February 15, 2002

TO: Klamath River Technical Advisory Team

FROM: California Department of Fish and Game
Ocean Salmon Project
Marine Region

SUBJECT: 2001 Klamath River fall chinook age-composition

This memorandum presents the results of the Klamath-Trinity Basin age-composition project for 2001 fall chinook run. This project was a joint venture between the Hoopa Valley Tribe (HVT), the Yurok Tribe (YT), the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Game (CDFG), National Marine Fisheries Service (NMFS), and the U.S. Forest Service (USFS). The HVT was responsible for scale analysis for the Trinity River, and the YT was responsible for the Klamath River. The USFWS providing scale reading assistance to the YT. Scale collection was done by HVT, YT, USFWS, CDFG, and USFS. The HVT, NMFS, and CDFG compiled the final age-composition report.

A total of 18,005 scales from 16 different sampling locations were read to estimate the age-composition of the run (Table 1). Each scale was read twice (independently by different readers). A third reader was used as needed to resolve any discrepancies between the two primary readers. A total of 596 scales were unusable due to scale re-absorption, regeneration, inconclusive age estimates, or were coded-wire-tagged (CWT) fish non-randomly sampled at Iron Gate Hatchery (IGH).

Analysis of scale reader error for the Klamath River samples indicated that scale readers aged known age fish with an overall accuracy rate of 90.6% (n=500). In the Klamath River, 81.3% (n=16) of the age 2 fish were correctly aged, 90.3% (n= 311) of the age 3 fish were correctly aged, 92.1% (n=152) of the age 4 fish were correctly aged, and 100% (n=1) of age 5 fish were aged correctly. Scale reading results were adjusted for reader bias using a maximum likelihood estimator described by Kimura and Chikuni (1987).

Analysis of scale reader error for the Trinity River samples indicated that scale readers aged known age fish with an overall accuracy rate of 98.2% (n=3,451). In the Trinity River, 95.5% (n=22) of the age 2 fish were correctly aged, 98.8% (n= 2,059) of the age 3 fish were correctly aged, and 97.3% (n=1,370) of the age 4 fish were correctly aged (no known age 5 scales were read). Scale reading results were adjusted for reader bias using a maximum likelihood estimator described by Cook and Lord (1978) and Cook (1983).

Two-year-old fish (jacks) numbers were taken from the final 2001 mega-table (CDFG 2002). The number of jacks recorded in the mega-table was initially determined by using length-frequency distributions to determine the length "cutoff" for age 2 fish (jack "cutoff"). The jack "cutoff" is defined as the visual break in the length-frequency distribution between the age 2 and age 3 fish. In some instances, exceptions were made to the jack "cutoff" method. The scale age apportionment for jacks and adults were used where the jack "cutoff" method was determined to be biased (Appendix A). The proportions of fish belonging to age classes 3, 4, and 5 were adjusted so that the sum of all ages totaled 100%.

In fisheries and areas where an insufficient number of scales were collected, the age-composition of areas that were believed to best represent the under-sampled areas was used a surrogate (Appendix A). The surrogate age-composition was obtained by weighting the representative area compositions according to their escapements.

The Trinity River natural escapement was derived from an estimate of the total number of fish that passed the Willow Creek Weir (WCW) as follows. First, the age-composition of the Trinity River Hatchery (TRH) and upper Trinity recreational fishery (UTC) was determined. The bias-corrected age-composition of the WCW non-adipose-clipped fish scales was determined and applied to the estimated total for above WCW to give the numbers at age passing the WCW. The TRH and UTC age-structure was then deducted from the numbers above WCW to estimate natural area spawner age-composition above WCW. The same proportions-at-age were also used to derive the age-composition of the natural area spawners below WCW.

The final 2001 mega-table estimates by individual river reach or stream, the Klamath River age-composition, the Trinity River age-composition and supporting calculations are provided in Appendices B, C and D.

