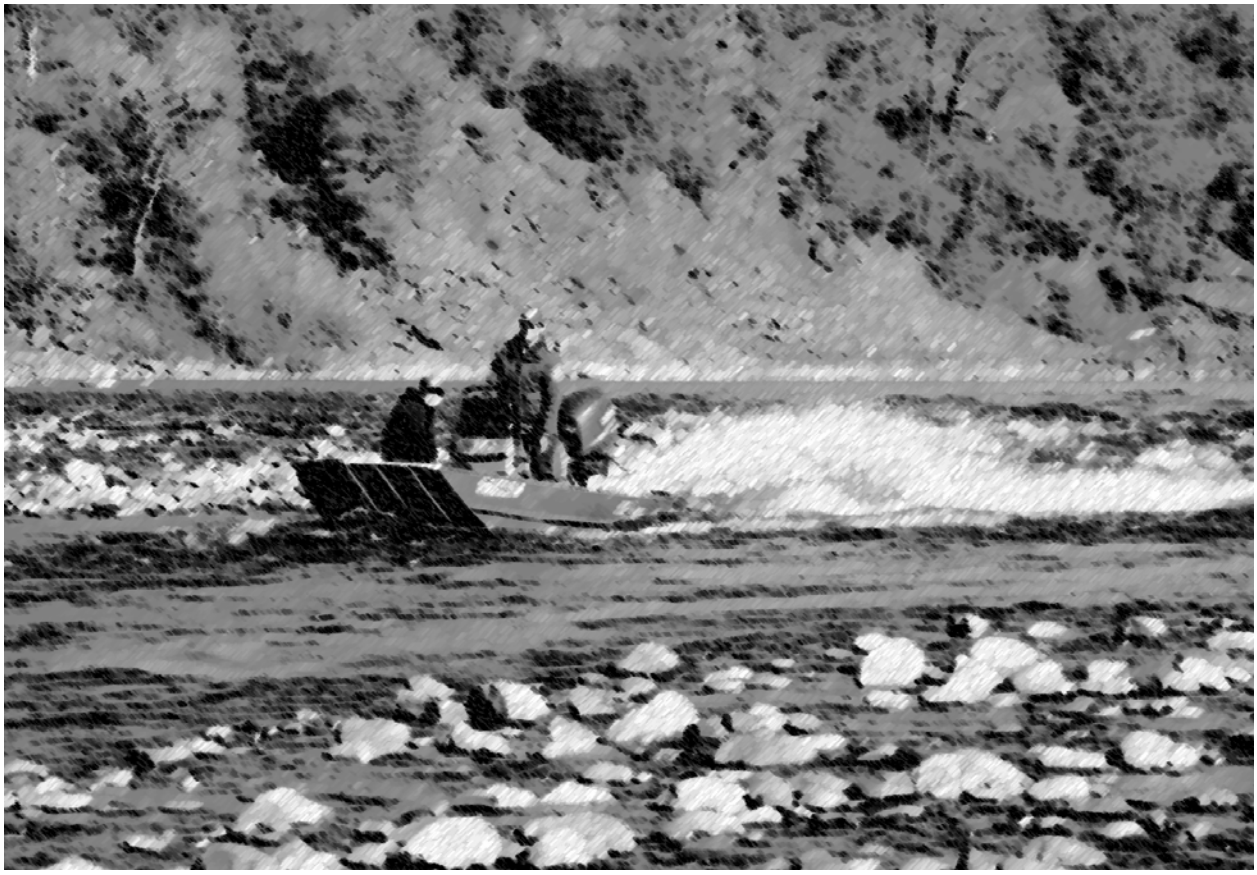
State of California
The Resources Agency
Department of Fish and Game
North Central Region

Lower Yuba River Chinook Salmon Escapement Survey

October 2007 – January 2008



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Introduction

The Yuba River, a tributary of the Feather River, drains a watershed of 3,468 kilometers^2 (1,339 miles^2), originating in the higher elevations of the west slope of the Sierra Nevada. The lower Yuba River is drained by the North, Middle, and South Yuba Rivers. The three tributaries converge near, and are impounded by the U.S. Army Corps of Engineers' Englebright Dam, approximately 39 kilometers (24 river miles) east of the city of Marysville. Englebright Dam represents the upper limits of anadromous fish migration and spawning (Drury 2001; Massa 2006, 2007). The lower Yuba River provides spawning habitat for adult spring-, fall-, and late fall-run Chinook salmon, as well as Central Valley steelhead trout (CDFG 1991). In addition, the river below Daguerre Point Dam supports other anadromous species including American shad and striped bass. Over the years, lower Yuba River anadromous salmonid populations have been adversely affected by water and land use practices such as mining, dam construction, and water diversions that have impacted available spawning habitat through non-natural flow regimes, unsuitable water temperatures, and an overall loss of available spawning gravel substrates. These practices have affected adult Chinook salmon populations through losses to crucial habitat during essential rearing, migration and spawning periods.

Historically, the spring-run Chinook salmon was considered the most abundant run of salmon in the Central Valley of California, with yearly escapements in the Sacramento River estimated to have reached 600,000 spawners (Yoshiyama 2001). The spring-run was also a major component of the Yuba River fishery. Prior to extensive habitat degradation by hydraulic mining and hydroelectric dams, spring-run Chinook salmon were able to ascend high into the Sierra Nevada in the North Yuba River to Loves Falls near Sierra City (Yoshiyama 2001). The Middle and South Yuba Rivers were also utilized for spawning and rearing. Currently, spring-run Chinook salmon are restricted from their historic range and must spawn in the sub-optimal habitat downstream of Englebright Dam. Spring-run Chinook salmon on the lower Yuba River were listed as threatened under both the Federal and State Endangered Species Acts on September 16, 1999, and their threatened status was reaffirmed on July 28, 2005.

