

Ocean Abundance Projections and Prospective Harvest Levels for Klamath River Fall Chinook, 2017 Season

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Summary

Predictor performance for 2016 and forecasts for 2017 are:

	Age	2016			2017 Forecast
		Preseason	Postseason	Pre/Post	
Ocean Abundance	3	93,400	42,400	2.20	42,000
	4	45,100	24,900	1.81	10,600
	5	3,700	1,200	3.17	1,700
Proportion Natural	3	0.66	0.66	1.00	0.59
	4	0.76	0.89	0.85	0.72
	5	0.80	0.76	1.06	0.80
Ocean Harvest Rate	4	0.08	0.09	0.92	-
Ocean Fall Harvest	3	-	82	-	-
	4	-	105	-	-
	5	-	0	-	-

The implications of the 2017 forecast ocean abundances, proportions natural, and the 2016 ocean fall harvest for fisheries management in 2017 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 2017 between Cape Falcon, OR and Point Sur, CA (187 Klamath River fall Chinook were estimated to have been harvested in the ocean during the Sept-Dec 2016 period) and no Klamath River fisheries (tribal and recreational) in 2017, and (B) the 2016 ocean fishery seasons and quotas, the 2016 river recreational allocation of 15.0 percent (of non-tribal harvest), and a tribal allocation of 50% (of total harvest). The results are:

Sector	KOHM Forecasts	
	(A) No-fishing in 2017	(B) 2016 Regulations
Adult Spawners		
Natural Areas	12,300	9,400
Hatcheries	6,400	5,100
Adult Harvest		
Ocean Commercial	0	1,400
Ocean Recreational	200	600
River Recreational	0	400
Tribal	0	2,400
Age-4 Ocean Harvest Rate	0.010	0.090
Spawner Reduction Rate	0.006	0.241

With no further fishing in 2017 on the current stock, the expected number of natural area adult spawners would be 12,309, with an expected age-4 ocean harvest rate of 1.0% (105 age-4 KRFC were harvested in the Sept–Dec 2016 period). Applying 2016 fishery regulations resulted in 9,397 natural area adult spawners and an age-4 ocean harvest rate of 9.0%. These forecasts are provided for informational purposes only; the Pacific Fishery Management Council (PFMC) will adopt 2017 ocean salmon fishery management regulations in April 2017.

Introduction

The PFMC's fishery management plan for Klamath River fall Chinook (PFMC 2012; Amendment 16) defines a conservation objective of a natural spawner reduction rate via fisheries of no more than 0.68 and a maximum sustainable yield escapement of 40,700 natural area adult spawners. Annual management is guided by a harvest control rule that reflects this conservation objective but allows for *de minimis* fishing provisions at low abundance. 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 alternative 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 2017 management year. For informational purposes, KOHM forecasts of harvest and spawner escapement are also presented under two hypothetical management scenarios: (A) no ocean or river fisheries in 2017, and (B) the 2016 ocean fishery seasons and quotas, the 2016 river recreational allocation of 15.0 percent (of non-tribal harvest), and a tribal allocation of 50 percent (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 2016 river run of Klamath River fall Chinook salmon used in this report is from KRTT (2017).

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 1979-2012 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 forecasted 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 2015 (age-three) and 2016 (age-three, age-four) are preliminary, as their respective cohorts are incomplete (Table 1).

The 2016 age-three ocean abundance forecast was 2.20 times its postseason estimate (Table 2); the age-three predictor has overestimated abundance in 17 of the 32 previous years. The 2016 age-four ocean abundance forecast was 1.81 times its postseason estimate (Table 2); the age-four predictor has overestimated abundance in 21 of the 32 previous years. The 2016 age-five ocean abundance forecast was 3.17 times its postseason estimate (Table 2); the age-five predictor has over estimated abundance in 13 of the 30 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 1997-2016 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 2016 proportion natural forecast for age-three, -four, and -five fish was 0.66, 0.76, and 0.80, respectively, and the corresponding post-season estimates are 0.66, 0.89, and 0.76, respectively (Table 4).

Historical Harvest Levels and Rates

Historical (1986-2016) ocean and river harvest levels and rates of age-three and age-four Klamath River fall Chinook are listed in Table 5. The 2016 age-four ocean harvest rate (preliminary) postseason estimate of 9.1 percent is greater than the preseason forecast of 8.4 percent (PFMC 2016).

2016 Ocean Fishery Fall Harvest

Klamath River fall Chinook ocean harvests during the 2016 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, which is assumed to happen just prior to these fall fisheries (same brood and calendar year). In 2016, 187 Klamath River fall Chinook were estimated to have been harvested.

2017 Forecasts

The 2017 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	42,026	0.59
4	10,558	0.73
5	1,662	0.80

For the 2016 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	2,786	765	3.64
4	8,615	3,171	2.72
5	15,443	2,173	7.11

The fishery-area-month-age-specific estimated harvests are presented in Table 6. Estimated fall landings are accounted for in ocean fisheries harvest allocation in the following calendar year, and the associated harvest impacts are 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 2017 between Cape Falcon, OR and Point Sur, CA (187 Klamath River fall Chinook were estimated to have been harvested in the ocean during the Sept–Dec 2016 period) and no Klamath River fisheries (tribal and recreational) in 2017, and (B) the 2016 ocean fishery seasons and quotas, the 2016 river recreational allocation of 15.0% (of non-tribal harvest), and a tribal allocation of 50% (of total harvest); are provided in Appendices A and B respectively.

