Ocean Abundance Projections and Prospective Harvest Levels for Klamath River Fall Chinook, 2019 Season

Klamath River Technical Team
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Summary

Predictor performance for 2018 and forecasts for 2019 are:

		2018			
	Age	*Preseason*	*Postseason*	*Pre/Post*	*2019 Forecast*
Ocean Abundance	3	330,000	397,600	0.83	167,500
	4	28,400	11,000	2.58	106,100
	5	800	50	16.00	600
Proportion Natural	3	0.58	0.74	0.78	0.69
	4	0.66	0.75	0.88	0.78
	5	0.81	1.00	0.81	0.82
Ocean Harvest Rate	4	0.12	0.23	0.51	-
Ocean Fall Harvest	3	-	0	-	-
	4	-	160	-	-
	5	-	28	-	-

The implications of the 2019 forecast ocean abundances, proportions natural, and the 2018 ocean fall harvest for fisheries management in 2019 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 2019 between Cape Falcon, OR and Point Sur, CA (188 Klamath River fall Chinook were estimated to have been harvested in the ocean during the Sept-Dec 2018 period) and no Klamath River fisheries (tribal and recreational) in 2019, and (B) the 2018 ocean fishery seasons and quotas, the 2018 river recreational allocation of 19.3 percent (of non-tribal harvest), and a tribal allocation of 50% (of total harvest). The results are:

	KOHM Forecasts	
Sector	*(A) No fishing in 2019*	*(B) 2018 Regulations*
Adult Spawners		
Natural Areas	87,800	58,700
Hatcheries	29,200	20,000
Adult Harvest		
Ocean Commercial	160	13,800
Ocean Recreational	30	2,600
River Recreational	0	3,900
Tribal	0	20,300
Age-4 Ocean Harvest Rate	0.002	0.102
Spawner Reduction Rate	0.001	0.332

With no further fishing in 2019 on the current stock, the expected number of natural area adult spawners would be 87,768, with an expected age-four ocean harvest rate of 0.2% (160 age-four KRFC were harvested in the Sept–Dec 2018 period). Applying 2018 fishery regulations resulted in 58,729 natural area adult spawners and an age-four ocean harvest rate of 10.2%. These forecasts are provided for informational purposes only; the Pacific Fishery Management Council (PFMC) will adopt 2019 ocean salmon fishery management regulations in April 2019.

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 2019 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 2019, and (B) the 2018 ocean fishery seasons and quotas, the 2018 river recreational allocation of 19.3 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 2018 river run of Klamath River fall Chinook salmon used in this report is from KRTT (2019).

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 1979-2014 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 2017 (age-three) and 2018 (age-three, age-four) are preliminary, as their respective cohorts are incomplete (Table 1).

The 2018 age-three ocean abundance forecast was 0.83 times its postseason estimate (Table 2); the age-three predictor has underestimated abundance in 17 of the 34 previous years. The 2018 age-four ocean abundance forecast was 2.58 times its postseason estimate (Table 2); the age-four predictor has overestimated abundance in 23 of the 34 previous years. The 2018 age-five ocean abundance forecast was 16.0 times its postseason estimate (Table 2); the age-five predictor has overestimated abundance in 14 of the 32 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 1997-2018 were regressed against the age *a-1* observed proportion natural of their respective cohorts (Table 4, Figure 2). Data for calendar years prior to 1997 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 2018 proportion natural forecast for age-three, -four, and -five fish was 0.58, 0.66, and 0.81, respectively, and the corresponding post-season estimates are 0.74, 0.75, and 1.00, respectively (Table 4).

Historical Harvest Levels and Rates

Historical (1986-2018) ocean and river harvest levels and rates of age-three and age-four Klamath River fall Chinook are listed in Table 5. The 2018 age-four ocean harvest rate (preliminary) postseason estimate of 22.6 percent is greater than the preseason forecast of 11.5 percent (PFMC 2018).

2018 Ocean Fishery Fall Harvest

Klamath River fall Chinook ocean harvests during the 2018 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 2018, 188 Klamath River fall Chinook were estimated to have been harvested (Table 6).

2019 Forecasts

The 2019 forecasts of ocean stock abundance and proportion natural area spawners are (Figures 1 and 2):

Age	*Abundance*	*Proportion Natural*
3	167,504	0.69
4	106,119	0.78
5	599	0.82

For the 2018 ocean fall fisheries, the natural production multipliers for the coded-wire tag recoveries are:

Age (a)	*Total Escapement (a-1)*	*Hatchery-origin Escapement (a-1)*	*Natural-production Multiplier (a)*
3	11,114	1,449	7.67
4	86,717	32,520	2.67
5	5,567	1,395	3.99

The fishery-area-month-age-specific estimated fall ocean 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 2019 between Cape Falcon, OR and Point Sur, CA (188 Klamath River fall Chinook were estimated to have been harvested in the ocean during the Sept–Dec 2018 period) and no Klamath Basin fisheries (tribal and recreational) in 2019, and (B) the 2018 ocean fishery seasons and quotas, the 2018 river recreational allocation of 19.3% (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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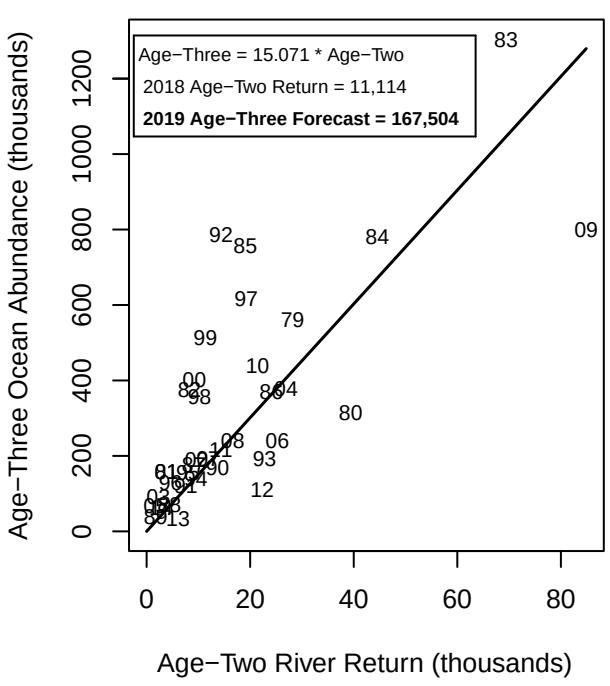