Fall-run Chinook salmon also historically utilized the lower Yuba River. They supported up to 15% of the total annual escapement of fall-run Chinook salmon in the Sacramento River system (Reynolds 1993). Hydraulic mining activities in the past have played a major role in habitat degradation, through water diversions that blocked fish passage and through extensive siltation that destroyed prime spawning areas. Due to fall-run Chinook salmon life history traits, Yuba River populations have not been largely affected by the spatial loss of habitat due to dam construction, but rather are more affected by the associated non-natural flows and loss of rearing/spawning habitat; notably the absence of natural gravel recruitment and large woody debris.

Escapement surveys have been conducted on the lower Yuba River to estimate the number of returning adult Chinook salmon since 1953. Previous estimates were infrequent and unlike more recent surveys (1994, 1996-2006), methods were not consistent from year to year. Survey duration and area of sampling varied, resulting in data that are statistically inappropriate for trend analysis. Escapement survey methods have been more consistent in recent years in both duration

and actual area surveyed. This year's survey on the Yuba River incorporates the methods of more recent escapement protocols.

Methods

The lower Yuba River Chinook salmon escapement survey was conducted from the Narrows pool downstream to the Simpson Lane Bridge; a distance of approximately 32 kilometers (20 river miles). The river was stratified into six reaches (**Table 1**). All reaches were surveyed once a week utilizing two jet boats and a crew of five to six crew members.

Table 1. Yuba River fall-run Chinook salmon escapement survey reaches.

Reach	Location	Kilometers
1	Narrows pool to Timbuctoo Bend (riffle above U.C. Davis Picnic Area)	2.5
2	Timbuctoo Bend to State Route 20 Bridge	2.5
3	State Route 20 Bridge to Old Debris Dam	5
4	Old Debris Dam to Daguerre Point Dam	6
5	Daguerre Point Dam to Hallwood Boulevard	9.5
6	Hallwood Boulevard to Simpson Lane Bridge	6.5
Total		**32**

Fresh adult carcass data were compiled and used in a Schaefer mark-recovery matrix (Schaefer 1951) as modified by Taylor (1974) to produce an adult escapement estimate. Each week fresh carcasses (defined as having one clear eye and pink gills) were counted, measured, sexed and tagged with a color-coded hog ring on the upper jaw for adults and on the lower jaw for grilse. A unique color was used each week to identify the carcasses to a specific tagging week. Each tagged carcass was returned to flowing water for dispersal and possible recapture in subsequent weeks. All observed decomposing carcasses were counted and cut in half with a machete to prevent recounting during subsequent surveys. Decomposing and recovered (previously tagged) carcasses were also cut in half.

Coded-wire tags (CWT) were collected from carcasses with missing adipose fins. Snouts were removed from fresh CWT carcasses and affixed with a tag containing information on fish length, sex, species, method of take, date and a tag code. Collected CWT snouts were frozen and later processed (tags extracted and read) by Department personnel. CWT carcasses were tagged in the lower jaw and returned to flowing water for dispersal.

A grilse estimate was completed by taking the observed proportion of fresh adult to grilse carcasses and extrapolating from the Schaefer adult estimate. A grilse cutoff length of 64.5 cm was utilized to distinguish between adult and sub-adult spawners. This criterion was also used for the 2005 and 2006 surveys. Additionally, the standard cutoff length from the 2003 and 2004

Jones and Stokes study was 64.5 cm. The Department's Ocean Salmon Project has also indicated that 65 cm was an appropriate cutoff length based on analysis of Central Valley Chinook salmon metadata (Neillands 2006).

Scale samples were collected from fresh Chinook salmon carcasses for age determination and cohort reconstruction through cooperation with the Ocean Salmon Project (**Appendix B, Table B-1**). A skin patch containing scales was removed from the scale pocket located posterior of the last dorsal fin ray, and above the lateral line. Each skin patch was placed in an individual envelope containing a unique sample code, date, location, fork length, sex, ad-clip status, and head tag number if available. Scale envelopes were placed in a dry storage area for later processing by the Ocean Salmon Project's scale aging team.

Mean daily flow data were obtained from the Marysville gauging station located on the lower Yuba River near the town of Hallwood.

Results

An estimated 2,604 Chinook salmon (2,423 adult and 81 grilse) spawned in the lower Yuba River survey area during the period of October 2, 2007 to January 3, 2008. (**Appendix A, Table A1**). This estimate was the lowest observed in twelve consecutive years, and was less than a third of the escapement estimate reported for 2006 (8,231 fish) (**Figure 1**).

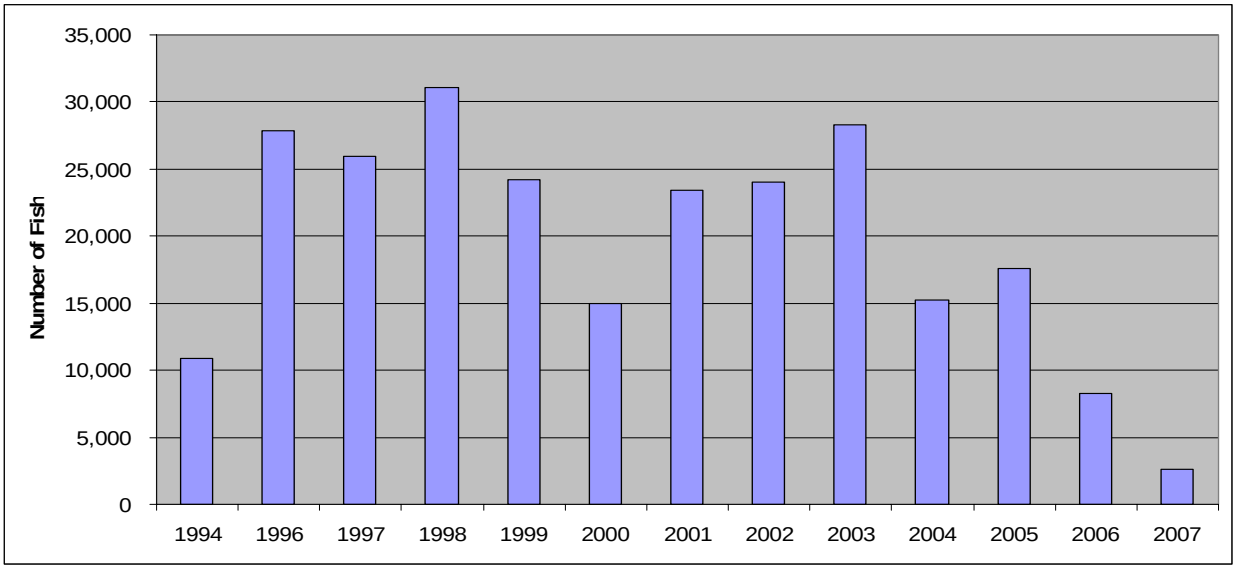

Figure 1. Yuba River Chinook salmon escapement estimates (from comparable methods).