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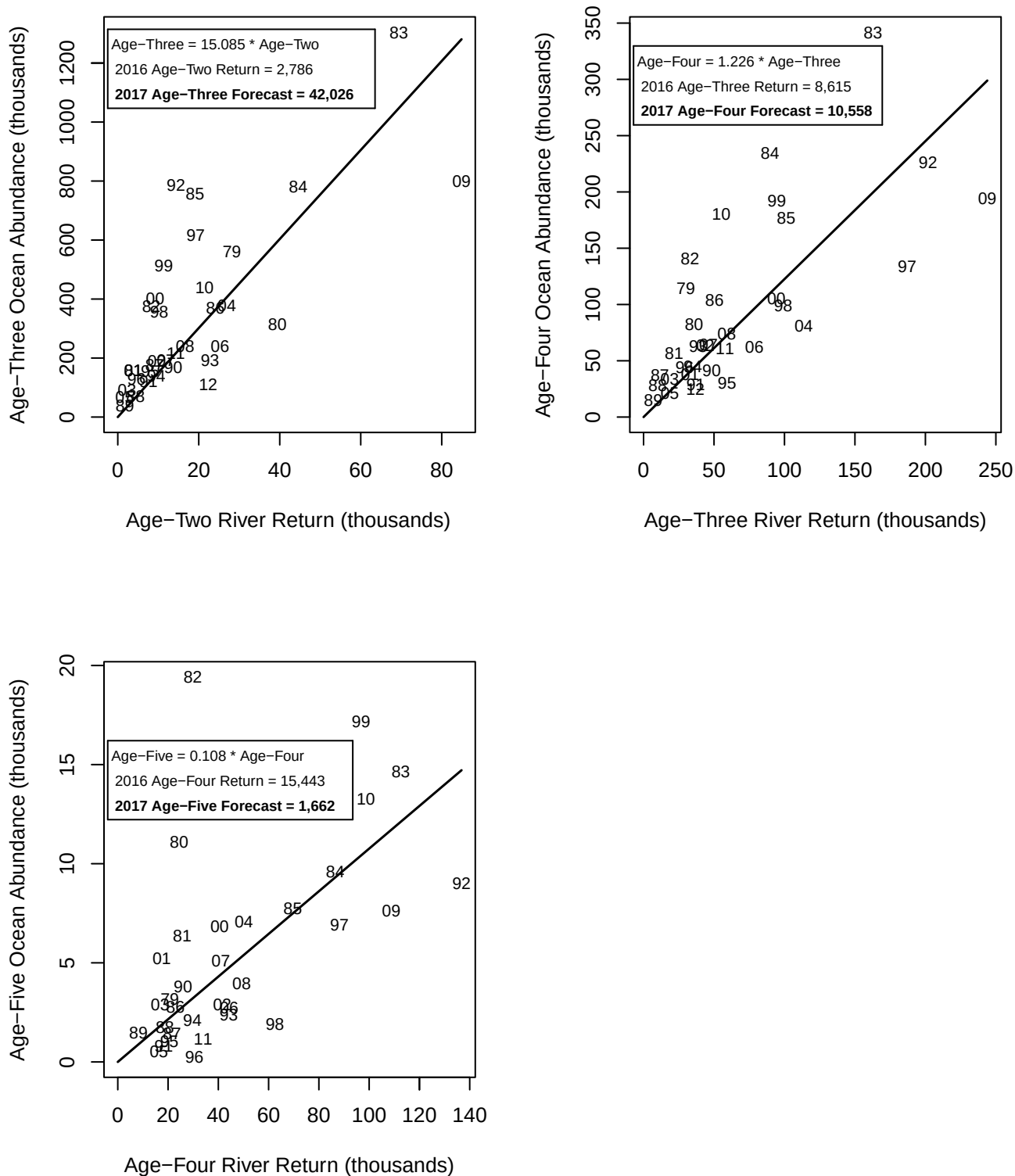
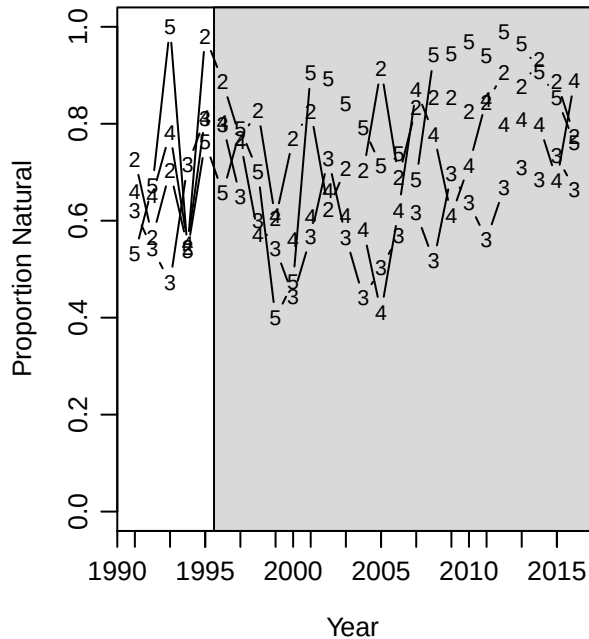
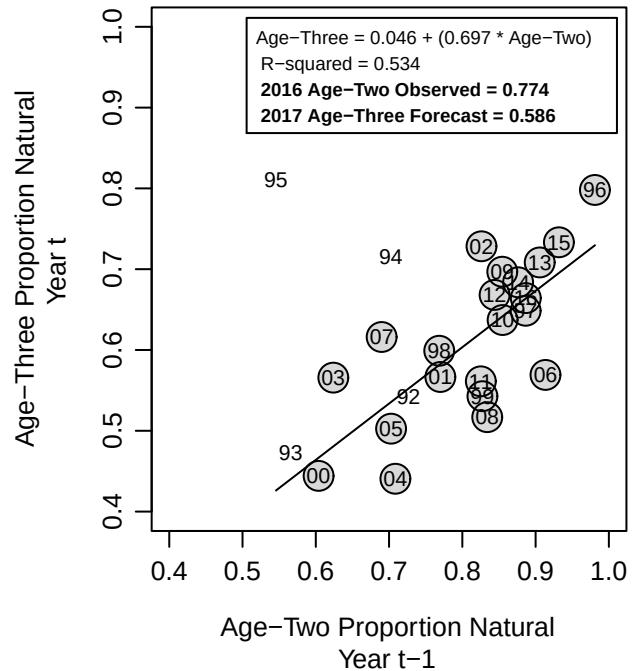


Figure 1. Regression estimators for Klamath River fall Chinook ocean abundance (Sept. 1) based on that year's river return of same cohort. Numbers in plots denote brood years.