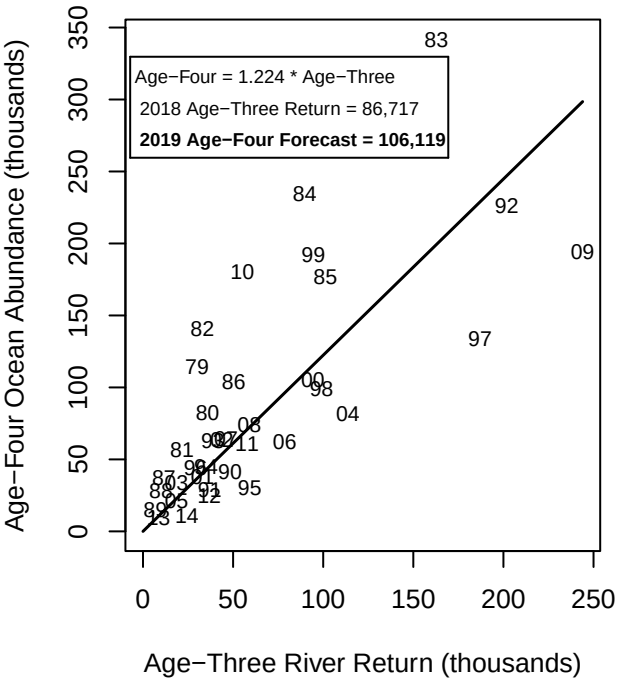

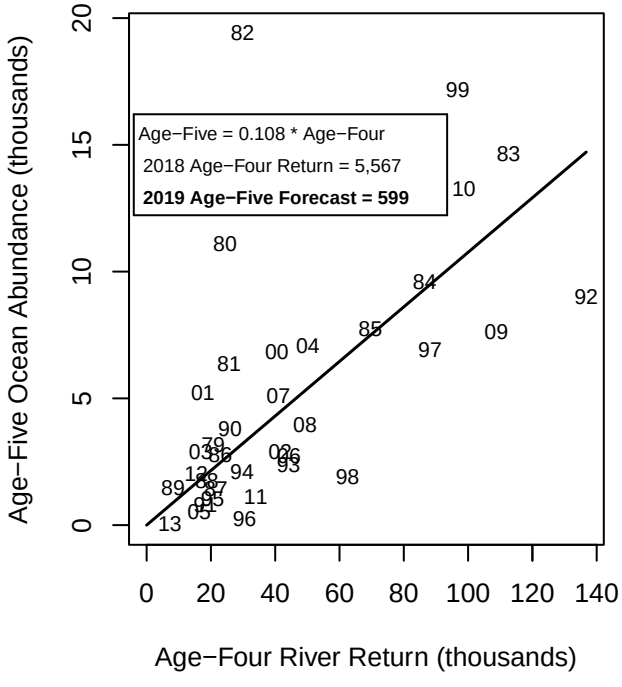

Figure 1. Regression estimators for Klamath River fall chinook ocean abundance (Sept. 1) based on that year's river return of same cohort. Numbers in plots denote brood years.

