	3512	423	13976
Total	3200	1300	300	NA	NA	0	0	5155	7833	14072	22167	13764	67789

Klamath Contribution Rates: Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	0.000	0	0	NA	NA	NA	0.228	0.065	0.169	0.057	0.119	0.135
CO	0.369	0	0	NA	NA	NA	0.190	0.117	0.108	0.137	0.219	0.268
KO	0.654	0	0	NA	NA	NA	0.000	0.000	0.180	0.255	0.312	0.293
KC	0.365	NA	NA	NA	NA	NA	NA	NA	0.772	0.490	0.451	0.460
FB	0.000	NA	NA	NA	NA	NA	0.171	0.171	0.338	0.412	0.311	0.122
SF	0.019	0	NA	NA	NA	NA	NA	0.000	0.119	0.183	0.145	0.047
MO	0.000	NA	NA	NA	NA	NA	NA	0.000	0.041	0.053	0.088	0.004

Klamath Contribution Rates: Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	0.152	0.00	NA	NA	NA	NA	0.000	0.000	0.051	0.010	0.056	0.115
CO	0.698	NaN	NA	NA	NA	NA	0.000	0.000	0.166	0.032	0.072	0.042
KO	0.832	0.04	NA	NA	NA	NA	NA	NA	0.044	0.070	0.172	0.342
KC	0.186	NA	NA	NA	NA	NA	NA	0.000	0.170	0.209	0.164	0.261
FB	NaN	NaN	NaN	NA	NA	0.000	0.000	0.043	0.093	0.106	0.080	0.035
SF	0.000	0.00	0	NA	NA	0.007	0.001	0.029	0.012	0.033	0.015	0.001
MO	0.000	NaN	NA	NA	NA	0.000	0.001	0.014	0.004	0.005	0.012	0.013

Season Effort: Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	0	0	0	318	1107	1079	938	986	4427
CO	NA	NA	NA	NA	0	0	0	326	601	701	606	687	2921
KO	NA	NA	NA	NA	0	0	0	10	51	0	0	0	61
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	0	0	1579	1579
SF	NA	NA	NA	NA	0	0	0	0	1836	0	2896	1126	5857
MO	NA	NA	NA	NA	0	0	0	0	3400	0	1924	291	5615
Total	NA	NA	NA	NA	0	0	0	654	6995	1780	6363	4668	20459

Season Effort: Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	0	0	40	88	657	3561	18565	19901	42812
CO	NA	NA	NA	NA	0	0	22	57	396	3423	14139	11328	29365
KO	NA	NA	NA	NA	0	0	0	0	3082	4207	8666	7669	23625
KC	NA	NA	NA	NA	0	0	0	0	5072	7857	14227	8380	35537
FB	NA	NA	NA	NA	0	149	491	944	2424	6666	10080	5175	25928
SF	NA	NA	NA	NA	0	0	0	6464	9253	12526	26099	15588	69930
MO	NA	NA	NA	NA	0	0	0	13447	9829	9271	11100	2939	46586
Total	NA	NA	NA	NA	0	149	553	21000	30714	47510	102876	70982	273783

Quota Effort: Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KO	NA	NA	NA	NA	NA	NA	NA	NA	NA	121	133	166	420
KC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FB	NA	NA	NA	NA	NA	NA	NA	376	NA	NA	NA	NA	376
SF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	NA	NA	NA	NA	NA	NA	NA	376	NA	121	133	166	796

Quota Effort: Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FB	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Total Effort: Troll

Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Total

NO	NA	NA	NA	NA	0	0	0	318	1107	1079	938	986	4427
CO	NA	NA	NA	NA	0	0	0	326	601	701	606	687	2921
KO	NA	NA	NA	NA	0	0	0	10	51	121	133	166	482
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	376	0	0	0	1579	1955
SF	NA	NA	NA	NA	0	0	0	0	1836	0	2896	1126	5857
MO	NA	NA	NA	NA	0	0	0	0	3400	0	1924	291	5615
Total	NA	NA	NA	NA	0	0	0	1030	6995	1901	6496	4834	21256