Separate estimates could not be created for each of the six survey reaches due to low sample size, although previous surveys have suggested that the majority of spawning occurs above Daguerre Dam (Jones & Stokes 2006; Massa 2006, 2007). Approximately 70% of the returning escapement in 2006 utilized the area between the Narrows pool and Daguerre Dam, a distance of about 16 kilometers (Massa 2007).

Eight fresh carcasses were identified as having an adipose fin clip and the heads were collected for later CWT extraction and reading (**Table 2**). Of the eight collected heads, five CWTs were successfully extracted and read. The remaining three carcasses with no tags were recorded as having shed the tag. Spring-run Chinook salmon accounted for four of the recoveries, and fall-run accounted for one of the five total recoveries. Although it is difficult to accurately determine time of spawning from carcass recovery dates, spring-run carcasses as identified through CWT recovery suggest a general temporal agreement with accepted spring-run spawning periods. Identified spring-run carcasses were recovered between October 3, 2007 and October 16, 2007 (**Table 2**).

Table 2. Coded-wire tag recoveries from the Yuba River escapement survey from October 2, 2007 to January 3, 2008.

Date Rec	Head Tag #	CWT #	Brood Yr.	Race	Rel Location	Rel Date	# Released	Origin	FL (cm)	Sex
10/3/2007	86399	62401	2003	Spring	San Pablo Bay	5/28/2004	113164	Feather River	88	M
10/9/2007	86280	62411	2004	Spring	Wickland Oil Net Pen	5/25/2005	118156	Feather River	76	F
10/10/2007	86297	62799	2004	Spring	Wickland Oil Net Pen	5/25/2005	53910	Feather River	87	M
10/11/2007	86174	62798	2004	Fall	Wickland Oil Net Pen	6/2/2005	52725	Feather River	78	F
10/16/2007	86172	62422	2004	Spring	Live Oak	5/26/2005	113653	Feather River	80	M
10/24/2007	86350	shed	n/a	n/a	n/a	n/a	n/a	n/a	78	M
10/25/2007	86282	shed	n/a	n/a	n/a	n/a	n/a	n/a	89	M
10/30/2007	86351	shed	n/a	n/a	n/a	n/a	n/a	n/a	81	F

As observed in 2005, all spring-run Chinook salmon recoveries were from the Feather River Hatchery. A single fall-run recovery also originated from the Feather River Hatchery. No recoveries were observed from the Department's wild-tagging operation (Lower Yuba River Life History Investigation) during this survey. Out-of-basin Feather River Hatchery Chinook salmon accounted for 100% of the recoveries. As observed in 2005 and 2006, the majority of Feather River Hatchery strays were from plants transported far from their natal hatchery, mostly to San Pablo Bay via the Wickland Oil net pens. The continued straying from this hatchery could be attributed to these non-natal stream plants, either through an incomplete imprinting on home waters, or an increase in survivability over in-river releases. A combination of both scenarios could be possible; however, further data analysis and cohort reconstruction from these brood years would be needed to make any definitive conclusions.

Beginning in 2005, the Feather River Hatchery began tagging early arriving (May-June) spring-run Chinook salmon with floy tags and releasing these fish to the river. The intent was to gain better control of gene flow through the hatchery and to maintain the remaining genetic integrity of the Feather River spring-run by spawning only floy-tagged salmon with other previously marked floy-tagged salmon as they returned to the hatchery in September. This program was intended to eliminate the possibility of hatchery-induced mixing of spatially overlapping salmon stocks (spring- and fall-run) in the Feather River. Incidentally, two of these floy-tagged Feather River spring-run Chinook salmon have been collected during escapement surveys on the Yuba River - one in 2006 and one in 2007. These limited data suggest the possibility of a latent straying associated with the post-handling release of floy-tagged Feather River Chinook salmon to the Yuba River.

Scale samples were collected at random from October 2, 2007 through January 3, 2008. As a result of low overall sample numbers, an attempt was made to collect scales from all fresh carcasses encountered. A total of 346 samples were collected and transferred to the Ocean

Salmon Project for processing (**Appendix B, Table B-1**). The results from the age scale reading and cohort analysis from these collections will not be available immediately. Total length measurements were recorded from all carcasses utilized in scale age sample collections (**Figure 2**).