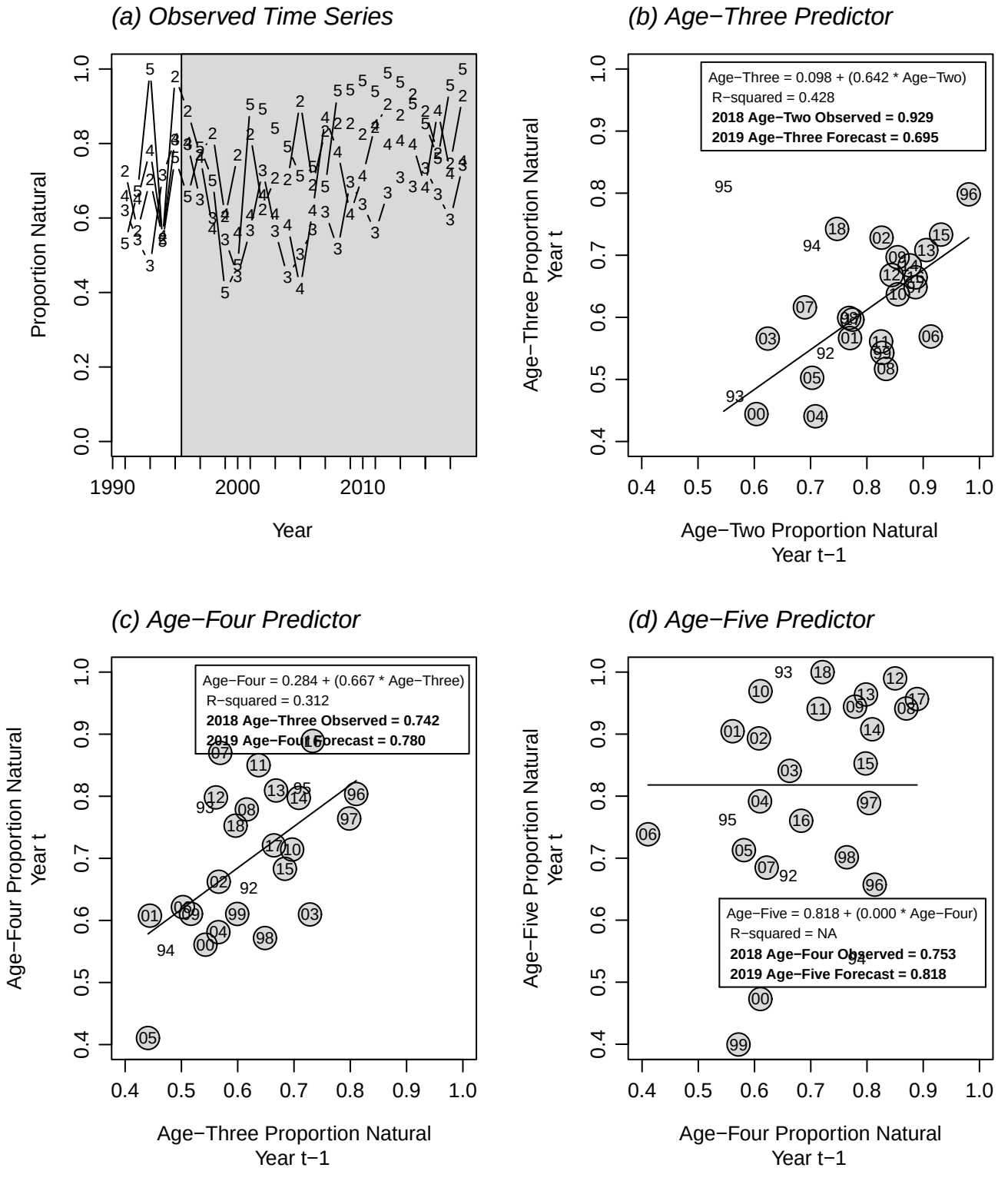

Figure 2. Age−specific proportion of natural area spawners. Panel (a): observed time series; numbers in plot denote age; shaded area depicts data used for predictor. Panels (b)−(d): age−specific predictor based on previous−year observed proportion for same cohort; numbers in plots denote years 1992−2018; 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) Age 3	Ocean Abundance Sept1(t-1) Age 4	Ocean Abundance Sept1(t-1) Total	Annual Ocean Harvest Rate Sept1(t-1) thru Aug31(t) Age 3	Annual Ocean Harvest Rate Sept1(t-1) thru Aug31(t) Age 4	Klamath Basin River Run (t) Age 2	Klamath Basin River Run (t) Age 3	Klamath Basin River Run (t) Age 4	Klamath Basin River Run (t) Age 5	Total Adults
1981	493.2	57.0	550.2	0.21	0.53	28.180	64.100	14.400	1.800	80.300
1982	561.1	133.4	694.5	0.30	0.52	39.436	30.052	33.900	2.600	66.552
1983	313.3	114.2	427.5	0.19	0.60	3.849	35.873	20.744	0.900	57.517
1984	157.3	82.8	240.1	0.08	0.38	8.297	21.721	24.437	1.086	47.244
1985	374.8	56.9	431.7	0.11	0.24	69.424	32.938	25.657	5.807	64.402
1986	1,304.4	140.8	1,445.2	0.18	0.46	44.566	162.873	29.843	2.276	194.992
1987	781.1	341.9	1,123.0	0.16	0.43	19.075	89.718	112.614	6.775	209.107
1988	756.3	234.8	991.0	0.20	0.39	24.090	101.210	86.519	3.877	191.606
1989	369.8	177.2	547.1	0.15	0.36	9.119	50.407	69.604	4.309	124.320
1990	176.1	104.0	280.1	0.30	0.55	4.396	11.615	22.944	1.304	35.863
1991	69.4	37.2	106.6	0.03	0.18	1.755	9.993	21.567	1.110	32.670
1992	39.5	28.2	67.7	0.02	0.07	13.693	6.936	18.761	1.000	26.697
1993	168.5	15.0	183.5	0.05	0.16	7.598	48.301	8.248	0.663	57.212
1994	119.9	41.7	161.7	0.03	0.09	14.371	37.017	25.977	0.989	63.983
1995	787.3	28.7	816.0	0.04	0.14	22.774	201.896	18.276	2.596	222.768
1996	192.3	226.3	418.6	0.05	0.16	9.532	38.766	136.745	0.262	175.773
1997	140.2	62.8	203.0	0.01	0.06	7.993	34.973	44.184	4.579	83.736
1998	154.8	44.7	199.5	0.00	0.09	4.639	59.244	29.696	1.707	90.647
1999	129.1	30.5	159.5	0.02	0.09	19.248	29.171	20.534	1.343	51.048
2000	617.1	44.2	661.3	0.06	0.10	10.246	187.088	30.486	0.503	218.077
2001	356.1	133.8	489.9	0.03	0.09	11.343	99.097	88.172	0.065	187.334
2002	513.6	98.9	612.5	0.02	0.15	9.226	94.576	62.525	3.686	160.787
2003	401.1	192.2	593.3	0.08	0.21	3.845	94.287	96.798	0.864	191.949
2004	159.4	105.2	264.7	0.12	0.35	9.646	33.105	40.527	5.311	78.943
2005	190.0	38.1	228.1	0.02	0.20	2.296	43.811	17.515	3.901	65.227
2006	90.6	63.4	154.0	0.01	0.10	26.935	18.505	41.597	1.272	61.374
2007	376.9	33.6	410.5	0.06	0.21	1.684	113.685	16.846	1.600	132.131
2008	68.0	81.4	149.4	0.00	0.10	25.247	18.644	50.173	1.737	70.554
2009	240.7	21.1	261.8	0.00	0.00	11.914	78.620	16.377	5.647	100.644
2010	192.8	62.1	254.9	0.01	0.04	16.640	46.129	44.349	0.382	90.860
2011	240.2	64.6	304.7	0.03	0.08	84.895	59.023	40.997	1.957	101.977
2012	799.0	74.3	873.3	0.03	0.08	21.433	243.938	49.292	2.092	295.322
2013	438.3	194.4	632.6	0.04	0.20	14.356	55.152	108.805	1.068	165.025
2014	216.5	180.7	397.2	0.03	0.17	22.321	57.792	98.707	3.896	160.395
2015	110.6	61.0	171.6	0.02	0.22	6.094	36.742	33.951	7.128	77.821
2016	32.7	24.8	57.5	0.01	0.09	2.787	8.619	15.453	0.510	24.582
2017	63.4 [a/]	9.8	73.2	0.02 [a/]	0.04	20.318	24.397	7.272	1.563	33.232
2018	397.6 [b/]	11.0 [a/]	408.6	---- [c/]	0.23 [a/]	11.114	86.717	5.567	0.009	92.293