Total Effort: Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	0	0	40	88	657	3561	18565	19901	42812
CO	NA	NA	NA	NA	0	0	22	57	396	3423	14139	11328	29365
KO	NA	NA	NA	NA	0	0	0	0	3082	4207	8666	7669	23625
KC	NA	NA	NA	NA	0	0	0	0	5072	7857	14227	8380	35537
FB	NA	NA	NA	NA	0	149	491	944	2424	6666	10080	5175	25928
SF	NA	NA	NA	NA	0	0	0	6464	9253	12526	26099	15588	69930
MO	NA	NA	NA	NA	0	0	0	13447	9829	9271	11100	2939	46586
Total	NA	NA	NA	NA	0	149	553	21000	30714	47510	102876	70982	273783

Days open: ocean troll, type 0

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	0	0	0	20	31	30	20	25
CO	NA	NA	NA	NA	0	0	0	20	31	30	20	25
KO	NA	NA	NA	NA	0	0	0	20	31	0	0	0
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	0	0	0
SF	NA	NA	NA	NA	0	0	0	0	23	0	31	0
MO	NA	NA	NA	NA	0	0	0	0	23	0	31	0

Days open: ocean troll, type 1

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
CO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	0	0	29
SF	NA	NA	NA	NA	0	0	0	0	0	0	0	29
MO	NA	NA	NA	NA	0	0	0	0	0	0	0	29

Days open: ocean troll, type 2

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
CO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	0	0	0
SF	NA	NA	NA	NA	0	0	0	0	0	0	0	0
MO	NA	NA	NA	NA	0	0	0	0	8	0	0	0

Days open: ocean sport, type 0

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	0	0	17	30	31	22	0	0

CO	NA	NA	NA	NA	0	0	17	30	31	22	0	0
KO	NA	NA	NA	NA	0	0	0	0	27	30	31	31
KC	NA	NA	NA	NA	0	0	0	0	27	30	31	31
FB	NA	NA	NA	NA	0	12	31	30	31	30	31	31
SF	NA	NA	NA	NA	0	0	0	24	31	30	31	31
MO	NA	NA	NA	NA	0	0	0	24	31	30	31	31

Days open: ocean sport, type 1

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	0	0	0	0	0	8	31	31
CO	NA	NA	NA	NA	0	0	0	0	0	8	31	31
KO	NA	NA	NA	NA	0	0	0	0	0	0	0	0
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	0	0	0
SF	NA	NA	NA	NA	0	0	0	0	0	0	0	0
MO	NA	NA	NA	NA	0	0	0	0	0	0	0	0

Chinook Quotas (All Stocks): ocean troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KO	NA	NA	NA	NA	NA	NA	NA	NA	NA	1600	1600	1800
KC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FB	NA	NA	NA	NA	NA	NA	NA	2000	NA	NA	NA	NA
SF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Chinook Quotas (All Stocks): ocean sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FB	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Size limits: ocean

	fishery	month	area	limit
1		10	9	NO 28
2		10	10	NO 28
3		10	4	NO 28
4		10	5	NO 28
5		10	6	NO 28
6		10	7	NO 28
7		10	8	NO 28
8		10	9	CO 28
9		10	10	CO 28
10		10	4	CO 28
11		10	5	CO 28
12		10	6	CO 28
13		10	7	CO 28
14		10	8	CO 28

15	10	9	KO	28
16	10	4	KO	28
17	10	5	KO	28
18	10	6	KO	28
19	10	7	KO	28
20	10	8	KO	28
21	10	9	KC	28
22	10	9	FB	27
23	10	4	FB	27
24	10	8	FB	28
25	10	9	SF	27
26	10	10	SF	27
27	10	5	SF	27
28	10	7	SF	28
29	10	8	SF	28
30	10	9	MO	27
31	10	5	MO	27
32	10	7	MO	28
33	10	8	MO	28
34	40	9	NO	24
35	40	10	NO	24
36	40	3	NO	24
37	40	4	NO	24
38	40	5	NO	24
39	40	6	NO	24
40	40	7	NO	24
41	40	8	NO	24
42	40	9	CO	24
43	40	10	CO	24
44	40	3	CO	24
45	40	4	CO	24
46	40	5	CO	24
47	40	6	CO	24
48	40	7	CO	24
49	40	8	CO	24
50	40	9	KO	24
51	40	5	KO	24
52	40	6	KO	24
53	40	7	KO	24
54	40	8	KO	24
55	40	9	KC	24
56	40	5	KC	24
57	40	6	KC	24
58	40	7	KC	24
59	40	8	KC	24

Allocation objective:
 Tribes: 0.5
 River Recreational: 0.26