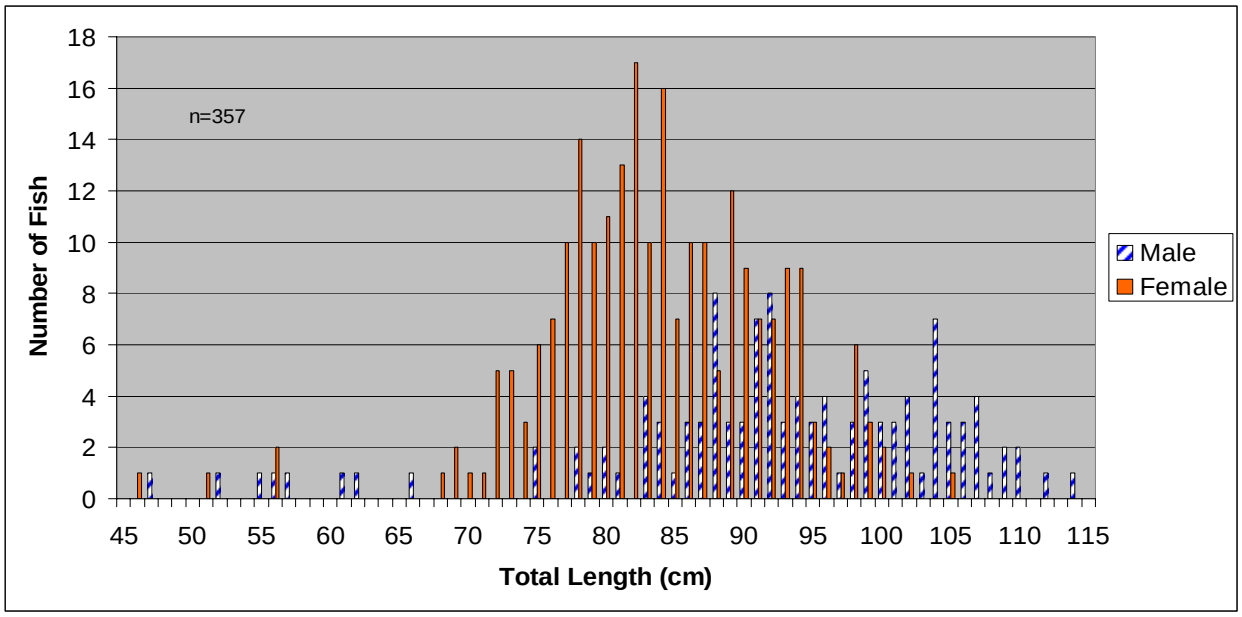

Figure 2. Yuba River Chinook salmon length distribution.

Flows during the survey period remained fairly constant (~ 600 – 800 cfs), with the exception of a small increase in flows from precipitation in December 2007 (**Figure 3**). This hydrograph is similar to the observed 2006 flow regime, although on average the 2007 flows were approximately 200 cfs higher than the previous year's for most of the survey period.

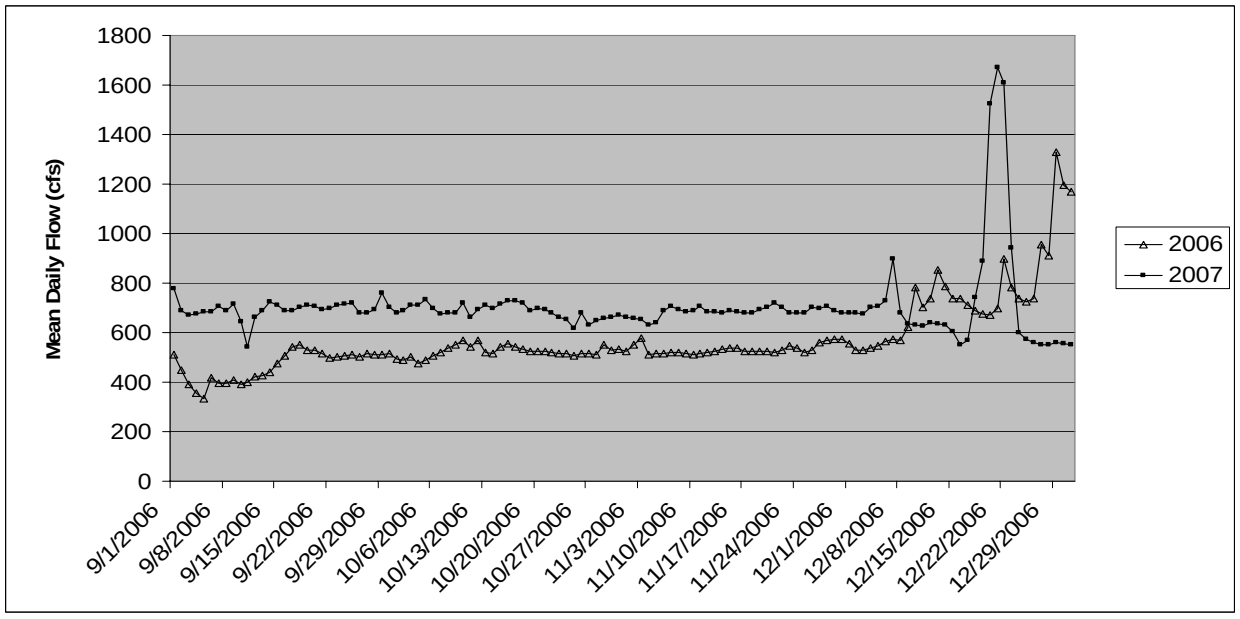

Figure 3. Yuba River mean daily flow as measured at the Marysville gage from September 1 to December 31.

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Appendix A – Schaefer Estimate

Table A1. Weekly recoveries and Schaefer population matrix for adult Chinook salmon spawning in the Yuba River (Narrows pool to Simpson Lane Bridge).

	T(i)			E(i)	R(i)		RECAPTURES OF FISH MARKED IN SURVEY PERIOD													
SURVEY	NUMBER	NUMBER	RATIO	TOTAL	Sum of Rows															
PERIOD	TAGGED	CHOPPED	E(i) / R(i)	EXAMINED	RECOVERED		1	2	3	4	5	6	7	8	9	10	11	12	13	14
PASTE SCHAEFER 1 HERE							PASTE FINAL SCHAEFER MATRIX HERE													
1	8	3	0	11	0															
2*	24	21	57	57	1		1													
3	20	28	0	48	0		0	0												
4	53	79	67	134	2		2	0	0											
5	41	76	7.5	135	18		0	6	2	10										
6	41	54	5.75	115	20		0	0	0	3	17									
7	26	34	6	72	12		0	0	2	0	2	8								
8	41	43	9.4	94	10		0	0	0	0	0	2	8							
9	30	52	8.45454545	93	11		0	0	0	0	0	1	1	9						
10	26	37	10	70	7		0	0	0	0	0	2	0	2	3					
11	17	26	7.14285714	50	7		0	0	0	0	0	0	1	1	0	5				
12	7	10	4.4	22	5		0	0	0	0	0	0	0	0	3	1	1			
13	5	10	6	18	3		0	0	0	0	0	0	0	0	2	1	0	0		
14	0	17	5.25	21	4		0	0	0	0	0	0	0	0	0	0	2	0	2	
Totals	339	490		940	100	R(i) Total														
					100	C(i) Total														
				C(i) RECOVERED Sum of Columns			3	6	4	13	19	13	10	12	8	7	3	0	2	0
				T(i) / C(i) Ratio			2.67	4.00	5.00	4.08	2.16	3.15	2.60	3.42	3.75	3.71	5.67	0.00	2.50	0.00