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/] Sept 1 (t-1)	Postseason Estimate Sept 1 (t-1)	Pre/Postseason
	Age-Three		
1985	113,000	374,822	0.30
1986	426,000 [b/]	1,304,409	0.33
1987	511,800	781,122	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	376,922	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	799,014	1.96
2013	390,700	438,264	0.89
2014	219,800	216,499	1.02
2015	342,200	110,592	3.09
2016	93,400	32,668	2.86
2017	42,000	63,360	0.66
2018 [c/]	330,000	397,568	0.83
2019	167,500	--	--

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/] Sept 1 (t-1)	Postseason Estimate Sept 1 (t-1)	Pre/Postseason
	Age-Four		
1985	56,900	56,908	1.00
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	81,408	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	194,379	1.70
2014	67,400	180,662	0.37
2015	71,100	60,983	1.17
2016	45,100	24,826	1.82
2017	10,600	9,820	1.08
2018 [c/]	28,400	11,008	2.58
2019	106,100	--	--

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

Year (t)	Preseason Forecast [a/] Sept 1 (t-1)	Postseason Estimate 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	13,283	0.78
2016	3,700	1,144	3.23
2017	1,700	2,024	0.84
2018 [c/]	800	50	16.00
2019	600	--	--

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/] Sept 1 (t-1)	Postseason Estimate Sept 1 (t-1)	Pre/Postseason
	Total Adults		
1985 [d/]	169,900	442,843	0.38
1986 [d/]	492,300	1,451,608	0.34
1987	723,200	1,142,411	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	413,448	1.32
2008	190,700	152,311	1.25
2009	505,700	268,896	1.88
2010	331,500	255,369	1.30
2011	371,100	307,481	1.21
2012	1,651,800	878,413	1.88
2013	727,700	636,587	1.14
2014	299,300	404,784	0.74
2015	423,800	184,858	2.29
2016	142,200	58,638	2.43
2017	54,200	75,204	0.72
2018 [c/]	359,200	408,626	0.88
2019	274,200	--	--

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.

	Preseason Ocean Abundance Forecast[a/] Sept 1 (t-1)		Postseason Ocean Abundance Estimate Sept 1 (t-1)		Preseason Age-4 Harvest Rate Forecast[b/]		Postseason Age-4 Harvest Rate Estimate[c/]		Preseason Adult Harvest Forecast		Postseason Adult Harvest Estimate	
Year (t)	Age-3	Age-4	Age-3	Age-4	Ocean	River	Ocean	River	Ocean	River	Ocean	River
1986	426,000	66,300	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	781,122	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	125,118	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	376,922	33,615	0.16	0.63	0.21	0.56	30,200	51,400	30,249	33,884
2008	31,600	157,200	68,003	81,408	0.02	0.43	0.10	0.38	4,500	49,500	8,718	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	799,014	74,289	0.16	0.77	0.08	0.51	92,400	227,600	34,721	109,263
2013	390,700	331,200	438,264	194,379	0.16	0.62	0.20	0.51	74,800	154,800	59,421	82,835
2014	219,800	67,400	216,499	180,662	0.16	0.40	0.17	0.25	23,200	31,400	40,152	31,353
2015	342,200	71,100	110,592	60,983	0.16	0.59	0.22	0.47	29,400	57,700	20,020	35,890
2016	93,400	45,100	32,668	24,826	0.08	0.19	0.09	0.31	6,300	8,500	3,064	6,470
2017[d/]	42,000	10,600	63,360	9,820	0.03	0.06	0.04	0.08	700	900	1,777	1,951
2018[e/]	330,000	28,400	397,568	11,008	0.12	0.34	0.23	0.36	14,600	21,600	14,863	18,844

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/ Postseason estimates are preliminary for age-3.

e/ Postseason estimates are preliminary for age-3 and age-4.

Table 4. Numbers of hatchery and natural-area adult fall Chinook spawners in the Klamath Basin by age.[a/]

	Hatchery Spawners					Natural Area Spawners					Proportion Natural				
Year	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	4,761	9,030	146	13,937	0.77	0.66	0.89	0.76	0.80
2017	5,056	9,287	1,864	62	11,213	14,937	13,717	4,817	1,370	19,904	0.75	0.60	0.72	0.96	0.64
2018	606	17,720	844	0	18,564	7,937	51,045	2,570	9	53,624	0.93	0.74	0.75	1.00	0.74

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).

	Ocean Fisheries (Sept 1 (t-1) through Aug 31 (t))							River Fisheries (t)		
	KMZ			North of	South of		Ocean			
Year (t)	Troll	Sport	Subtotal	KMZ	KMZ	Subtotal	Total	Net	Sport	Total
					HARVEST (numbers of fish)					
Age-Three										
1986	35,632	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	8,101	8,871	4,194	9,367	13,561	22,432	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	4,144	1,550	5,694	6,260	3,386	1,778	5,164
2015	48	293	341	652	1,597	2,249	2,590	10,604	4,509	15,113
2016	0	0	0	14	308	322	322	918	430	1,348
2017 [a/]	0	0	0	114	1,258	1,372	1,372	1,261	23	1,284
2018 [a/]	1,895	1,210	3,105	4,941	4,287	9,228	12,333	12,954	3,896	16,850
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	1,772	3,651	3,893	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	6,379	1,106	7,485	581	113	694	8,179	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	4,047	23,993	28,040	38,541	43,671	12,043	55,714
2014	1,292	1,434	2,726	19,818	8,977	28,795	31,521	21,303	3,404	24,707
2015	273	197	470	5,763	7,128	12,891	13,361	13,160	2,692	15,852
2016	0	56	56	671	1,571	2,242	2,298	3,966	870	4,836
2017	0	124	124	98	183	281	405	503	43	546
2018 [a/]	638	36	674	925	885	1,810	2,484	1,815	179	1,994