2001 Klamath River Basin Age-Composition

Brood Year	Age	River Run	Proportion
1999	2	11,365	0.0567
1998	3	99,977	0.4984
1997	4	89,171	0.4446
1996	5	67	0.0003
	Total	200,579	

Literature Cited

Kimura, D.K. and Chikuni, S. 1987. Mixtures of empirical distributions: an iterative application of the age-length key. Biometrics 43:23-35.

Cook, R.C., and G.E. Lord. 1978. Identification of stocks of Bristol Bay sockeye salmon, *Oncorhynchus nerka*, by evaluating scale patterns with a polynomial discriminant method. Fishery Bulletin 76:415-423.

Cook, R.C. 1983. Simulation and application of stock composition estimators. Canadian Journal of Fisheries and Aquatic Sciences 40:2113-2118.

CDFG. 2002. Klamath River basin fall chinook salmon spawner escapement, in-river harvest and run-size estimates, 1978-2001. Memorandum.

List of Participants at the January 30-31,2002 Age-Composition Meeting
(in alphabetical order)

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Table 1. Scale sampling locations and numbers of scales provided for the 2001 Klamath River Fall chinook age-composition.

Sampling Location	Scales	Used	Not Used	Agency
Iron Gate Hatchery	2,558	2,378	180	CDFG
Trinity River Hatchery	4,556	4,505	51	HVT,CDFG
Klamath River mainstem	501	483	18	USFWS
Salmon River Carcass Survey	328	316	12	USFS, CDFG
Scott River Carcass Survey	558	538	20	USFS, CDFG
Shasta River Weir & Carcass	282	280	2	USFS, CDFG
Bogus Creek Weir	1,380	1,214	166	CDFG
Lower Trinity River Carcass	6	6	0	HVT
Willow Creek Weir	1,541	1,493	48	HVT,CDFG
Lower Klamath River Creel Census	1,943	1,907	36	CDFG
Upper Klamath River Creel Census	22	22	0	CDFG
Lower Trinity River Creel	139	136	3	HVT,CDFG
Upper Trinity River Creel	378	370	8	HVT,CDFG
Hoopa Tribal Net Harvest	1,117	1,099	18	HVT
Yurok Tribal Net Harvest (Mouth to Hwy 101)	1,236	1,216	20	YT
Yurok Tribal Net Harvest (Hwy 101 to Weitchpec)	1,460	1,446	14	YT
TOTALS	18,005	17,409	596	

Table 1. Age Composition of the 2001 Klamath River fall chinook run as determined by the Klamath River Technical Advisory Team, with assistance from CDFG's Klamath and Trinity River projects.

Escapment & Harvest			Age 4	5	Total Adults	Total Run
Hatchery Spawners						
Iron Gate Hatchery (IGH)	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
Trinity River (TRH)	[illegible]	[illegible]	7,084	[illegible]	17,907	[illegible]
Subtotals	**1,631**	**31,305**	**23,802**	**4**	**55,111**	**56,742**
Natural Spawners						
Trinity River mainstem above WCW	[illegible]	16,586	19,374	1	35,962	[illegible]
Trinity River mainstem above WCW	[illegible]	116	136	0	252	261
Salmon River basin	[illegible]	1,433	1,174	0	2,607	3,350
Scott River basin	744	3,083	2,293	[illegible]	5,398	6,142
Shasta River Basin	2,641	4,837	3,615	0	8,452	11,093
Bogus Creek Basin	648	8,200	3,716	11	11,927	12,575
Klamath River mainstem (IGH to Shasta R)	739	3505	3642	0	7,148	7887
Klamath River mainstem (Shasta R to Indian Cr)	277	1316	1368	0	2,684	2961
Trinity Tributaries above Reservation	[illegible]	336	393	0	729	756
Klamath Tributaries above Reservation	538	1,265	972	3	2,240	2,778
Hoopa Reservation Tributaries	6	78	91	0	169	175
Yurok Reservation Tributaries	48	268	220	0	488	536
Subtotals	**7,753**	**41,024**	**36,994**	**38**	**78,056**	**85,810**
Total Spawner Escapement	**9,384**	**72,329**	**60,796**	**42**	**133,167**	**142,552**
Angler Harvest						
Klamath River (below Hwy 101 bridge)	298	2,621	1,988	11	4,620	4,918
Klamath River (Hwy 101 to Coon Cr. Falls)	825	1,132	824	4	1,960	2,785
Klamath River (Coon Cr. Falls to IGH)	242	1,726	1,308	7	3,041	3,283
Trinity River basin (above WCW)	65	1,337	459	0	1,796	1,861
Trinity River basin (below WCW)	70	472	238	0	710	780
Subtotals	**1,499**	**7,289**	**4,817**	**22**	**12,128**	**13,627**
Indian Net Harvest						
Klamath River (below Hwy 101)	275	13,738	16,733	1	30,472	30,747
Klamath River (Hwy 101 to Trinity mouth)	83	2,633	2,383	0	5,016	5,099
Trinity River (Hoopa Reservation)	60	2,346	2,608	0	4,954	5,014
Subtotals	**418**	**18,716**	**21,724**	**1**	**40,442**	**40,860**
Total in-river Harvest	**1,918**	**26,005**	**26,541**	**23**	**52,569**	**54,487**
Totals						
In-River Harvest and Escapement	11,302	98,334	87,337	65	185,737	197,039
Angling Mortality (2% of harvest)	30	146	96	<1	242	272
Net Mortality (8% of harvest)	33	1,497	1,738	<1	3,235	3,268
Total In-river Run	**11,365**	**99,977**	**89,171**	**67**	**189,214**	**200,579**