SCHAEFER ESTIMATE CALCULATIONS:	
Total Population from Matrix =	2854
# Tagged from period 2 to last =	-331
SCHAEFER ESTIMATE IS:	2,523

SCHAEFER ESTIMATE EXPANDED TO INCLUDE GRILSE AT 3.21% OF TOTAL ADULT ESTIMATE:	
TOTAL SCHAEFER ESTIMATE:	2,604

Matrix of Population Estimates

Survey Period	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	152	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	357	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	180	75	306	0	0	0	0	0	0	0	0	0	0
6	0	0	0	70	211	0	0	0	0	0	0	0	0	0
7	0	0	60	0	26	151	0	0	0	0	0	0	0	0
8	0	0	0	0	0	59	196	0	0	0	0	0	0	0
9	0	0	0	0	0	27	22	260	0	0	0	0	0	0
10	0	0	0	0	0	63	0	68	113	0	0	0	0	0
11	0	0	0	0	0	0	19	24	0	133	0	0	0	0
12	0	0	0	0	0	0	0	0	50	16	25	0	0	0
13	0	0	0	0	0	0	0	0	45	22	0	18	0	0
14	0	0	0	0	0	0	0	0	0	0	60	21	26	0
Totals	509	180	135	376	237	300	236	353	207	171	84	39	26	0

Appendix B – Scale Age Sampling

Table B-1. Chinook salmon scale samples collected from the Yuba River escapement survey from October 2, 2007 to January 3, 2008.

Sample Number	Date	Run	Ad-Clipped?	Headtag Number	Sex	FL (cm)	Adult/Jack?	Comments
44,001	10/10/2007	S	N		F	94	A	
44,002	10/10/2007	S	N		M	88	A	
44,003	10/10/2007	S	N		M	96	A	
44,004	10/11/2007	F	N		M	102	A	
44,005	10/17/2007	F	N		F	72	A	
44,006	10/31/2007	F	N		F	88	A	
44,007	10/31/2007	F	N		M	92	A	
44,008	10/31/2007	F	N		F	72	A	
44,009	10/31/2007	F	N		F	90	A	
44,010	10/31/2007	F	N		F	57	J	
44,011	10/3/2007	S	N		M	98	A	
44,012	10/10/2007	S	N		M	80	A	
44,013	10/10/2007	S	N		F	74	A	
44,014	10/10/2007	S	N		M	102	A	
44,015	10/31/2007	F	N		F	89	A	
44,016	10/31/2007	F	N		F	86	A	
44,018	11/21/2007	F	N		F	92	A	
44,019	11/21/2007	F	N		M	110	A	
44,020	11/21/2007	F	N		F	89	A	
44,022	11/21/2007	F	N		F	77	A	
44,023	11/21/2007	F	N		F	88	A	
44,024	11/21/2007	F	N		F	94	A	
44,025	11/21/2007	F	N		F	82	A	
44,026	11/21/2007	F	N		M	110	A	
44,027	11/21/2007	F	N		M	103	A	
44,028	11/21/2007	F	N		F	75	A	
44,029	11/27/2007	F	N		F	91	A	
44,031	11/28/2007	F	N		M	91	A	
44,032	11/28/2007	F	N		M	107	A	
44,035	11/28/2007	F	N		F	75	A	
44,036	11/28/2007	F	N		F	77	A	
44,037	11/28/2007	F	N		M	107	A	
44,038	11/28/2007	F	N		M	90	A	
44,039	11/27/2007	F	N		F	78	A	
44,040	11/27/2007	F	N		F	81	A	
44,041	11/27/2007	F	N		F	100	A	
44,044	11/21/2007	F	N		M	99.9	A	
44,045	11/20/2007	F	N		F	83	A	
44,046	11/27/2007	F	N		F	92	A	
44,047	11/27/2007	F	N		M	66	A	
44,048	12/4/2007	F	N		F	88	A	
44,049	11/20/2007	F	N		F	87	A	
44,050	11/20/2007	F	N		M	92	A	
44,054	12/13/2007	F	N		M	92	A	
44,055	12/13/2007	F	N		M	85	A	
44,056	12/18/2007	F	N		F	72	A	
44,059	12/27/2007	F	N		F	90	A	UNSPAWNED
44,060	12/28/2007	F	N		F	70	A	
44,061	12/28/2007	F	N		F	80	A	
44,063	12/28/2007	F	N		F	82	A	

Table B-1. Chinook salmon scale samples collected from the Yuba River escapement survey from October 2, 2007 to January 3, 2008 (cont.).