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

	Ocean Fisheries (Sept 1 (t-1) through Aug 31 (t))							River Fisheries (t)		
	KMZ			North of	South of		Ocean			
Year (t)	Troll	Sport	Subtotal	KMZ	KMZ	Subtotal	Total	Net	Sport	Total
					HARVEST RATE [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	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.29	0.12	0.41
2016	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.11	0.05	0.16
2017 [a/]	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.05	0.00	0.05
2018 [a/]	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.15	0.04	0.19
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	0.00	0.00	0.01	0.09	0.12	0.21	0.22	0.39	0.08	0.47
2016	0.00	0.00	0.00	0.03	0.06	0.09	0.09	0.26	0.06	0.31
2017	0.00	0.01	0.01	0.01	0.02	0.03	0.04	0.07	0.01	0.08
2018 [a/]	0.06	0.00	0.06	0.08	0.08	0.16	0.23	0.33	0.03	0.36

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 2018 (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	--	--	--	85	--	--	28	--	--	113
CO	--	--	--	--	--	--	--	--	--	0
KO	--	--	--	--	--	--	--	--	--	0
KC	--	--	--	--	--	--	--	--	--	0
FB	--	--	--	44	--	--	--	--	--	44
SF	--	--	--	--	--	--	--	--	--	0
MO	--	--	--	--	--	--	--	--	--	0
Total	0	0	0	129	0	0	28	0	0	157

SPORT FISHERY

KOHM area[a/]	Age 3			Age 4			Age 5			Total
	Sept	Oct	Nov	Sept	Oct	Nov	Sept	Oct	Nov	
NO	--	--	--	31	--	--	--	--	--	31
CO	--	--	--	--	--	--	--	--	--	0
KO	--	--	--	--	--	--	--	--	--	0
KC	--	--	--	--	--	--	--	--	--	0
FB	--	--	--	--	--	--	--	--	--	0
SF	--	--	--	--	--	--	--	--	--	0
MO	--	--	--	--	--	--	--	--	--	0
Total	0	0	0	31	0	0	0	0	0	31

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: No 2019 fishing. KOHM: Summary Output. Thu Feb 14 14:26:25 2019

Klamath Escapement

Absent fishing:	117134
Hatcheries:	29240
Natural areas:	87893
With fishing	
Mature adults:	117418
Strays:	444
Klamath Basin:	116974
Spawners:	116974
Hatcheries:	29206
Natural areas:	87768
Reduction rate:	0.001

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:	157		
CA / OR:	0.283 / 0.717		
Ocean sport:	31		
KMZ:	0	0.000	
Age-four o.harv.rate:	0.002		(objective: <= 0.16)

Klamath Harvest: ocean troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total	%CA
NO	112	0	0	0	0	0	0	0	0	0	0	0	112	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	44	0	0	0	0	0	0	0	0	0	0	0	44	100
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	157	0	0	0	0	0	0	0	0	0	0	0	157	NA

Klamath Harvest: ocean sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total	%CA	%CA.rec
NO	31	0	0	0	0	0	0	0	0	0	0	0	31	NA	NA
CO	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	NA
KO	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	NA
KC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NaN
FB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NaN
SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NaN
MO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NaN
Total	31	0	0	0	0	0	0	0	0	0	0	0	31	NA	NA

Chinook Harvest (All Stocks): Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	200	20	NA	NA	NA	NA	0	0	0	0	0	0	220
CO	50	500	400	NA	NA	NA	0	0	0	0	0	0	950
KO	NA	300	NA	NA	NA	NA	NaN	NaN	0	0	0	0	300
KC	NA	NA	NA	NA	NA	NA	NA	NA	0	0	0	0	0
FB	300	NA	NA	NA	NA	NA	NA	0	0	0	0	0	300
SF	10700	2000	NA	NA	NA	NA	NA	NaN	0	0	0	0	12700
MO	NA	NA	NA	NA	NA	NA	NA	NaN	0	0	0	0	0
Total	11250	2820	400	NA	NA	NA	0	0	0	0	0	0	14470

Chinook Harvest (All Stocks): Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	400	100	NA	NA	NA	NA	NaN	NaN	0	0	0	0	500
CO	200	0	0	NA	NA	NA	NA	NaN	0	0	0	0	200
KO	NA	400	NA	NA	NA	NA	NA	NA	0	0	0	0	400
KC	30	NA	NA	NA	NA	NA	NA	NA	0	0	0	0	30
FB	100	0	NA	NA	NA	NaN	NaN	0	0	0	0	0	100
SF	6700	4100	NA	NA	NA	0	0	0	0	0	0	0	10800
MO	NA	NA	NA	NA	NA	NaN	0	0	0	0	0	0	0
Total	7430	4600	0	NA	NA	0	0	0	0	0	0	0	12030

Klamath Contribution Rates: Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	0.562	0	NA	NA	NA	NA	0.113	0.020	0.034	0.019	0.044	0.096
CO	0.000	0	0	NA	NA	NA	0.100	0.087	0.057	0.076	0.162	0.182
KO	NA	0	NA	NA	NA	NA	0.000	0.000	0.129	0.139	0.204	0.245
KC	NA	NA	NA	NA	NA	NA	NA	NA	0.476	0.290	0.263	0.319
FB	0.148	NA	NA	NA	NA	NA	NA	0.059	0.173	0.210	0.161	0.080
SF	0.000	0	NA	NA	NA	NA	NA	0.000	0.075	0.093	0.076	0.032
MO	NA	NA	NA	NA	NA	NA	NA	0.000	0.021	0.024	0.044	0.002