Appendix A. Documentation of the methods used by the KRTAT to determine the age composition of the 1996 Klamath River fall chinook run.

Age computation methods	
Hatchery Spawners	
Iron Gate Hatchery (IGH)	Jack, adult breakout from scale age analysis.
Trinity River (THH)	Jack, adult breakout from scale age analysis.
Natural Spawners	
Trinity River mainstem above WCW	Calculated from total Willow Creek Weir age structure from scales) minus THH age structure from scales) minus recreational harvest (jack: from CDFG Megatable(MT); adults from scales).
Trinity River mainstem below WCW	Used age% from TR nat. spawner mainstem above WCW to calculate jack and adult structure; adults= 2*redd counts; total run=adults/(1-%jacks).
Salmon River basin	Jack, adult breakout from scale age analysis.
Scott River basin	Jack, adult breakout from scale age analysis.
Shasta River basin	Jack, adult breakout from scale analysis.
Bogus Creek basin	FL <64 for jacks, adult structure from scale age analysis.
Klamath main stem (IGH to Shasta R)	USFW mark-recapture carcass survey; used Schaefer estimate (minus week 1) for adults; Jack, adult breakout from scale analysis.
Klamath main stem (Shasta R to Indian Cr.)	Used scale age% from Klamath main stem (IGH to Shasta R) to calculate jack and adult structure; adults= 2*redd counts; total run=adults/(1-%jacks).
Trinity Tributaries above Reservation	Used age% from TR nat. spawners mainstem above WCW to calculate jack and adult structure; adults= 2*redd counts; total run=adults/(1-%jacks).
Klamath Tributaries above Reservation	Surrogate based on unweighted average age structure from the Shasta, Scott, and Salmon Rivers.
Hoopa Reservation Tributaries	Used age% from TR nat. spawners mainstem above WCW to calculate jack and adult structure; adults= 2*redd counts; total run=adults/(1-%jacks).
Yurok Reservation Tributaries	Surrogate based on jacks observed during Blue Creek dive surveys; adult breakout from Salmon River scales analysis.
Angler Harvest	
Klamath River (below Hwy 101 bridge)	Lower Klamath R. creel census, jacks from Megatable, adult structure from scales
Klamath River (Hwy 101 to Coon Cr. Falls)	Lower Klamath R. creel census, jacks from Megatable, adult structure from scales
Klamath River (Coon Cr. Falls to IGH)	Lower Klamath R. creel census, jacks from Megatable, adult structure from scales
Trinity River basin (above WCW)	Jack and adult structure from scale analysis.
Trinity River basin (below WCW)	Jack and adult structure from scale analysis.
Indian Net Harvest	
Klamath River (below Hwy 101)	FL< 61 for jacks, adult structure from scale analysis.
Klamath River (Hwy 101 to Trinity mouth)	Jack and adult structure from scale analysis.
Trinity River (Hoopa Reservation)	Jack and adult breakout from scale analysis.