Sample Number	Date	Run	Ad-Clipped?	Headtag Number	Sex	FL (cm)	Adult/Jack?	Comments
44,064	12/28/2007	F	N		F	78	A	
44,065	12/21/2007	F	N		F	74	A	
44,066	12/28/2007	F	N		F	73	A	
44,081	12/13/2007	F	N		F	82	A	
44,086	11/13/2007	F	N		F	73	A	
44,089	12/13/2007	F	N		F	70	A	
44,090	12/13/2007	F	N		F	82	A	
44,091	12/13/2007	F	N		F	76	A	
44,092	12/13/2007	F	N		F	87	A	
44,093	12/13/2007	F	N		F	76	A	
44,094	12/13/2007	F	N		F	100	A	
44,095	1/2/2008	F	N		M	89	A	
44,096	1/2/2008	F	N		F	79	A	
44,109	12/12/2007	F	N		F	78	A	
44,110	12/2/2007	F	N		F	77	A	
44,111	12/12/2007	F	N		F	56	J	
44,112	12/12/2007	F	N		F	77	A	
44,117	12/13/2007	F	N		F	69	A	
44,118	12/13/2007	F	N		F	85	A	
44,119	12/18/2007	F	N		F	82	A	
44,120	12/27/2007	F	N		M	88	A	
44,121	12/27/2007	F	N		F	79	A	
44,122	12/27/2007	F	N		F	79	A	
44,266	11/6/2007	F	N		F	90	A	
44,267	11/6/2007	F	N		M	95	A	
44,268	11/8/2007	F	N		F	81	A	
44,269	11/8/2007	F	N		M	107	A	
44,270	11/8/2007	F	N		M	92	A	
44,271	11/15/2007	F	N		F	93	A	
44,272	11/21/2007	F	N		F	90	A	
44,273	11/14/2007	F	N		F	85	A	
44,274	11/8/2007	F	N		F	80	A	
44,275	11/19/2007	F	N		F	86	A	
44,276	11/19/2007	F	N		F	93	A	
44,277	11/19/2007	F	N		F	76	A	
44,278	11/21/2007	F	N		F	72	A	
44,279	11/19/2007	F	N		F	81	A	
44,280	11/14/2007	F	N		F	84	A	
44,281	11/13/2007	F	N		F	81	A	
44,282	11/14/2007	F	N		F	82	A	
44,283	11/19/2007	F	N		F	105	A	
44,284	11/8/2007	F	N		F	94	A	
44,285	11/8/2007	F	N		F	93	A	
44,286	11/8/2007	F	N		M	109	A	
44,287	11/15/2007	F	N		F	98	A	
44,288	11/15/2007	F	N		F	96	A	
44,289	11/14/2007	F	N		F	79	A	
44,290	11/15/2007	F	N		M	99	A	
44,291	11/14/2007	F	N		M	105	A	
44,292	11/14/2007	F	N		F	93	A	

Table B-1. Chinook salmon scale samples collected from the Yuba River escapement survey from October 2, 2007 to January 3, 2008 (cont.).

Sample Number	Date	Run	Ad-Clipped?	Headtag Number	Sex	FL (cm)	Adult/Jack?	Comments
44,293	11/19/2007	F	N		F	91	A	
44,294	11/6/2007	F	N		F	82	A	
44,295	11/15/2007	F	N		F	81	A	
44,296	11/6/2007	F	N		F	83	A	
44,297	11/8/2007	F	N		F	78	A	
44,298	11/6/2007	F	N		F	79	A	
44,299	11/6/2007	F	N		F	94	A	
44,300	11/8/2007	F	N		F	78	A	
44,301	11/15/2007	F	N		F	92	A	
44,307	10/3/2007	F	N		M	83	A	
44,308	10/3/2007	S	Y	86399	M	88	A	
44,309	10/3/2007	S	N		M	96	A	
44,310	10/24/2007	F	N		M	106	A	
44,311	10/24/2007	F	N		F	90	A	
44,312	10/24/2007	F	N		F	79	A	
44,313	10/31/2007	F	N		M	101	A	
44,314	10/24/2007	F	N		F	86	A	
44,315	10/24/2007	F	N		F	91	A	
44,316	10/24/2007	F	N		M	107	A	
44,317	10/24/2007	F	N		F	87	A	
44,318	10/24/2007	F	N		F	80	A	
44,319	10/24/2007	F	N		F	84	A	
44,320	10/24/2007	F	N		M	47	J	
44,321	10/24/2007	F	N		F	82	A	
44,322	10/24/2007	F	N		F	98	A	
44,323	11/14/2007	F	N		F	83	A	
44,324	10/24/2007	F	N		F	78	A	
44,325	10/24/2007	F	N		M	104	A	
44,326	10/24/2007	F	N		F	82	A	
44,327	10/24/2007	F	N		M	106	A	
44,328	10/24/2007	F	N		M	105	A	
44,329	10/30/2007	F	N		F	90	A	
44,330	10/30/2007	F	N		F	75	A	
44,331	10/30/2007	F	N		M	55	J	
44,332	10/30/2007	F	N		F	81	A	
44,333	10/30/2007	F	N		F	97	A	
44,334	10/30/2007	F	N		F	83	A	
44,335	10/30/2007	F	N		F	94	A	
44,336	10/31/2007	F	N		M	92	A	
44,337	10/31/2007	F	N		M	112	A	
44,338	10/31/2007	F	N		F	75	A	
44,339	10/31/2007	F	N		M	83	A	
44,340	10/31/2007	F	N		F	86	A	
44,341	10/31/2007	F	N		F	88	A	
44,342	10/31/2007	F	N		F	82	A	
44,343	10/31/2007	F	N		M	91	A	
44,344	10/31/2007	F	N		F	90	A	
44,345	10/31/2007	F	N		F	75	A	
44,346	10/31/2007	F	N		M	102	A	
44,349	11/14/2007	F	N		F	95	A	

Table B-1. Chinook salmon scale samples collected from the Yuba River escapement survey from October 2, 2007 to January 3, 2008 (cont.).