Klamath Contribution Rates: Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	0.077	0	NA	NA	NA	NA	0.000	0.000	0.003	0.001	0.032	0.028
CO	0.000	NaN	NaN	NA	NA	NA	NA	0.000	0.040	0.030	0.044	0.045
KO	NA	0	NA	NA	NA	NA	NA	NA	0.028	0.103	0.117	0.257
KC	0.000	NA	NA	NA	NA	NA	NA	NA	0.141	0.152	0.117	0.166
FB	0.000	NaN	NA	NA	NA	0.000	0.000	0.016	0.049	0.058	0.062	0.032
SF	0.000	0	NA	NA	NA	0.002	0.003	0.018	0.011	0.036	0.014	0.002
MO	NA	NA	NA	NA	NA	0.000	0.003	0.006	0.002	0.002	0.004	0.004

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

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	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: 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

Retention 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

Retention 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

Non-retention 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

Non-retention 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

Mgt.Input.Files/ocean.dat
[1] fishery   area   start.date end.date   Q   ret   sl
[8] coho
<0 rows> (or 0-length row.names)

Days open: commercial, 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, 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: commercial, retention

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

Appendix B: 2018 regulations. KOHM: Summary Output. Thu Feb 14 14:30:01 2019

Klamath Escapement

Absent fishing:	117134		
Hatcheries:	29240		
Natural areas:	87893		
With fishing			
Mature adults:	105174		
Strays:	403		
Klamath Basin:	104771		
Spawners:	78712		
Hatcheries:	19983		
Natural areas:	58729		
Reduction rate:	0.332		

Klamath Harvest

Total:	40607		
River:	24214		
Ocean:	16393		
Tribal:	20304	0.500	(objective: 0.500)
Non-tribal:	20304		
River:	3910	0.193	(objective: 0.193)
Ocean troll:	13832		
CA / OR:	0.692 / 0.308		
Ocean sport:	2561		
KMZ:	1665	0.102	
Age-four o.harv.rate:	0.102		(objective: <= 0.16)

Klamath Harvest: ocean troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total	%CA
NO	112	0	0	0	0	0	0	0	221	89	120	354	896	NA
CO	0	0	0	0	0	0	0	0	381	425	608	1117	2531	NA
KO	0	0	0	0	0	0	0	0	95	208	409	122	834	NA
KC	0	0	0	0	0	0	0	0	1714	1159	1052	1274	5199	45.5
FB	44	0	0	0	0	0	0	0	0	0	1537	1275	2856	25.0
SF	0	0	0	0	0	0	0	0	0	0	562	716	1277	11.2
MO	0	0	0	0	0	0	0	0	90	148	0	0	238	2.1
Total	157	0	0	0	0	0	0	0	2501	2029	4287	4858	13832	NA

Klamath Harvest: ocean sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total	%CA	%CA.rec
NO	31	0	0	0	0	0	0	0	0	0	25	43	99	NA	NA
CO	0	0	0	0	0	0	0	0	4	12	54	60	130	NA	NA
KO	0	0	0	0	0	0	0	0	3	63	135	279	480	NA	NA
KC	0	0	0	0	0	0	0	0	0	378	351	456	1186	10.4	64.0
FB	0	0	0	0	0	0	0	0	0	63	221	52	335	2.9	18.1
SF	0	0	0	0	0	0	0	0	0	67	187	14	268	2.3	14.5
MO	0	0	0	0	0	0	0	39	8	14	2	0	63	0.5	3.4
Total	31	0	0	0	0	0	0	39	15	598	975	904	2561	NA	NA

Chinook Harvest (All Stocks): Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	200	20	NA	NA	NA	NA	0	0	6426	4770	2736	3681	17833
CO	50	500	400	NA	NA	NA	0	0	6730	5623	3745	6144	23192
KO	NA	300	NA	NA	NA	NA	NaN	NaN	738	1500	2000	500	5038
KC	NA	NA	NA	NA	NA	NA	NA	NA	3600	4000	4000	4000	15600
FB	300	NA	NA	NA	NA	NA	NA	0	0	0	9520	15901	25721
SF	10700	2000	NA	NA	NA	NA	NA	NaN	0	0	7423	22539	42662
MO	NA	NA	NA	NA	NA	NA	NA	NaN	4245	6216	0	0	10461
Total	11250	2820	400	NA	NA	NA	0	0	21738	22110	29424	52765	140506

Chinook Harvest (All Stocks): Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	400	100	NA	NA	NA	NA	NaN	NaN	74	59	792	1547	2972
CO	200	0	0	NA	NA	NA	NA	NaN	96	407	1232	1336	3271
KO	NA	400	NA	NA	NA	NA	NA	NA	92	618	1154	1085	3349
KC	30	NA	NA	NA	NA	NA	NA	NA	0	2492	2999	2748	8269
FB	100	0	NA	NA	NA	NaN	NaN	0	0	1084	3553	1596	6333
SF	6700	4100	NA	NA	NA	0	0	0	0	1841	13304	6264	32209
MO	NA	NA	NA	NA	NA	NaN	0	6702	3974	6135	537	0	17347
Total	7430	4600	0	NA	NA	0	0	6702	4236	12636	23571	14577	73751

Klamath Contribution Rates: Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	0.562	0	NA	NA	NA	NA	0.113	0.020	0.034	0.019	0.044	0.096
CO	0.000	0	0	NA	NA	NA	0.100	0.087	0.057	0.076	0.162	0.182
KO	NA	0	NA	NA	NA	NA	0.000	0.000	0.129	0.139	0.204	0.245
KC	NA	NA	NA	NA	NA	NA	NA	NA	0.476	0.290	0.263	0.319
FB	0.148	NA	NA	NA	NA	NA	NA	0.059	0.173	0.210	0.161	0.080
SF	0.000	0	NA	NA	NA	NA	NA	0.000	0.075	0.093	0.076	0.032
MO	NA	NA	NA	NA	NA	NA	NA	0.000	0.021	0.024	0.044	0.002