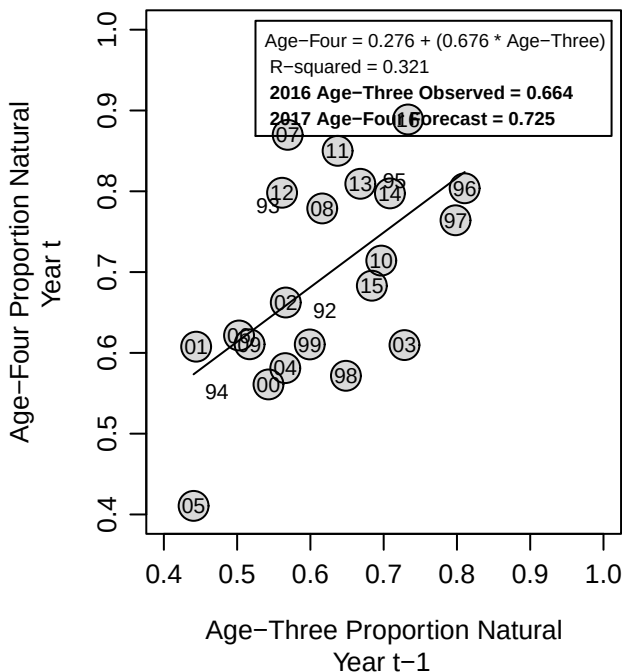
(a) Observed Time Series



(b) Age-Three Predictor



(c) Age-Four Predictor



(d) Age-Five Predictor

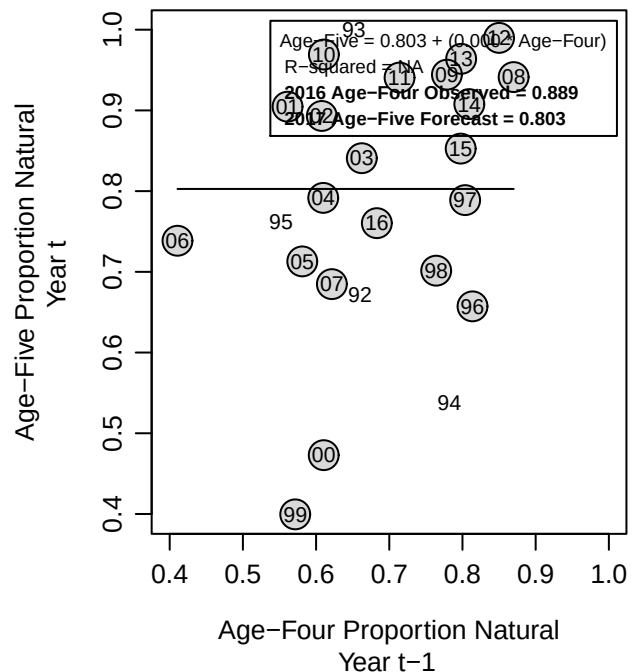


Figure 2. Age-specific proportion of natural area spawners. Panel (a): observed time-series; numbers in plot denote age; shaded area depicts data used for predictor. Panels (b)–(d): age-specific predictor based on previous-year observed proportion for same cohort; numbers in plots denote years 1992–2016; shaded circles indicate years used for predictor; age-three and age-four are regression predictors; age-5 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	561.1	133.4	694.5	0.30	0.52	39.4	30.1	33.9	2.6	66.6
1983	313.3	114.2	427.5	0.19	0.60	3.8	35.9	20.7	0.9	57.5
1984	157.3	82.8	240.1	0.08	0.38	8.3	21.7	24.4	1.1	47.2
1985	374.8	56.9	431.7	0.11	0.24	69.4	32.9	25.7	5.8	64.4
1986	1,304.4	140.8	1,445.2	0.18	0.46	44.6	162.9	29.8	2.3	195.0
1987	781.1	341.9	1,123.0	0.16	0.43	19.1	89.7	112.6	6.8	209.1
1988	756.3	234.8	991.0	0.20	0.39	24.1	101.2	86.5	3.9	191.6
1989	369.8	177.2	547.1	0.15	0.36	9.1	50.4	69.6	4.3	124.3
1990	176.1	104.0	280.1	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	161.7	0.03	0.09	14.4	37.0	26.0	1.0	64.0
1995	787.3	28.7	816.0	0.04	0.14	22.8	201.9	18.3	2.6	222.8
1996	192.3	226.3	418.6	0.05	0.16	9.5	38.8	136.7	0.3	175.8
1997	140.2	62.8	203.0	0.01	0.06	8.0	35.0	44.2	4.6	83.7
1998	154.8	44.7	199.5	0.00	0.09	4.6	59.2	29.7	1.7	90.6
1999	129.1	30.5	159.5	0.02	0.09	19.2	29.2	20.5	1.3	51.0
2000	617.1	44.2	661.3	0.06	0.10	10.2	187.1	30.5	0.5	218.1
2001	356.1	133.8	489.9	0.03	0.09	11.3	99.1	88.2	0.2	187.4
2002	513.6	98.9	612.5	0.02	0.15	9.2	94.6	62.5	3.7	160.8
2003	401.1	192.2	593.3	0.08	0.21	3.8	94.3	96.8	0.9	191.9
2004	159.4	105.2	264.7	0.12	0.35	9.6	33.1	40.5	5.3	78.9
2005	190.0	38.1	228.1	0.02	0.20	2.3	43.8	17.5	3.9	65.2
2006	90.6	63.4	154.0	0.01	0.10	26.9	18.5	41.6	1.3	61.4
2007	376.8	33.6	410.5	0.06	0.21	1.7	113.7	16.8	1.6	132.1
2008	68.0	81.4	149.4	0.00	0.10	25.2	18.6	50.2	1.7	70.6
2009	240.7	21.1	261.8	0.00	0.00	11.9	78.6	16.4	5.6	100.6
2010	192.8	62.1	254.9	0.01	0.04	16.6	46.1	44.3	0.4	90.9
2011	240.2	64.6	304.7	0.03	0.08	84.9	59.0	41.0	2.0	102.0
2012	799.0	74.3	873.3	0.03	0.08	21.4	243.9	49.3	2.1	295.3
2013	438.3	194.4	632.6	0.04	0.20	14.4	55.2	108.8	1.1	165.0
2014	216.6	180.7	397.3	0.03	0.17	22.3	57.8	98.7	3.9	160.4
2015	110.6 ^{a/}	61.0	171.7	0.02 ^{a/}	0.22	6.1	36.7	34.0	7.1	77.8
2016	42.4 ^{b/}	24.9 ^{a/}	67.3	---- ^{c/}	0.09 ^{a/}	2.8	8.6	15.4	0.5	24.6

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 4).

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/}	1,304,409	0.33
1987	511,800	781,123	0.66
1988	370,800	756,261	0.49
1989	450,600	369,828	1.22
1990	479,000	176,122	2.72
1991	176,200	69,424	2.54
1992	50,000	39,502	1.27
1993	294,400	168,473	1.75
1994	138,000	119,915	1.15
1995	269,000	787,309	0.34
1996	479,800	192,272	2.50
1997	224,600	140,153	1.60
1998	176,000	154,799	1.14
1999	84,800	129,066	0.66
2000	349,600	617,097	0.57
2001	187,200	356,128	0.53
2002	209,000	513,604	0.41
2003	171,300	401,112	0.43
2004	72,100	159,446	0.45
2005	185,700	189,976	0.98
2006	44,100	90,606	0.49
2007	515,400	376,840	1.37
2008	31,600	68,003	0.46
2009	474,900	240,713	1.97
2010	223,400	192,760	1.16
2011	304,600	240,160	1.27
2012	1,567,600	798,976	1.96
2013	390,700	438,269	0.89
2014	219,800	216,585	1.01
2015	342,200	110,643	3.09
2016 ^{c/}	93,400	42,361	2.20
2017	42,000	--	--

Table 2. Comparisons of preseason forecast and postseason estimates for ocean abundance of adult Klamath River fall Chinook (Page 2 of 4).