Appendix B. 2001 Mega-Table Estimates by River Reach and Stream.

	New Data			Klamath Age Comp (Feb 11 '02)											
	No.	No.		CALCULATED AGE						SCALE AGE PROPORTIONS					
Hatchery spawners	Grilse	Adults	Total	2	3	4	5	Total		2	3	4	5	Total	Notes
Iron Gate Hatchery (IGH)	1364	37204	38568	1364	20483	16719	3	38568	scales	0.03533	0.53133	0.43334	[illegible]	[illegible]	[illegible]
									IGH cwts	19	337	244	3	[illegible]	[illegible]
Trinity River Hatchery (TRH)	267	17907	18174	267	10822	7084	1	18174	scales	0.01822	0.59526	0.38653	[illegible]	[illegible]	[illegible]
Hatchery sub-total:	1631	55111	56742	1631	31305	23802	4	56742	TRH cwts	29	3229	1957	1	[illegible]	[illegible]
Natural Spawners															
Trinity River mainstem above WCW	1333	35962	37295	1333	16586	19374	1	37295	scales	0.03575	0.44473	0.51949	[illegible]	[illegible]	[illegible]
Trinity River mainstem below WCW	9	252	261	9	116	136	0	261	TR nat above	0.03575	0.44473	0.51949	[illegible]		
Salmon River Basin-includes Wooley '	743	2607	3350	743	1433	1174	0	3350	scales	0.22154	[illegible]	0.35034	[illegible]	[illegible]	[illegible]
Scott River	744	5398	6142	744	3083	2293	23	6142	scales	0.12107	0.50173	0.37525	[illegible]	[illegible]	[illegible]
Shasta River	2641	8452	11093	2641	4837	3615	0	11093	scales	0.23805	0.43605	0.32587	[illegible]	[illegible]	[illegible]
Bogus Creek	648	11927	12575	648	8200	3716	11	12575	scales	464 FL	0.61997	0.29577	[illegible]	[illegible]	[illegible]
Main stem Klamath (IGH to Shasta R)	739	7148	7887	739	3505	3643	0	7887	scales	0.09369	0.44447	0.46184	[illegible]	[illegible]	[illegible]
Main stem Klamath (Shasta R to Indi	277	2684	2961	277	1316	1368	0	2961	Upper main	0.09369	0.44447	0.46184	[illegible]	[illegible]	[illegible]
sub-total:	7134	74430	81564	7134	39077	35313	35	81564							
									Weighted Scott Shasta Salmon SSS - [illegible]						
									SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
		Surrogate													
Klamath Tributaries															
Aiken Cr.	0	0	0	0	0	0	0	0	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Beaver Cr.	102	426	528	102	241	185	1	529	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Bluff Cr.	8	33	41	8	19	14	0	41	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Boise Cr.	0	0	0	0	0	0	0	0	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Camp Cr.	54	224	278	54	126	97	0	278	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Clear Cr.	59	246	305	59	139	107	0	305	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Dillon Cr.	34	140	174	34	79	61	0	174	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Elk Cr.	48	200	248	48	113	87	0	248	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Grider Cr.	108	449	557	108	254	195	1	557	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Horse Cr.	0	0	0	0	0	0	0	0	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Independence Cr.	4	16	20	4	9	7	0	20	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Indian Cr.	36	149	185	36	84	65	0	185	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Irving Cr.	0	0	0	0	0	0	0	0	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Perch Cr.	0	0	0	0	0	0	0	0	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Red Cap Cr.	33	139	172	33	78	60	0	172	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Thompson Cr.	52	218	270	52	123	95	0	270	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Ti Cr.	0	0	0	0	0	0	0	0	SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Klamath Tribs sub-totals	538	2240	2778	538	1265	972	2	2778							
									SSS	0.19365	0.45527	0.34984	[illegible]	[illegible]	
Trinity Tributaries															
Horse Linto Cr.	21	574	595	21	265	309	0	595	TR nat above	0.03575	0.44473	0.51949	[illegible]	[illegible]	
Willow Cr.	5	156	161	6	72	84	0	161	TR nat above	0.03575	0.44473	0.51949	[illegible]	[illegible]	
sub-totals	26	730	756	27	336	393	0	756							
Non-Reservation Misc. tribs sub tot	564	2970	3534	565	1601	1365	3	3534							