Klamath Contribution Rates: Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
NO	0.077	0	NA	NA	NA	NA	0.000	0.000	0.003	0.001	0.032	0.028
CO	0.000	NaN	NaN	NA	NA	NA	NA	0.000	0.040	0.030	0.044	0.045
KO	NA	0	NA	NA	NA	NA	NA	NA	0.028	0.103	0.117	0.257
KC	0.000	NA	NA	NA	NA	NA	NA	NA	0.141	0.152	0.117	0.166
FB	0.000	NaN	NA	NA	NA	0.000	0.000	0.016	0.049	0.058	0.062	0.032
SF	0.000	0	NA	NA	NA	0.002	0.003	0.018	0.011	0.036	0.014	0.002
MO	NA	NA	NA	NA	NA	0.000	0.003	0.006	0.002	0.002	0.004	0.004

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	668	525	413	375	1982
CO	NA	NA	NA	NA	0	0	0	0	518	525	334	384	1762
KO	NA	NA	NA	NA	0	0	0	0	59	75	120	35	289
KC	NA	NA	NA	NA	0	0	0	0	343	263	544	404	1555
FB	NA	NA	NA	NA	0	0	0	0	0	0	496	800	1296
SF	NA	NA	NA	NA	0	0	0	0	0	0	368	1751	2119

MO	NA	NA	NA	NA	0	0	0	0	576	829	0	0	1405
Total	NA	NA	NA	NA	0	0	0	0	2164	2218	2275	3750	10406

Total Effort: Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	0	0	72	108	713	1111	13914	16566	32483
CO	NA	NA	NA	NA	0	0	22	57	439	1441	8873	8306	19138
KO	NA	NA	NA	NA	0	0	0	0	654	1919	3428	4172	10172
KC	NA	NA	NA	NA	0	0	0	0	0	4835	6283	5992	17110
FB	NA	NA	NA	NA	0	0	0	0	0	1940	7318	3860	13118
SF	NA	NA	NA	NA	0	0	0	0	0	4504	19651	13848	38004
MO	NA	NA	NA	NA	0	0	0	11986	6552	5538	418	0	24495
Total	NA	NA	NA	NA	0	0	94	12152	8358	21288	59885	52744	154521

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	668	525	413	375	1982
CO	NA	NA	NA	NA	0	0	0	0	518	525	334	384	1762
KO	NA	NA	NA	NA	0	0	0	0	59	0	0	0	59
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	496	800	1296
SF	NA	NA	NA	NA	0	0	0	0	0	0	368	1751	2119
MO	NA	NA	NA	NA	0	0	0	0	576	829	0	0	1405
Total	NA	NA	NA	NA	0	0	0	0	1821	1880	1611	3310	8622

Season Effort: Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	0	0	72	108	713	1111	13914	16566	32483
CO	NA	NA	NA	NA	0	0	22	57	439	1441	8873	8306	19138
KO	NA	NA	NA	NA	0	0	0	0	654	1919	3428	4172	10172
KC	NA	NA	NA	NA	0	0	0	0	0	4835	6283	5992	17110
FB	NA	NA	NA	NA	0	0	0	0	0	1940	7318	3860	13118
SF	NA	NA	NA	NA	0	0	0	0	0	4504	19651	13848	38004
MO	NA	NA	NA	NA	0	0	0	11986	6552	5538	418	0	24495
Total	NA	NA	NA	NA	0	0	94	12152	8358	21288	59885	52744	154521

Quota 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	75	120	35	230
KC	NA	NA	NA	NA	0	0	0	0	343	263	544	404	1555
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	343	338	664	440	1785

Quota 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

Retention Effort: Troll

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	0	0	0	0	668	525	413	375	1982
CO	NA	NA	NA	NA	0	0	0	0	518	525	334	384	1762
KO	NA	NA	NA	NA	0	0	0	0	59	75	120	35	289
KC	NA	NA	NA	NA	0	0	0	0	343	263	544	404	1555
FB	NA	NA	NA	NA	0	0	0	0	0	0	496	800	1296
SF	NA	NA	NA	NA	0	0	0	0	0	0	368	1751	2119
MO	NA	NA	NA	NA	0	0	0	0	576	829	0	0	1405
Total	NA	NA	NA	NA	0	0	0	0	2164	2218	2275	3750	10406

Retention Effort: Sport

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
NO	NA	NA	NA	NA	0	0	72	108	713	1111	13914	16566	32483
CO	NA	NA	NA	NA	0	0	22	57	439	1441	8873	8306	19138
KO	NA	NA	NA	NA	0	0	0	0	654	1919	3428	4172	10172
KC	NA	NA	NA	NA	0	0	0	0	0	4835	6283	5992	17110
FB	NA	NA	NA	NA	0	0	0	0	0	1940	7318	3860	13118
SF	NA	NA	NA	NA	0	0	0	0	0	4504	19651	13848	38004
MO	NA	NA	NA	NA	0	0	0	11986	6552	5538	418	0	24495
Total	NA	NA	NA	NA	0	0	94	12152	8358	21288	59885	52744	154521