Sample Number	Date	Run	Ad-Clipped?	Headtag Number	Sex	FL (cm)	Adult/Jack?	Comments
44,350	11/13/2007	F	N		F	94	A	
44,351	11/13/2007	F	N		F	80	A	
44,352	10/3/2007	F	N		F	86	A	
44,353	10/17/2007	F	N		F	84	A	
44,354	10/17/2007	F	N		M	62	J	
44,355	10/23/2007	F	N		F	86	A	
44,356	10/17/2007	F	N		M	102	A	
44,357	10/10/2007	F	N		M	87	A	
44,359	10/10/2007	F	N		F	75	A	
44,360	10/10/2007	F	N		M	79	A	
44,361	10/10/2007	F	N		M	56	J	
44,362	10/10/2007	F	N		M	100	A	
44,363	10/11/2007	F	N		F	95	A	
44,364	10/17/2007	F	N		M	90	A	
44,365	10/17/2007	F	N		F	80	A	
44,366	10/23/2007	F	N		F	93	A	
44,367	10/23/2007	F	N		M	78	A	
44,368	10/23/2007	F	N		M	92	A	
44,369	10/23/2007	F	N		M	98	A	
44,370	10/18/2007	F	N		M	61	J	
44,371	10/17/2007	F	N		M	106	A	
44,372	10/17/2007	F	N		F	78	A	
44,373	10/3/2007	S	N		M	99	A	
44,374	10/9/2007	F	N		F	84	A	
44,377	10/2/2007	F	N		M	92	A	
44,378	10/2/2007	F	N		M	101	A	
44,379	10/9/2007	F	N		F	68	A	
44,380	10/9/2007	F	N		M	91	A	
44,381	10/9/2007	F	N		F	86	A	
44,382	10/9/2007	F	N		F	93	A	
44,383	10/23/2007	F	N			77	A	SEX UNKNOWN
44,384	10/23/2007	F	N		F	78	A	
44,385	10/16/2007	F	N		F	81	A	
44,386	10/9/2007	F	N		M	78	A	
44,387	10/9/2007	F	N		F	51	J	
44,388	10/23/2007	F	N		M	52	J	
44,389	10/23/2007	F	N		F	84	A	
44,390	10/30/2007	F	N		F	98	A	
44,391	10/30/2007	F	N		F	91	A	
44,392	10/30/2007	F	N		F	91	A	
44,393	10/30/2007	F	N		F	81	A	
44,394	10/30/2007	F	N		F	87	A	
44,395	11/1/2007	F	N		M	94	A	
44,396	11/1/2007	F	N		F	99	A	
44,397	11/1/2007	F	N		F	80	A	
44,398	11/1/2007	F	N		F	95	A	
44,399	11/1/2007	F	N		F	46	J	
44,400	11/1/2007	F	N		M	97	A	
44,401	11/6/2007	F	N		M	104	A	
44,402	11/6/2007	F	N		M	101	A	

Table B-1. Chinook salmon scale samples collected from the Yuba River escapement survey from October 2, 2007 to January 3, 2008 (cont.).

Sample Number	Date	Run	Ad-Clipped?	Headtag Number	Sex	FL (cm)	Adult/Jack?	Comments
44,403	11/6/2007	F	N		F	77	A	
44,404	11/6/2007	F	N		F	93	A	
44,405	11/15/2007	F	N		F	92	A	
44,406	11/15/2007	F	N		M	104	A	
44,407	11/15/2007	F	N		F	90	A	
44,408	11/15/2007	F	N		M	91	A	
44,409	11/15/2007	F	N		M	93	A	
44,412	11/15/2007	F	N		F	76	A	
44,413	11/15/2007	F	N		F	86	A	
44,414	11/15/2007	F	N		M	93	A	
44,415	11/20/2007	F	N		M	88	A	
44,416	11/15/2007	F	N		F	85	A	
44,417	11/14/2007	F	N		F	83	A	
44,419	10/23/2007	F	N		F	85	A	
44,420	10/16/2007	F	N		F	88	A	
44,421	10/16/2007	F	N		F	69	A	
44,422	10/24/2007	F	N		F	56	J	
44,423	12/6/2007	F	N		F	82	A	
44,424	10/31/2007	F	N		M	89	A	
44,425	10/31/2007	F	N		F	72	A	
44,426	10/30/2007	F	N		F	82	A	
44,427	10/4/2007	F	N		M	83	A	
44,428	11/7/2007	F	N		F	77	A	
44,429	11/7/2007	F	N		M	90	A	
44,430	11/7/2007	F	N		M	99	A	
44,431	11/20/2007	F	N		M	98	A	
44,432	11/20/2007	F	N		F	84	A	
44,433	11/20/2007	F	N		F	85	A	
44,434	11/6/2007	F	N		F	82	A	
44,435	11/6/2007	F	N		M	83	A	
44,436	11/6/2007	F	N		M	103	A	
44,437	12/6/2007	F	N		F	84	A	
44,438	12/6/2007	F	N		F	96	A	
44,439	11/20/2007	F	N		F	84	A	
44,440	11/15/2007	F	N		F	92	A	
44,441	11/7/2007	F	N		F	89	A	
44,442	11/7/2007	F	N		M	99	A	
44,443	11/6/2007	F	N		M	93	A	
44,444	10/31/2007	F	N		F	94	A	
44,445	11/7/2007	F	N		M	89	A	
44,446	10/30/2007	F	N		F	91	A	
44,447	11/7/2007	F	N		F	92	A	
44,448	10/31/2007	F	N		F	76	A	
44,449	10/17/2007	F	N		M	114	A	
44,450	10/23/2007	F	N		F	82	A	
44,451	10/16/2007	F	N		F	85	A	
44,452	10/23/2007	F	N		F	89	A	
44,453	10/16/2007	F	N		F	84	A	
44,454	10/16/2007	S	N		F	92	A	
44,455	10/16/2007	S	N		M	96	A	

Table B-1. Chinook salmon scale samples collected from the Yuba River escapement survey from October 2, 2007 to January 3, 2008 (cont.).