Appendix B (cont.). 2001 Mega-Table Estimates by River Reach and Stream.

Reservation Tributaries-Hoopa Valley															
Campbell Cr.	0	0	0	0	0	0	0	0	TR nat above	0.03575	0.44473	0.51943	0.00000		
Hostler	0	0	0	0	0	0	0	0	TR nat above	0.03575	0.44473	0.51943	0.00000		
Mill	3	98	101	4	45	52	0	101	TR nat above	0.03575	0.44473	0.51943	0.00000		
Soctish	0	0	0	0	0	0	0	0	TR nat above	0.03575	0.44473	0.51943	0.00000		
Supply Cr.	1	24	25	1	11	13	0	25	TR nat above	0.03575	0.44473	0.51943	0.00000		
Tish Tang Cr.	1	42	43	2	19	22	0	43	TR nat above	0.03575	0.44473	0.51943	0.00000		
Others	0	6	6	0	3	3	0	6	TR nat above	0.03575	0.44473	0.51943	0.00000		
sub-total	5	170	175	6	78	91	0	175							
Reservation Tributaries-Yurok															
Blue Cr.	48	488	536	48	268	220	0	536	Salmon R	not used	0.03780	0.33016	0.00000	1.0000	
reservation tributaries sub-total	53	658	711	54	346	311	0	711							
Natural spawner sub-total:	7751	78058	85810	7753	41024	36934	39	85810							
Total spawner sub-total:	9382	133169	142552	9384	72329	60736	42	142552							
Angler Harvest															
Klamath River-below Hwy 101	298	4620	4918	298	2621	1998	11	4919	LRC scales	<62 FL	0.44491	0.33964	0.00173	1.787	Scale Analysis
									LRC cwts		40	31	1	72	Scale Analysis
Klamath River- Hwy 101 to Coon Cr	825	1960	2785	825	1132	824	4	2785	LRC scales	<62 FL	0.44491	0.33964	0.00173	1.787	Scale Analysis
									LRC cwts		74	22	1	98	Scale Analysis
Klamath River- Coon Cr. to IGH	242	3041	3283	242	1726	1308	7	3283		<62 FL	0.44491	0.33964	0.00173	1.787	Surrogate LRC Anal
Trinity River-below Willow Cr. weir	70	710	780	70	472	238	0	780	scales	0.0000	0.8043	0.2957	1	1.77	Scale Anal sys
									lower cwts	0	5	2	1	8	
Trinity River-upstream of Willow Cr	65	1796	1861	65	1337	459	0	1861	scales	0.0737	0.7263	0.2437	1	1.77	Scale Anal sys
Angler harvest subtotal:	1499	12128	13627	1499	7289	4817	22	13627	upper cwts	1	1	1	1	4	
Indian Net Harvest															
Klamath River-Below 101 hwy	275	30472	30747	275	13738	16733	1	30747	scales	<61 FL	0.4510	0.5487	0.0000	1.0000	Klam scales
									YTFP EST cwt		33	59	1	93	Klam cwts
Klamath River-101 to Trinity	83	5016	5099	83	2633	2383	0	5099	scales	0.0167	0.5136	0.4697	0.0000	1.77	Klam scales
									YTFP MU cwt	0	79	48	1	127	Klam cwts
Trinity River	60	4954	5014	60	2346	2608	0	5014	scales	0.0124	0.4552	0.5323	0	1.77	Scale Analysis
Net harvest sub-total:	418	40442	40860	418	18716	21724	1	40860	Hoopa cwts	0	86	71	1	157.00	
Total harvest	1918	52569	54487	1918	26005	26541	23	54487							
Totals															
In-river run and escapement	11302	185737	197039	11302	98334	87337	66	197039							
Angling mortality (2% of harvest)	30	243	273	30	146	96	0	272							
Net mortality (8% of harvest)	33	3236	3269	33	1497	1738	0	3268							
Total in-river run	11365	189215	200580	11365	99977	89171	66	200579							