Year (t)	Preseason Forecast ^{a/}	Postseason Estimate	Pre/Postseason
	Sept 1 (t-1)	Sept 1 (t-1)	
Age-Four			
1985	56,900	57,500	0.99
1986	66,300	140,823	0.47
1987	206,100	341,875	0.60
1988	186,400	234,751	0.79
1989	215,500	177,245	1.22
1990	50,100	103,951	0.48
1991	44,600	37,171	1.20
1992	44,800	28,169	1.59
1993	39,100	15,037	2.60
1994	86,100	41,736	2.06
1995	47,000	28,726	1.64
1996	268,500	226,282	1.19
1997	53,900	62,820	0.86
1998	46,000	44,733	1.03
1999	78,800	30,456	2.59
2000	38,900	44,176	0.88
2001	247,000	133,801	1.85
2002	143,800	98,927	1.45
2003	132,400	192,180	0.69
2004	134,500	105,246	1.28
2005	48,900	38,079	1.28
2006	63,700	63,383	1.01
2007	26,100	33,615	0.78
2008	157,200	81,366	1.93
2009	25,200	21,124	1.19
2010	106,300	62,092	1.71
2011	61,600	64,568	0.95
2012	79,600	74,289	1.07
2013	331,200	194,356	1.70
2014	67,400	180,665	0.37
2015	71,100	61,029	1.17
2016 ^{c/}	45,100	24,911	1.81
2017	10,600	--	--

Table 2. Comparisons of preseason forecast and postseason estimates for ocean abundance of adult Klamath River fall Chinook (Page 3 of 4).

	Preseason Forecast ^{a/}	Postseason Estimate	
Year (t)	Sept 1 (t-1)	Sept 1 (t-1)	Pre/Postseason
Age-Five			
1985 ^{d/}	--	11,113	--
1986 ^{d/}	--	6,376	--
1987	5,300	19,414	0.27
1988	13,300	14,632	0.91
1989	10,100	9,612	1.05
1990	7,600	7,767	0.98
1991	1,500	2,774	0.54
1992	1,300	1,444	0.90
1993	1,100	1,759	0.63
1994	500	1,468	0.34
1995	2,000	3,805	0.53
1996	1,100	788	1.40
1997	7,900	9,004	0.88
1998	3,300	2,382	1.39
1999	2,000	2,106	0.95
2000	1,400	1,051	1.33
2001	1,300	258	5.04
2002	9,700	6,933	1.40
2003	6,500	1,915	3.39
2004	9,700	17,184	0.56
2005	5,200	6,859	0.76
2006	2,200	5,236	0.42
2007	4,700	2,911	1.61
2008	1,900	2,900	0.66
2009	5,600	7,059	0.79
2010	1,800	517	3.48
2011	5,000	2,753	1.82
2012	4,600	5,110	0.90
2013	5,700	3,944	1.45
2014	12,100	7,623	1.59
2015	10,400	13,285	0.78
2016 ^{c/}	3,700	1,166	3.17
2017	1,700	--	--

Table 2. Comparisons of preseason forecast and postseason estimates for ocean abundance of adult Klamath River fall Chinook (Page 4 of 4).

Year (t)	Preseason Forecast ^{a/}	Postseason Estimate	Pre/Postseason
	Sept 1 (t-1)	Sept 1 (t-1)	
Total Adults			
1985 ^{d/}	169,900	344,613	0.49
1986 ^{d/}	492,300	1,451,608	0.34
1987	723,200	1,142,412	0.63
1988	570,500	1,005,644	0.57
1989	676,200	556,685	1.21
1990	536,700	287,840	1.86
1991	222,300	109,369	2.03
1992	96,100	69,115	1.39
1993	334,600	185,269	1.81
1994	224,600	163,119	1.38
1995	318,000	819,840	0.39
1996	749,400	419,342	1.79
1997	286,400	211,977	1.35
1998	225,300	201,914	1.12
1999	165,600	161,628	1.02
2000	389,900	662,324	0.59
2001	435,500	490,187	0.89
2002	362,500	619,464	0.59
2003	310,200	595,207	0.52
2004	216,300	281,876	0.77
2005	239,800	234,914	1.02
2006	110,000	159,225	0.69
2007	546,200	413,366	1.32
2008	190,700	152,269	1.25
2009	505,700	268,896	1.88
2010	331,500	255,369	1.30
2011	371,200	307,481	1.21
2012	1,651,800	878,375	1.88
2013	727,600	636,569	1.14
2014	299,300	404,873	0.74
2015	423,700	184,957	2.29
2016 ^{c/}	142,200	68,438	2.08
2017	54,200	--	--

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

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)									
	Age-3	Age-4	Age-3	Age-4	Ocean	River	Ocean	River	Ocean	River	Ocean	River
1986	426,000	66,300	1,304,409	140,823	0.28	0.50	0.46	0.67	72,000	37,700	301,999	46,154
1987	511,800	206,100	781,123	341,875	0.28	0.53	0.43	0.44	121,200	78,200	277,203	73,265
1988	370,800	186,400	756,261	234,751	0.31	0.53	0.39	0.52	114,100	65,400	253,888	73,854
1989	450,600	215,500	369,828	177,245	0.30	0.49	0.36	0.70	128,100	67,600	125,117	54,340
1990	479,000	50,100	176,122	103,951	0.30	0.49	0.55	0.36	85,100	31,200	114,780	11,459
1991	176,200	44,600	69,424	37,171	0.13	0.28	0.18	0.45	16,700	12,800	9,871	13,581
1992	50,000	44,800	39,502	28,169	0.06	0.15	0.07	0.27	4,200	4,200	3,142	6,787
1993	294,400	39,100	168,473	15,037	0.12	0.43	0.16	0.49	20,100	22,500	11,355	12,808
1994	138,000	86,100	119,915	41,736	0.07	0.20	0.09	0.29	10,400	14,300	7,961	13,524
1995	269,000	47,000	787,309	28,726	0.07	0.32	0.14	0.19	13,500	18,500	33,146	21,637
1996	479,800	268,500	192,272	226,282	0.17	0.66	0.16	0.39	88,400	129,100	45,637	69,241
1997	224,600	53,900	140,153	62,820	0.10	0.43	0.06	0.26	17,600	26,500	8,987	17,764
1998	176,000	46,000	154,799	44,733	0.07	0.29	0.09	0.30	10,200	14,800	4,891	17,897
1999	84,800	78,800	129,066	30,456	0.10	0.28	0.09	0.45	12,300	18,100	5,116	16,942
2000	349,600	38,900	617,097	44,176	0.11	0.53	0.10	0.25	24,000	32,400	42,050	35,066
2001	187,200	247,000	356,128	133,801	0.14	0.61	0.09	0.29	45,600	105,300	21,747	50,780
2002	209,000	143,800	513,604	98,927	0.13	0.57	0.15	0.26	30,000	70,900	28,896	35,069
2003	171,300	132,400	401,112	192,180	0.16	0.50	0.21	0.28	30,600	52,200	70,995	39,715
2004	72,100	134,500	159,446	105,246	0.15	0.38	0.35	0.48	26,500	35,800	64,226	29,807
2005	185,700	48,900	189,976	38,079	0.08	0.16	0.20	0.19	7,100	9,600	12,807	10,001
2006	44,100	63,700	90,606	63,383	0.11	0.23	0.10	0.18	10,000	10,000	10,401	10,345
2007	515,400	26,100	376,840	33,615	0.16	0.63	0.21	0.56	30,200	51,400	30,244	33,884
2008	31,600	157,200	68,003	81,366	0.02	0.43	0.10	0.38	4,500	49,500	8,679	24,180
2009	474,900	25,200	240,713	21,124	0.00	0.57	0.00	0.40	100	61,700	51	34,040
2010	223,400	106,300	192,760	62,092	0.12	0.49	0.04	0.40	22,600	46,600	4,497	32,920
2011	304,600	61,600	240,160	64,568	0.16	0.54	0.08	0.34	26,900	42,700	11,996	30,502
2012	1,567,600	79,600	798,976	74,289	0.16	0.77	0.08	0.51	92,400	227,600	34,721	109,263
2013	390,700	331,200	438,269	194,356	0.16	0.62	0.20	0.51	74,800	154,800	59,403	82,835
2014	219,800	67,400	216,585	180,665	0.16	0.40	0.17	0.25	23,200	31,400	40,156	31,353
2015 ^{d/}	342,200	71,100	110,643	61,029	0.16	0.59	0.22	0.47	29,400	57,700	20,037	35,890
2016 ^{d/}	93,400	45,100	42,361	24,911	0.08	0.19	0.09	0.31	6,300	8,500	3,052	6,469