Sample Number	Date	Run	Ad-Clipped?	Headtag Number	Sex	FL (cm)	Adult/Jack?	Comments
44,456	10/25/2007	F	N		F	86	A	
44,457	10/25/2007	F	N		M	89	A	
44,459	10/25/2007	F	N		F	76	A	
44,460	11/1/2007	F	N		F	89	A	
44,461	11/1/2007	F	N		M	104	A	
44,462	11/1/2007	F	N		M	92	A	
44,463	11/8/2007	F	N		M	100	A	
44,464	10/23/2007	F	N		F	82	A	
44,465	10/23/2007	F	N		M	92	A	
44,466	10/23/2007	F	N		F	94	A	
44,467	10/23/2007	F	N		F	89	A	
44,468	10/23/2007	F	N		M	96	A	
44,470	11/7/2007	F	N		M	90	A	
44,471	11/7/2007	F	N		F	87	A	
44,472	11/7/2007	F	N		M	87	A	
44,473	11/7/2007	F	N		M	88	A	
44,474	11/7/2007	F	N		F	86	A	
44,475	11/7/2007	F	N		F	73	A	
44,476	11/7/2007	F	N		F	89	A	
44,477	10/11/2007	F	N		F	78	A	
44,478	10/9/2007	F	N		F	71	A	
44,479	10/9/2007	F	N		M	91	A	
44,480	10/9/2007	F	N		M	84	A	
44,481	10/9/2007	F	N		M	102	A	
44,482	10/9/2007	F	N		F	73	A	
44,483	10/9/2007	F	N		F	82	A	
44,484	10/9/2007	F	N		F	84	A	
44,485	10/16/2007	F	N		F	87	A	
44,486	10/6/2007	F	N		F	79	A	
44,487	10/23/2007	F	N		F	89	A	
44,488	10/23/2007	F	N		F	99	A	
44,489	10/23/2007	F	N		F	74	A	
44,490	10/25/2007	F	N		F	87	A	
44,491	10/25/2007	F	N		F	84	A	
44,492	10/25/2007	F	N		F	93	A	
44,493	10/25/2007	F	N		F	79	A	
44,494	10/25/2007	F	N		F	78	A	
44,495	10/25/2007	F	N		M	102	A	
44,496	10/30/2007	F	N		F	82	A	
44,497	10/30/2007	F	N		F	91	A	
44,498	10/30/2007	F	N		F	84	A	
44,499	12/11/2007	F	N		M	91	A	
44,500	10/303/07	F	N		F	78	A	
12,286	11/28/2007	F	N		F	94	A	Scale envelope from prev. season
12,287	11/28/2007	F	N		F	89	A	Scale envelope from prev. season
12,288	11/28/2007	F	N		F	88	A	Scale envelope from prev. season
12,309	11/7/2007	F	N		M	94	A	Scale envelope from prev. season
12,311	12/5/2007	F	N		M	94	A	Scale envelope from prev. season
12,312	11/6/2007	F	N		F	81	A	Scale envelope from prev. season
12,313	11/21/2007	F	N		F	89	A	Scale envelope from prev. season

Table B-1. Chinook salmon scale samples collected from the Yuba River escapement survey from October 2, 2007 to January 3, 2008 (cont.).

Sample Number	Date	Run	Ad-Clipped?	Headtag Number	Sex	FL (cm)	Adult/Jack?	Comments
12,314	11/29/2007	F	N		F	86	A	Scale envelope from prev. season
12,315	12/6/2007	F	N		F	87	A	Scale envelope from prev. season
12,316	12/4/2007	F	N		M	88	A	Scale envelope from prev. season
12,318	11/21/2007	F	N		F	99	A	Scale envelope from prev. season
12,319	11/13/2007	F	N		F	80	A	Scale envelope from prev. season
12,320	11/6/2007	F	N		F	79	A	Scale envelope from prev. season
12,321	12/11/2007	F	N		F	83	A	Scale envelope from prev. season
12,322	11/21/2007	F	N		F	81	A	Scale envelope from prev. season
12,323	11/8/2007	F	N		M	86	A	Scale envelope from prev. season
12,324	11/19/2007	F	N		F	80	A	Scale envelope from prev. season
12,325	11/29/2007	F	N		F	85	A	Scale envelope from prev. season
12,326	11/13/2007	F	N		F	75	A	Scale envelope from prev. season
12,327	11/27/2007	F	N		F	78	A	Scale envelope from prev. season
12,328	11/21/2007	F	N		F	82	A	Scale envelope from prev. season
12,329	12/13/2007	F	N		F	72	A	Scale envelope from prev. season
12,330	11/27/2007	F	N		F	83	A	Scale envelope from prev. season
12,331	11/27/2007	F	N		F	87	A	Scale envelope from prev. season
12,332	11/27/2007	F	N		M	104	A	Scale envelope from prev. season
12,333	11/27/2007	F	N		F	87	A	Scale envelope from prev. season
12,334	11/29/2007	F	N		F	92	A	Scale envelope from prev. season
12,335	11/8/2007	F	N		F	82	A	Scale envelope from prev. season
12,336	11/21/2007	F	N		F	84	A	Scale envelope from prev. season
12,337	12/5/2007	F	N		F	81	A	Scale envelope from prev. season
12,338	12/11/2007	F	N		M	84	A	Scale envelope from prev. season
12,340	11/21/2007	F	N		F	85	A	Scale envelope from prev. season
12,341	11/29/2007	F	N		F	82	A	Scale envelope from prev. season
12,342	11/29/2007	F	N		M	81	A	Scale envelope from prev. season
12,343	12/5/2007	F	N		F	78	A	Scale envelope from prev. season
12,344	11/21/2007	F	N		F	98	A	Scale envelope from prev. season
12,345	12/5/2007	F	N		F	81	A	Scale envelope from prev. season
12,346	11/21/2007	F	N		F	90	A	Scale envelope from prev. season
12,347	11/29/2007	F	N		M	87	A	Scale envelope from prev. season
12,348	11/13/2007	F	N		F	78	A	Scale envelope from prev. season
12,349	12/4/2007	F	N		F	81	A	Scale envelope from prev. season
12,350	12/4/2007	F	N		F	80	A	Scale envelope from prev. season
12,351	11/29/2007	F	N		F	97	A	Scale envelope from prev. season
12,352	11/29/2007	F	N		F	76	A	Scale envelope from prev. season
12,353	12/11/2027	F	N		F	84	A	Scale envelope from prev. season
12,354	11/21/2007	F	N		M	107	A	Scale envelope from prev. season
12,355	11/29/2007	F	N		M	84	A	Scale envelope from prev. season
12,356	11/21/2007	F	N		F	90	A	Scale envelope from prev. season
12,357	12/6/2007	F	N		M	86	A	Scale envelope from prev. season
12,358	11/19/2007	F	N		M	94	A	Scale envelope from prev. season
12,359	12/5/2007	F	N		F	84	A	Scale envelope from prev. season
12,360	12/6/2007	F	N		F	77	A	Scale envelope from prev. season
12,361	11/29/2007	F	N		F	80	A	Scale envelope from prev. season