Appendix C. Klamath River Age-Composition and Calculations

Unknown scaler outs

Ages as Read	Age 2	Age 3	Age 4	Age 5	Total
BOGUS	[illegible]	[illegible]	[illegible]		
LRC	[illegible]	[illegible]	[illegible]		
URC		[illegible]	[illegible]	[illegible]	[illegible]
IGH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SALMON	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SCOTT	[illegible]	[illegible]	[illegible]		[illegible]
SHASTA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
YTFF EST	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
YTFF M&U	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAINSTEM	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Validation Matrix

		Known Age			
		[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Read	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Age	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Percentages from validation matrix

		Known Age			
		2	3	4	5
	2	0.83	0.02	0	1
Read	3	0.19	0.9	0.00	1
Age	4	0	0.08	0.50	1
	5	0	0	0	1
Total		1	1	1	1

Flug is each area from unknown read scale:

		Read Age				
		2	3	4	5	Total
n	MAINSTEM	40	220	222.999999	1.00E-06	482
p		0.08282	0.4554863	0.4616977	0	1

Output for current area

		Adjusted Ages				
		2	3	4		Total
	b	45.3	214.7	222.3	0	482
MAINSTEM	p	0.09366	0.44442	0.46191	0	1
MAINSTEM	p	0.09366	0.44442	0.46191	0	1

Copy and save output (corrected proportions) here

BOGUS	p	0.10105	0.61802	0.2801	0.00082	1
LRC	p	0.21282	0.44683	0.33864	0.00172	1
URC	p	0.38408	0.40504	0.21088	0	1
IGH	p	0.03532	0.52633	0.43534	0	1
SALMON	p	0.22166	0.4278	0.35036	0	1
SCOTT	p	0.12107	0.50193	0.37329	0.00372	1
SHASTA	p	0.23605	0.43608	0.32587	0	1
YTFP EST	p	0.00025	0.45097	0.54868	0	1
YTFF M&U	p	0.0187	0.51364	0.46967	0	1
MAINSTEM	p	0.09366	0.44442	0.46191	0	1

All known age fish

	Age 2	Age 3	Age 4	Age 5	Total
BOGUS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
LRC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
URC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
IGH	[illegible]	[illegible]	[illegible]		[illegible]
SALMON	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SCOTT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SHASTA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
YTFF EST	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
YTFF M&U	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAINSTEM	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Megatable unknown redistributed using corrected percentages

	Megatable totals minus known age totals + unknowns				
	Age 2	Age 3	Age 4	Age 5	Megatable Unknowns
BOGUS	1,203	7,356	3,334	10	12,540
LRC	1,765	3,708	2,855	14	8,294
URC	1,259	1,328	694	0	3,279
IGH	1,345	20,133	16,594	0	38,072
SALMON	742	1,433	1,174	0	3,350
SCOTT	744	3,083	2,295	23	6,142
SHASTA	2,670	4,895	3,653	0	11,217
YTFF EST	11	13,857	16,878	0	30,746
YTFF M&U	83	2,536	2,382	0	5,099
MAINSTEM	939	3,508	3,447	0	7,893

KNOWN AGE + CORRECTED UNKNOWN

	AGE 2	AGE 3	AGE 4	AGE 5	TOTAL
BOGUS	1,207	7,372	3,534	10	12,573
LRC	1,767	3,820	2,862	15	8,464
URC	1,259	1,331	694	0	3,283
IGH	1,364	20,483	16,711	2	38,561
SALMON	742	1,433	1,174	0	3,350
SCOTT	744	3,083	2,295	23	6,145
SHASTA	2,670	4,895	3,653	0	11,217
YTFF EST	11	13,857	16,878	1	30,747
YTFF M&U	83	2,535	2,382	0	5,099
MAINSTEM	939	3,508	3,447	0	7,893