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-area 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	4,685	11,421	11,380	1,030	23,831	0.70	0.44	0.58	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	213	34,073	854	122	35,049	1,071	54,693	5,712	265	60,670	0.83	0.62	0.87	0.68	0.63
2008	2,931	7,015	6,512	26	13,553	17,223	7,504	22,928	417	30,849	0.85	0.52	0.78	0.94	0.69
2009	1,372	15,849	3,628	136	19,613	8,090	36,417	5,691	2,303	44,411	0.85	0.70	0.61	0.94	0.69
2010	2,501	10,866	7,179	7	18,052	11,806	19,067	17,937	221	37,225	0.83	0.64	0.71	0.97	0.67
2011	11,424	18,381	3,874	82	22,337	61,849	23,517	21,945	1,303	46,765	0.84	0.56	0.85	0.94	0.68
2012	1,629	51,450	4,486	2	55,938	15,658	103,605	17,743	197	121,545	0.91	0.67	0.80	0.99	0.68
2013	1,458	7,775	9,352	21	17,148	10,310	18,897	39,696	562	59,155	0.88	0.71	0.81	0.96	0.78
2014	1,260	16,517	14,547	211	31,275	17,239	35,730	57,293	2,081	95,104	0.93	0.68	0.80	0.91	0.75
2015	444	5,489	5,331	265	11,085	3,472	15,086	11,492	1,534	28,112	0.89	0.73	0.68	0.85	0.72
2016	552	2,405	1,127	46	3,578	1,894	4,758	9,020	146	13,924	0.77	0.66	0.89	0.76	0.80

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))						River Fisheries (t)			
	KMZ			North of	South of	Ocean	River Fisheries (t)			
	Troll	Sport	Subtotal	KMZ	KMZ	Subtotal	Total	Net	Sport	Total
HARVEST (numbers of fish)										
Age-Three										
1986	35,632	4,876	40,508	73,777	122,913	196,690	237,198	8,100	18,100	26,200
1987	17,237	5,082	22,319	43,432	56,368	99,800	122,119	11,400	11,400	22,800
1988	15,999	5,165	21,164	24,317	107,971	132,288	153,452	12,500	15,600	28,100
1989	6,456	11,783	18,239	15,315	23,729	39,044	57,283	2,700	900	3,600
1990	81	4,357	4,438	36,575	11,004	47,579	52,017	1,300	1,400	2,700
1991	0	1,022	1,022	344	810	1,154	2,176	2,123	1,277	3,400
1992	0	0	0	972	0	972	972	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	13,126	14,808	27,934	28,933	11,840	5,536	17,376
1996	0	0	0	0	9,314	9,314	9,314	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	8,604	25,203	33,807	37,493	22,458	4,893	27,351
2001	113	105	218	2,749	6,082	8,831	9,049	17,885	7,294	25,179
2002	220	784	1,004	1,501	9,916	11,417	12,421	11,734	6,258	17,992
2003	176	669	845	1,921	27,586	29,507	30,352	6,996	5,061	12,057
2004	402	970	1,372	9,710	7,324	17,034	18,406	4,679	2,051	6,730
2005	0	568	568	619	2,381	3,000	3,568	4,394	1,641	6,035
2006	0	477	477	32	341	373	850	2,388	13	2,401
2007	770	8,099	8,869	4,193	9,365	13,558	22,427	17,543	5,734	23,277
2008	0	0	0	0	0	0	0	3,225	608	3,833
2009	0	51	51	0	0	0	51	19,820	4,715	24,535
2010	112	28	140	0	1,664	1,664	1,804	13,132	1,884	15,016
2011	334	1,119	1,453	35	4,830	4,865	6,318	13,286	2,630	15,916
2012	1,121	11,350	12,471	926	13,089	14,015	26,486	70,409	12,104	82,513
2013	390	5,574	5,964	865	11,986	12,851	18,815	18,996	7,675	26,671
2014	0	566	566	4,146	1,551	5,697	6,263	3,386	1,778	5,164
2015 ^{av}	48	294	342	653	1,598	2,251	2,593	10,604	4,509	15,113
2016 ^{av}	0	0	0	13	302	315	315	917	430	1,347
Age-Four										
1986	7,745	1,113	8,858	23,486	31,913	55,399	64,257	17,000	2,900	19,900
1987	21,736	4,427	26,163	70,645	48,832	119,477	145,640	41,000	8,500	49,500
1988	11,868	3,595	15,463	26,376	50,287	76,663	92,126	38,600	6,200	44,800
1989	6,064	9,735	15,799	32,116	16,608	48,724	64,523	41,000	7,700	48,700
1990	3,997	2,919	6,916	39,627	10,624	50,251	57,167	6,000	2,200	8,200
1991	0	1,001	1,001	1,513	4,134	5,647	6,648	7,593	2,016	9,609
1992	171	55	226	1,783	12	1,795	2,021	4,360	723	5,083
1993	0	0	0	849	1,616	2,465	2,465	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	866	3,457	4,323	10,776	20,698	31,474	35,797	43,959	9,080	53,039
1997	3	172	175	463	2,994	3,457	3,632	8,734	2,586	11,320
1998	0	105	105	3,942	0	3,942	4,047	7,164	1,822	8,986
1999	15	381	396	1,657	696	2,353	2,749	8,789	494	9,283
2000	117	895	1,012	2,327	1,076	3,403	4,415	6,733	756	7,489
2001	1,312	1,604	2,916	5,819	3,926	9,745	12,661	20,759	4,819	25,578
2002	1,938	827	2,765	2,811	9,416	12,227	14,992	11,929	4,063	15,992
2003	834	919	1,753	7,856	30,011	37,867	39,620	22,754	4,592	27,346
2004	1,429	1,234	2,663	11,645	22,132	33,777	36,440	17,623	1,751	19,374
2005	247	317	564	5,243	1,909	7,152	7,716	3,048	304	3,352
2006	196	725	921	4,192	985	5,177	6,098	7,569	42	7,611
2007	270	2,336	2,606	1,991	2,472	4,463	7,069	8,987	502	9,489
2008	6,376	1,105	7,481	546	113	659	8,140	17,891	1,260	19,151
2009	0	0	0	0	0	0	0	5,831	706	6,537
2010	42	112	154	886	1,482	2,368	2,522	16,630	1,134	17,764
2011	417	176	593	1,043	3,780	4,823	5,416	12,587	1,466	14,053
2012	336	2,087	2,423	760	2,957	3,717	6,140	23,285	1,718	25,003
2013	4,265	6,236	10,501	4,029	23,993	28,022	38,523	43,671	12,043	55,714
2014	1,292	1,434	2,726	19,818	8,978	28,796	31,522	21,303	3,404	24,707
2015	273	197	470	5,769	7,135	12,904	13,374	13,160	2,692	15,852
2016 ^{av}	0	56	56	636	1,575	2,211	2,267	3,966	870	4,836