Non-retention 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

Non-retention 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

Mgt.Input.Files/ocean.dat

	fishery	area	start.date	end.date	Q	ret	sl	coho
1	10	NO	may-04-2019	may-14-2019	NA	1	28	0
2	10	NO	may-19-2019	may-31-2019	NA	1	28	0
3	10	NO	jun-04-2019	jun-12-2019	NA	1	28	0
4	10	NO	jun-16-2019	jun-30-2019	NA	1	28	0
5	10	NO	jul-05-2019	jul-12-2019	NA	1	28	0
6	10	NO	jul-16-2019	jul-31-2019	NA	1	28	0
7	10	NO	aug-03-2019	aug-07-2019	NA	1	28	0
8	10	NO	aug-13-2019	aug-17-2019	NA	1	28	0
9	10	NO	aug-25-2019	aug-29-2019	NA	1	28	0
10	10	NO	sep-01-2019	oct-31-2019	NA	1	28	0
11	10	CO	may-04-2019	may-14-2019	NA	1	28	0
12	10	CO	may-19-2019	may-31-2019	NA	1	28	0
13	10	CO	jun-04-2019	jun-12-2019	NA	1	28	0
14	10	CO	jun-16-2019	jun-30-2019	NA	1	28	0
15	10	CO	jul-05-2019	jul-12-2019	NA	1	28	0
16	10	CO	jul-16-2019	jul-31-2019	NA	1	28	0
17	10	CO	aug-03-2019	aug-07-2019	NA	1	28	0
18	10	CO	aug-13-2019	aug-17-2019	NA	1	28	0
19	10	CO	aug-25-2019	aug-29-2019	NA	1	28	0
20	10	CO	sep-01-2019	oct-31-2019	NA	1	28	0
21	10	KO	may-04-2019	may-14-2019	NA	1	28	0
22	10	KO	may-19-2019	may-31-2019	NA	1	28	0
23	10	KO	jun-04-2019	jun-30-2019	1500	1	28	0
24	10	KO	jul-05-2019	jul-31-2019	2000	1	28	0
25	10	KO	aug-03-2019	aug-29-2019	500	1	28	0
26	10	KC	may-01-2019	may-29-2019	3600	1	26	0
27	10	KC	jun-01-2019	jun-30-2019	4000	1	26	0
28	10	KC	jul-01-2019	jul-31-2019	4000	1	26	0
29	10	KC	aug-03-2019	aug-31-2019	4000	1	26	0
30	10	FB	jul-26-2019	jul-31-2019	NA	1	26	0
31	10	FB	aug-03-2019	aug-29-2019	NA	1	26	0
32	10	FB	sep-01-2019	sep-30-2019	NA	1	26	0
33	10	SF	jul-26-2019	jul-31-2019	NA	1	26	0
34	10	SF	aug-03-2019	aug-29-2019	NA	1	26	0
35	10	SF	sep-01-2019	sep-30-2019	NA	1	26	0
36	10	SF	oct-01-2019	oct-05-2019	NA	1	26	0
37	10	SF	oct-08-2019	oct-12-2019	NA	1	26	0
38	10	MO	may-01-2019	may-07-2019	NA	1	26	0
39	10	MO	jun-19-2019	jun-30-2019	NA	1	26	0
40	40	NO	mar-15-2019	jun-29-2019	NA	1	24	0
41	40	NO	jun-30-2019	sep-03-2019	NA	1	24	1
42	40	NO	sep-04-2019	sep-06-2019	NA	1	24	0
43	40	NO	sep-07-2019	sep-08-2019	NA	1	24	1
44	40	NO	sep-09-2019	sep-13-2019	NA	1	24	0
45	40	NO	sep-14-2019	sep-15-2019	NA	1	24	1
46	40	NO	sep-16-2019	sep-20-2019	NA	1	24	0
47	40	NO	sep-21-2019	sep-22-2019	NA	1	24	1
48	40	NO	sep-23-2019	sep-27-2019	NA	1	24	0
49	40	NO	sep-28-2019	sep-29-2019	NA	1	24	1
50	40	NO	sep-30-2019	oct-31-2019	NA	1	24	0
51	40	CO	mar-15-2019	jun-29-2019	NA	1	24	0
52	40	CO	jun-30-2019	sep-03-2019	NA	1	24	1
53	40	CO	sep-04-2019	sep-06-2019	NA	1	24	0
54	40	CO	sep-07-2019	sep-08-2019	NA	1	24	1
55	40	CO	sep-09-2019	sep-13-2019	NA	1	24	0
56	40	CO	sep-14-2019	sep-15-2019	NA	1	24	1
57	40	CO	sep-16-2019	sep-20-2019	NA	1	24	0

```
58      40   CO sep-21-2019 sep-22-2019   NA   1 24    1
59      40   CO sep-23-2019 sep-27-2019   NA   1 24    0
60      40   CO sep-28-2019 sep-29-2019   NA   1 24    1
61      40   CO sep-30-2019 oct-31-2019   NA   1 24    0
62      40   KO may-19-2019 aug-26-2019   NA   1 24    0
63      40   KC jun-01-2019 sep-03-2019   NA   1 20    0
64      40   FB jun-17-2019 oct-31-2019   NA   1 20    0
65      40   SF jun-17-2019 oct-31-2019   NA   1 20    0
66      40   MO apr-07-2019 jul-02-2019   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	0	24	24	24	15
CO	NA	NA	NA	NA	0	0	0	0	24	24	24	15
KO	NA	NA	NA	NA	0	0	0	0	24	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	6	27
SF	NA	NA	NA	NA	0	0	0	0	0	0	6	27
MO	NA	NA	NA	NA	0	0	0	0	7	12	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	1500	2000	500
KC	NA	NA	NA	NA	NA	NA	NA	NA	3600	4000	4000	4000
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	NA	28	28	28	28
CO	28	28	26	NA	NA	NA	NA	NA	28	28	28	28
KO	NA	28	NA	NA	NA	NA	NA	NA	28	28	28	28
KC	NA	NA	NA	NA	NA	NA	NA	NA	26	26	26	26
FB	26	NA	NA	NA	NA	NA	NA	NA	NA	NA	26	26
SF	26	26	NA	NA	NA	NA	NA	NA	NA	NA	26	26
MO	NA	NA	NA	NA	NA	NA	NA	NA	26	26	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	13	30	31	26
KC	NA	NA	NA	NA	0	0	0	0	0	30	31	31
FB	NA	NA	NA	NA	0	0	0	0	0	14	31	31
SF	NA	NA	NA	NA	0	0	0	0	0	14	31	31
MO	NA	NA	NA	NA	0	0	0	24	31	30	2	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	NA	28	NA	NA	NA	NA	NA	NA	24	24	24	24
KC	20	NA	NA	NA	NA	NA	NA	NA	NA	20	20	20
FB	20	20	NA	NA	NA	NA	NA	NA	NA	20	20	20
SF	20	20	NA	NA	NA	NA	NA	NA	NA	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	0.1926
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