Proportions from known + corrected

	AGE 2	AGE 3	AGE 4	AGE 5	TOTAL
BOGUS	0.1008	0.6183	0.2802	0.0008	1
LRC	0.2088	0.4512	0.3381	0.0018	1
URC	0.3836	0.4058	0.2106	0	1
IGH	0.0354	0.5313	0.4333	0.0001	1
SALMON	0.2218	0.4278	0.3504	0	1
SCOTT	0.1211	0.5019	0.3733	0.0037	1
SHASTA	0.238	0.4361	0.3259	0	1
YTFF EST	0.000351	0.450679	0.548937	2.25E-05	1
YTFF M&U	0.016283	0.516336	0.467382	0	1
MAINSTEM	0.0937	0.4444	0.4619	0	1

Proportions of jacks in megatable

	MT AGE 2	MT AGE 2	MT TOT	DIFF MT/JAC-MT	
BOGUS	0.0515	648	12,573	4.90	619
LRC	0.1392	1178	8,464	7.00	589
URC	0.0727	242	3,283	31.00	1,017
IGH	0.0365	1408	38,561	-0.30	-44
SALMON	0.194	650	3,350	2.80	93
SCOTT	0.1571	965	6,142	-2.60	-223
SHASTA	0.2222	2494	11,217	1.80	176
YTFF EST	0.0089	275	30,747	-0.90	-264
YTFF M&U	0.0191	97	5,099	-0.30	-34
MAINSTEM	0.1288	1016	7,893	-2.50	-277

Appendix D. 2001 TRINITY RIVER FALL CHINOOK RUN AGE-COMPOSITION AND CALCULATIONS

CORRECTION FROM SCALE AND CWT AGE DATA

WCW - William O. Weir — Cwt Age

	no cwt	2	3	4	5
unreadable	38				
2	28	1			
Scale Ages 3	429		404	1	
4	566		1	110	
5					
	1066	1	405	111	

LOWTRINREC - [illegible] — Cwt Age

unreadable		
Scale Ages		

HUPANET - Hoopa Tribal Hatchery — Cwt Age

	no cwt	2	3	4	5
unreadable	14				
2	11				
Scale Ages 3	[illegible]		43	1	
4	1[illegible]		2	6[illegible]	
5					
	[illegible]	0	2[illegible]	[illegible]	

TRH - [illegible] — Cwt Age

unreadable		
Scale Ages		

LOWTRINCARCASS - Lower Trinity Tribs — Cwt Age

	no cwt	2	3	4	5
unreadable					
2	2				
Scale Ages 3	2				
4	1				
5	1				
	6				

UPPERINREC - [illegible] — Cwt Age

unreadable		
Scale Ages		

(A) POOLED data from all areas: Scale age-CWT age matrix.

(Includes only fish with both scale age and CWT [illegible])

	2	3	4	5
2	23			
3	1	[illegible]		28
4	5	34	[illegible]	
5	0			

(B) Scale-CWT age matrix of proportions of column sums

(C) Uncorrected age vectors for [illegible]

ALL [illegible]

Age	[illegible]	[illegible]
2	[illegible]	[illegible]
3	[illegible]	[illegible]
4	[illegible]	[illegible]
5	[illegible]	[illegible]
	[illegible]	[illegible]

WCW	HUPANET	LOWTRINREC	TRH	LOWTRINCARC	UPPERINREC
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(D) Correction Matrix for ages 2,3,4 .

(Inverse of Scale-CWT age proportion matrix)

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Uncorrected age vectors for age 2 - 4

WCW	HUPANET	LOWTRINREC	TRH	LOWTRINCARC	UPPERINREC
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(E) Corrected Scale age proportion vectors for scale-aged 2 - 4 fish, and integrated with uncorrected proportions of age 5 fish.