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))						River Fisheries (t)			
	KMZ			North of	South of	Ocean Total	River Fisheries (t)			
	Troll	Sport	Subtotal	KMZ	KMZ		Subtotal	Net	Sport	Total
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	0.06	0.07	0.13	0.16	0.13	0.13	0.25
1988	0.02	0.01	0.03	0.03	0.14	0.17	0.20	0.12	0.15	0.28
1989	0.02	0.03	0.05	0.04	0.06	0.11	0.15	0.05	0.02	0.07
1990	0.00	0.02	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	0.04	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	0.02	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	0.00	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	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.13	0.00	0.13
2007	0.00	0.02	0.02	0.01	0.02	0.04	0.06	0.15	0.05	0.20
2008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.03	0.21
2009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.06	0.31
2010	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.28	0.04	0.33
2011	0.00	0.00	0.01	0.00	0.02	0.02	0.03	0.23	0.04	0.27
2012	0.00	0.01	0.02	0.00	0.02	0.02	0.03	0.29	0.05	0.34
2013	0.00	0.01	0.01	0.00	0.03	0.03	0.04	0.34	0.14	0.48
2014	0.00	0.00	0.00	0.02	0.01	0.03	0.03	0.06	0.03	0.09
2015 ^{a/}	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.29	0.12	0.41
2016 ^{a/}	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.11	0.05	0.16
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	0.27	0.36	0.59	0.11	0.70
1990	0.04	0.03	0.07	0.38	0.10	0.48	0.55	0.26	0.10	0.36
1991	0.00	0.03	0.03	0.04	0.11	0.15	0.18	0.35	0.09	0.45
1992	0.01	0.00	0.01	0.06	0.00	0.06	0.07	0.23	0.04	0.27
1993	0.00	0.00	0.00	0.06	0.11	0.16	0.16	0.46	0.03	0.49
1994	0.00	0.03	0.03	0.03	0.04	0.06	0.09	0.26	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	0.05	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	0.10	0.12	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	0.35	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	0.01	0.07	0.08	0.06	0.07	0.13	0.21	0.53	0.03	0.56
2008	0.08	0.01	0.09	0.01	0.00	0.01	0.10	0.36	0.03	0.38
2009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.04	0.40
2010	0.00	0.00	0.00	0.01	0.02	0.04	0.04	0.37	0.03	0.40
2011	0.01	0.00	0.01	0.02	0.06	0.07	0.08	0.31	0.04	0.34
2012	0.00	0.03	0.03	0.01	0.04	0.05	0.08	0.47	0.03	0.51
2013	0.02	0.03	0.05	0.02	0.12	0.14	0.20	0.40	0.11	0.51
2014	0.01	0.01	0.02	0.11	0.05	0.16	0.17	0.22	0.03	0.25
2015 ^{a/}	0.00	0.00	0.01	0.09	0.12	0.21	0.22	0.39	0.08	0.47
2016 ^{a/}	0.00	0.00	0.00	0.03	0.06	0.09	0.09	0.26	0.06	0.31

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 2016 (September - November) ocean landings of Klamath River fall Chinook by fishery, age, and KOHM area.

COMMERCIAL FISHERY										
KOHM area ^{a/}	Age 3			Age 4			Age 5			Total
	Sept	Oct	Nov	Sept	Oct	Nov	Sept	Oct	Nov	
NO	--	--	--	--	--	--	--	--	--	0
CO	--	--	--	--	--	--	--	--	--	0
KO	--	--	--	--	--	--	--	--	--	0
KC	--	--	--	--	--	--	--	--	--	0
FB	--	--	--	--	--	--	--	--	--	0
SF	--	--	--	--	--	--	--	--	--	0
MO	--	--	--	--	--	--	--	--	--	0
Total	0	0	0	0	0	0	0	0	0	0

SPORT FISHERY										
KOHM area ^{a/}	Age 3			Age 4			Age 5			Total
	Sept	Oct	Nov	Sept	Oct	Nov	Sept	Oct	Nov	
NO	52	--	--	--	--	--	--	--	--	52
CO	30	--	--	--	--	--	--	--	--	30
KO	--	--	--	19	19	--	--	--	--	38
KC	--	--	--	67	--	--	--	--	--	67
FB	--	--	--	--	--	--	--	--	--	0
SF	--	--	--	--	--	--	--	--	--	0
MO	--	--	--	--	--	--	--	--	--	0
Total	82	0	0	86	19	0	0	0	0	187

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.

Klamath Escapement

Absent fishing: 18866
Hatcheries: 6482
Natural areas: 12383

With fishing
Mature adults: 18837
Strays: 80
Klamath Basin: 18757
Spawners: 18757
Hatcheries: 6448
Natural areas: 12309
Reduction rate: 0.006

Klamath Harvest

Total: 187
River: 0
Ocean: 187

Tribal: 0 0.000 (objective: 0.000)

Non-tribal: 187
River: 0 0.000 (objective: 0)
Ocean troll: 0
CA / OR: NaN / NaN
Ocean sport: 187
KMZ: 105 0.559
Age-four o.harv.rate: 0.010 (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	0	0	0	0	0	0	NA
CO	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
KO	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
KC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MO	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	NA

Klamath Harvest: ocean sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total	%CA	%CA.rec
NO	52	0	0	0	0	0	0	0	0	0	0	0	52	NA	NA
CO	30	0	0	0	0	0	0	0	0	0	0	0	30	NA	NA
KO	19	19	0	0	0	0	0	0	0	0	0	0	37	NA	NA
KC	67	0	0	0	0	0	0	0	0	0	0	0	67	100	100
FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	168	19	0	0	0	0	0	0	0	0	0	0	187	NA	NA

```
[1] fishery      area      start.date end.date    Q          ret          sl
[8] coho
<0 rows> (or 0-length row.names)
```

	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

[illegible][illegible]

	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

[illegible]

Days open: recreational, retention

	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

Quotas: recreational, retention

	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: recreational, retention

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	24	24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CO	24	24	24	NA	NA	NA	NA	NA	NA	NA	NA	NA
KO	24	24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
KC	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FB	20	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA
SF	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Days open: recreational, non-retention

	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

Quotas: recreational, non-retention

	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

Mgt.Input.Files/river.dat

parameter value

1	pi.t	0.00
2	pi.r	NA

3	H.r.tot	0.00
4	CR.r	0.00
5	c.r	0.07
6	s.r	0.10
7	E.nat.tot	NA

Klamath Escapement

Absent fishing: 18866
Hatcheries: 6482
Natural areas: 12383

With fishing
Mature adults: 17529
Strays: 75
Klamath Basin: 17455
Spawners: 14483
Hatcheries: 5086
Natural areas: 9397
Reduction rate: 0.241

Klamath Harvest

Total: 4793
River: 2756
Ocean: 2037

Tribal: 2396 0.500 (objective: 0.500)

Non-tribal: 2396
River: 360 0.150 (objective: 0.150)
Ocean troll: 1449
CA / OR: 0.604 / 0.396
Ocean sport: 588
KMZ: 295 0.145
Age-four o.harv.rate: 0.090 (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	14	34	10	16	37	111	NA
CO	0	0	0	0	0	0	0	41	61	50	93	155	400	NA
KO	0	0	0	0	0	0	0	0	12	32	18	0	62	NA
KC	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
FB	0	0	0	0	0	0	0	0	0	331	0	202	533	42.2
SF	0	0	0	0	0	0	0	0	92	112	0	61	265	21.0
MO	0	0	0	0	0	0	0	0	43	34	0	0	77	6.1
Total	0	0	0	0	0	0	0	54	242	570	128	454	1449	NA

Klamath Harvest: ocean sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total	%CA	%CA.rec
NO	52	0	0	0	0	0	0	0	0	0	5	2	59	NA	NA
CO	30	0	0	0	0	0	0	0	1	4	11	7	54	NA	NA
KO	19	19	0	0	0	0	0	0	0	11	26	12	87	NA	NA
KC	67	0	0	0	0	0	0	0	27	37	36	41	208	16.4	53.5
FB	0	0	0	0	0	0	0	2	11	26	39	10	88	7.0	22.6
SF	0	0	0	0	0	0	0	12	8	28	27	2	76	6.0	19.6
MO	0	0	0	0	0	0	0	9	2	3	3	0	16	1.3	4.2
Total	168	19	0	0	0	0	0	23	48	109	147	74	588	NA	NA

Chinook Harvest (All Stocks): Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	1600	30	NA	NA	NA	NA	0	3410	4812	2477	1650	1068	15048
CO	200	700	200	NA	NA	NA	0	1845	5421	2516	2244	1933	15058
KO	NA	200	NA	NA	NA	NA	NaN	NaN	531	720	200	0	1651
KC	200	NA	NA	NA	NA	NA	NA	NA	0	0	0	0	200
FB	900	NA	NA	NA	NA	NA	NA	0	0	5795	0	12258	18952
SF	8300	600	NA	NA	NA	NA	NA	NaN	3938	4674	0	6497	24009
MO	NA	NA	NA	NA	NA	NA	NA	NaN	9281	6197	0	0	15478
Total	11200	1530	200	NA	NA	NA	0	5254	23982	22379	4094	21756	90396

Chinook Harvest (All Stocks): Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	800	100	NA	NA	NA	NA	NaN	NaN	90	58	426	303	1778
CO	300	0	0	NA	NA	NA	NA	NaN	67	292	697	1412	2768
KO	100	300	NA	NA	NA	NA	NA	NA	30	512	584	175	1701
KC	500	NA	NA	NA	NA	NA	NA	NA	483	682	1052	717	3433
FB	100	10	0	NA	NA	NaN	NaN	1214	1405	1853	2229	1140	7952
SF	5700	600	NA	NA	NA	0	0	2211	3095	2585	6968	2534	23693
MO	NA	NA	NA	NA	NA	NaN	0	7200	2842	4450	2801	0	17292
Total	7500	1010	0	NA	NA	0	0	10625	8013	10432	14757	6280	58617

Klamath Contribution Rates: Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	0	0	NA	NA	NA	NA	0.027	0.004	0.007	0.004	0.010	0.034
CO	0	0	0	NA	NA	NA	0.021	0.022	0.011	0.020	0.042	0.080
KO	NA	0	NA	NA	NA	NA	0.000	0.000	0.023	0.044	0.091	0.113
KC	0	NA	NA	NA	NA	NA	NA	NA	0.185	0.149	0.089	0.249
FB	0	NA	NA	NA	NA	NA	NA	0.022	0.039	0.057	0.043	0.016
SF	0	0	NA	NA	NA	NA	NA	0.000	0.023	0.024	0.022	0.009
MO	NA	NA	NA	NA	NA	NA	NA	0.000	0.005	0.006	0.012	0.000

Klamath Contribution Rates: Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	0.065	0.000	NA	NA	NA	NA	0.000	0.000	0.000	0.000	0.011	0.006
CO	0.102	NaN	NaN	NA	NA	NA	NA	0.000	0.011	0.015	0.016	0.005
KO	0.187	0.063	NA	NA	NA	NA	NA	NA	0.005	0.022	0.045	0.071
KC	0.134	NA	NA	NA	NA	NA	NA	NA	0.057	0.054	0.034	0.057
FB	0.000	0.000	NaN	NA	NA	0	0.000	0.002	0.008	0.014	0.017	0.009
SF	0.000	0.000	NA	NA	NA	0	0.001	0.005	0.002	0.011	0.004	0.001
MO	NA	NA	NA	NA	NA	0	0.001	0.001	0.001	0.001	0.001	0.001

Total Effort: Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	0	0	0	385	893	498	429	293	2498
CO	NA	NA	NA	NA	0	0	0	397	695	493	351	316	2253
KO	NA	NA	NA	NA	0	0	0	8	77	85	38	0	208
KC	NA	NA	NA	NA	0	0	0	0	0	0	0	0	0
FB	NA	NA	NA	NA	0	0	0	0	0	947	0	831	1778
SF	NA	NA	NA	NA	0	0	0	0	1489	832	0	1531	3852