Age	WCW	w/age5	HUPANET	w/age5	LOWTRINREC	w/age5	TRH	w/age5	LOWTRINCARCASS	w/age5	UPPERINREC	w/age5
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(F) Proportions scaled to adult fish only (age 3 to 5).

	WCW	HUPANET	LOWTRINREC	TRH	LOWTRINCARCASS	UPPERINREC
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(G) TRH adult return, [illegible] adult age [illegible]

Total Adults	[illegible]	[illegible]
Scale CWT adults	[illegible]	
To apportion	[illegible]	

Corrected adult age proportion vector

Age	Proportion	Apportioned CWT #		w TRH Adults apportioned by age 3-5 proportions	
				[illegible]	
3	[illegible]	[illegible]	[illegible]		[illegible]
4	[illegible]	[illegible]	[illegible]		
5	[illegible]				
	[illegible]	[illegible]	[illegible]		

Appendix D (cont.). 2001 TRINITY RIVER FALL CHINOOK RUN AGE-COMPOSITION AND CALCULATIONS

(G-1) **TRH** fall chinook return, apportioned by a reported age 2 - 5 proportion.

Total Chinook	[illegible]	[illegible]
Minus CWT chinook	[illegible]	
[illegible]	[illegible]	

Reported chinook age 2 - 5 proportion sample

Age Proportion	Age Chinook CWT %		= TRH return apportioned by age 2-5 proportions
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

(H) **Natural** Escapement: Per [illegible] by adult age structure.

Upstream Count Adults	[illegible]	
+ TRH Adults	[illegible]	(Apply
= Natural Adults	[illegible]	Adjusted WCW
= Total	[illegible]	proportions [illegible]

Million (Required = [illegible])

Age	Adjusted WCW % Total [illegible]	Apportioned Natural Escapement of Adults
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

(H-1) **Natural** Escapement: Apportioned by age 2 - 5 proportions.

Upstream Count #	[illegible]	
+ TRH #	[illegible]	(Apply
= Natural #	[illegible]	Adjusted WCW
Total	[illegible]	proportions [illegible]

Age	Adjusted WCW % Total [illegible]	Apportioned Natural Escapement: Ages 2 - 5
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

(H-2) **Natural Escapement:** [illegible]

Adjust WCW for non-CWTs

Age	#	Proportion Original	Proportion Adjusted	Proportion Adjusted Per million
2	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]

Natural	Sport			TRH		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(I) **Lower Trinity Recreational Harvest:** [illegible] by adult age structure.

Total Adults =	[illegible]	[illegible]
Minus CWT Adults	[illegible]	
Non-CWT Adults [illegible] =	[illegible]	

% Estimated adult age structure Per [illegible] Non-CWT #			= Per [illegible] adult [illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

(I-1) **Lower Trinity Recreational Harvest:** [illegible]

Total [illegible] =	[illegible]	
Minus CWT #	[illegible]	
Non-CWT [illegible] =	[illegible]	

% Estimated age 2 - 5 structure Per [illegible] Non-CWT #			= Per [illegible] age 2 - 5 [illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

Appendix D (cont.). 2001 TRINITY RIVER FALL CHINOOK RUN AGE-COMPOSITION AND CALCULATIONS

(J) Hoopa Tribal Harvest: [illegible]

Total Adults = [illegible]
Hoopa CWT Adults [illegible]
Non-CWT adults to apportion = [illegible]

[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

(J-1) Hoopa Tribal Harvest: [illegible]

Total Chinook = [illegible]
Hoopa CWT Chinook [illegible]
Non-CWT chinook to apportion = [illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

(K) Hoopa Valley Tributaries: [illegible]

Adults = [illegible]

Grilse observed = [illegible]

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

(K-1) Hoopa Valley Tributaries: [illegible]

Chinook = [illegible]

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

(L) Upper Trinity Recreational Harvest: [illegible]

Adults = [illegible]

Grilse observed = [illegible]

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

(L-1) Upper Trinity Recreational Harvest: [illegible]

Total Chinook = [illegible]

[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]
4	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]