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

Retention Effort: Troll

Retention Effort: Sport

Non-retention Effort: Troll

Non-retention Effort: Sport

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Mgt.Input.Files/ocean.dat

	fishery	area	start.date	end.date	Q	ret	sl	coho
1	10	NO	apr-08-2017	may-31-2017	NA	1	28	0
2	10	NO	jun-05-2017	jun-10-2017	NA	1	28	0
3	10	NO	jun-15-2017	jun-30-2017	NA	1	28	0
4	10	NO	jul-08-2017	jul-31-2017	NA	1	28	0
5	10	NO	aug-08-2017	aug-12-2017	NA	1	28	0
6	10	NO	aug-18-2017	aug-24-2017	NA	1	28	0
7	10	NO	sep-01-2017	sep-07-2017	NA	1	28	0
8	10	NO	sep-15-2017	oct-31-2017	NA	1	28	0
9	10	CO	apr-08-2017	may-31-2017	NA	1	28	0
10	10	CO	jun-05-2017	jun-10-2017	NA	1	28	0
11	10	CO	jun-15-2017	jun-30-2017	NA	1	28	0
12	10	CO	jul-08-2017	jul-31-2017	NA	1	28	0
13	10	CO	aug-08-2017	aug-12-2017	NA	1	28	0
14	10	CO	aug-18-2017	aug-24-2017	NA	1	28	0
15	10	CO	sep-01-2017	sep-07-2017	NA	1	28	0
16	10	CO	sep-15-2017	oct-31-2017	NA	1	28	0
17	10	KO	apr-08-2017	may-31-2017	NA	1	28	0
18	10	KO	jun-05-2017	jun-30-2017	720	1	28	0
19	10	KO	jul-08-2017	jul-31-2017	200	1	28	0
20	10	KC	sep-09-2017	sep-27-2017	1000	1	28	0
21	10	FB	jun-13-2017	jun-30-2017	NA	1	27	0
22	10	FB	aug-03-2017	aug-27-2017	NA	1	27	0
23	10	FB	sep-01-2017	sep-30-2017	NA	1	27	0
24	10	SF	may-06-2017	may-31-2017	NA	1	27	0
25	10	SF	jun-13-2017	jun-30-2017	NA	1	27	0
26	10	SF	aug-03-2017	aug-28-2017	NA	1	27	0
27	10	SF	sep-01-2017	sep-30-2017	NA	1	26	0
28	10	SF	oct-03-2017	oct-07-2017	NA	1	26	0
29	10	SF	oct-10-2017	oct-14-2017	NA	1	26	0
30	10	MO	may-01-2017	jun-30-2017	NA	1	27	0
31	40	NO	mar-15-2017	jun-24-2017	NA	1	24	0
32	40	NO	jun-25-2017	aug-07-2017	NA	1	24	1
33	40	NO	aug-08-2017	sep-02-2017	NA	1	24	0
34	40	NO	sep-03-2017	sep-30-2017	NA	1	24	1
35	40	NO	oct-01-2017	oct-31-2017	NA	1	24	0
36	40	CO	mar-15-2017	jun-24-2017	NA	1	24	0
37	40	CO	jun-25-2017	aug-07-2017	NA	1	24	1
38	40	CO	aug-08-2017	sep-02-2017	NA	1	24	0
39	40	CO	sep-03-2017	sep-30-2017	NA	1	24	1
40	40	CO	oct-01-2017	oct-31-2017	NA	1	24	0
41	40	KO	may-28-2017	jun-24-2017	NA	1	24	0
42	40	KO	jun-25-2017	aug-07-2017	NA	1	24	1
43	40	KO	sep-03-2017	sep-05-2017	NA	1	24	0
44	40	KC	may-16-2017	may-31-2017	NA	1	20	0
45	40	KC	jun-16-2017	jun-30-2017	NA	1	20	0
46	40	KC	jul-16-2017	aug-16-2017	NA	1	20	0
47	40	KC	sep-01-2017	sep-05-2017	NA	1	20	0
48	40	FB	apr-02-2017	nov-13-2017	NA	1	20	0
49	40	SF	apr-02-2017	apr-30-2017	NA	1	24	0
50	40	SF	may-01-2017	oct-31-2017	NA	1	20	0
51	40	MO	apr-02-2017	jul-15-2017	NA	1	24	0

Days open: commercial, retention

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	0	0	0	23	31	22	24	12

CO	NA	NA	NA	NA	0	0	0	23	31	22	24	12
KO	NA	NA	NA	NA	0	0	0	23	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	18	0	25
SF	NA	NA	NA	NA	0	0	0	0	26	18	0	26
MO	NA	NA	NA	NA	0	0	0	0	31	30	0	0

Quotas: commercial, retention

	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	720	200	NA
KC	1000	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: commercial, retention

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	28	28	NA	NA	NA	NA	NA	28	28	28	28	28
CO	28	26	26	NA	NA	NA	NA	28	28	28	28	28
KO	NA	28	NA	NA	NA	NA	NA	28	28	28	28	NA
KC	28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FB	27	NA	NA	NA	NA	NA	NA	NA	NA	27	NA	27
SF	26	26	NA	NA	NA	NA	NA	NA	27	27	NA	27
MO	NA	NA	NA	NA	NA	NA	NA	NA	27	27	NA	NA

Days open: commercial, non-retention

	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

Quotas: commercial, non-retention

	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

Days open: recreational, retention

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	NA	NA	NA	NA	0	0	17	30	31	30	31	31
CO	NA	NA	NA	NA	0	0	17	30	31	30	31	31
KO	NA	NA	NA	NA	0	0	0	0	4	30	31	7
KC	NA	NA	NA	NA	0	0	0	0	16	15	16	16
FB	NA	NA	NA	NA	0	0	0	29	31	30	31	31
SF	NA	NA	NA	NA	0	0	0	29	31	30	31	31
MO	NA	NA	NA	NA	0	0	0	29	31	30	15	0

Quotas: recreational, retention

	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: recreational, retention

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	24	24	NA	NA	NA	NA	24	24	24	24	24	24
CO	24	24	24	NA	NA	NA	24	24	24	24	24	24
KO	24	24	NA	NA	NA	NA	NA	NA	24	24	24	24
KC	20	NA	NA	NA	NA	NA	NA	NA	20	20	20	20
FB	20	20	20	NA	NA	NA	NA	20	20	20	20	20
SF	20	20	NA	NA	NA	NA	NA	24	20	20	20	20
MO	NA	NA	NA	NA	NA	NA	NA	24	24	24	24	NA

Days open: recreational, non-retention

	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

Quotas: recreational, non-retention

	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

Mgt.Input.Files/river.dat

	parameter	value
1	pi.t	0.5000
2	pi.r	0.1501
3	H.r.tot	NA
4	CR.r	0.0000
5	c.r	0.0700
6	s.r	0.1000
7	E.nat.tot	NA
