LOWER MOKELUMNE RIVER
UPSTREAM FISH MIGRATION MONITORING
Conducted at Woodbridge Irrigation District Dam
August 2003 through July 2004

August 2004

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Key words: lower Mokelumne River, fall-run Chinook salmon, steelhead, escapement

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***Abstract*: This report summarizes data collected below Woodbridge Irrigation District Dam (WIDD) on the lower Mokelumne River (LMR) from August 01, 2003 through July 31, 2004. An estimated 10,240 fall-run Chinook salmon (*Oncorhynchus tschwaytscha*) passed the WIDD fish ladders between August 4, 2003 and January 14, 2004. Fifty percent of the run passed WIDD by November 13, 2003 as compared to November 7th of last year. Highest daily passage was 540 on November 7, 2003. The sex and life stage was positively determined for 9,997 salmon and included 4,112 (41%) adult females, 3,268 (33%) adult males, 617 (6%) grilse females and 2,000 (20%) grilse males. Thirty-nine adult steelhead (*O. mykiss*) passed WIDD between October 2003 and May 2004. Peak steelhead passage occurred in December (13). Other species using the WIDD fishways included: American shad, *Alosa sapidissima*; black bass, *Micropterus sp.*; common carp, *Cyprinus carpio*; goldfish, *Carassius auratus*; Hitch , *Lavinia exilicauda*; Pacific lamprey, *Lampetra tridentata*; Sacramento pikeminnow, *Ptychocheilus grandis*; Sacramento splittail, *Pogonichthys macrolepidotus*; Sacramento sucker, *Catostomus occidentalis*; and tule perch, *Hysterocarpus traski*.**

INTRODUCTION

East Bay Municipal Utility District (EBMUD) has been monitoring adult fall-run Chinook salmon escapement in the lower Mokelumne River (LMR) using video surveillance and trapping at Woodbridge Irrigation District Dam (WIDD) since the fall of 1990. Initially, monitoring documented the timing and magnitude of the adult salmon escapement to the LMR with a secondary focus on steelhead. Monitoring has started between August and mid-October, and ended between December and April in previous years. Since 2001, 12 months of continuous video/trap monitoring has been conducted. Carcass surveys were initiated this year to provide a secondary count method. Due to reconstruction of WIDD it was deemed appropriate to investigate this as a secondary count method in case conditions at WIDD precluded video monitoring and trapping during the construction phase of the rebuild project.

OBJECTIVES

The objectives of this study are to 1) monitor fish passage of native and non-native fishes through the WIDD fish ladders, 2) describe the relationship of fall-run Chinook salmon

movements to environmental conditions on the LMR and 3) to assess the use of carcass surveys as a secondary method of escapement on the LMR.

METHODS

Video/live trap

EBMUD's monitoring of fall-run Chinook salmon migration began on August 01,2003 with video monitoring in the high stage ladder at the WIDD. On November 4, Woodbridge Irrigation District (WID) began removing the boards in the dam, which necessitated operation of the low stage ladder. EBMUD began trapping and video monitoring in the low-stage ladder on November 6, 2003. Trapping and video monitoring continued until December 15, 2003 when trapping was discontinued. Video monitoring in the low stage ladder continued to April 13, 2004. Monitoring in the high stage was resumed on April 18, 2004, when the boards of WID were installed, and continued through July 31, 2004.

All other monitoring, and data collection and storage methods for video/live trap monitoring were consistent with prior year's monitoring efforts (Marine and Vogel 2000, Workman 2001).

Carcass surveys

Carcass surveys were conducted on a weekly basis from the last week in September to the second week in January. Each week a three-person crew in a drift boat, (one rower, one operating the trolling motor, and one at the bow of the boat to walk side channels) surveyed from the base of Camanche Dam to Elliott Road (Figure 1). In periods of low carcass abundance, one day was sufficient to cover the entire survey area. During periods of high carcass abundance the survey was conducted over two survey days. Split channels were surveyed with one person walking one arm and two surveyors in the boat drifting the other arm looking for carcasses. The river channel, as well as the banks, was scanned for carcasses.

The first survey section was just below the barrier fence adjacent to the hatchery ladder entrance. The crew walked out on the barrier fence to scan for carcasses above and below. Any carcasses encountered above the fence was marked and released below the barrier fence. The remainder of the river was surveyed from the boat or by foot. Surveys were conducted by drifting in the boat until a carcass was encountered. Each carcass was collected with a gaff, and then observed for sex, fork length, and the presence of an adipose fin clip.

Carcasses were given a designation of "fresh" (F), "decayed" (D), or "skeleton" (S). Fish with clear eyes and blood remaining in the gills were recorded as fresh, while fish with cloudy eyes and no blood in the gills were designated as decayed. Fish that were in an advanced state of decay (i.e. covered entirely or nearly entirely with fungus, falling apart, lacking substantial flesh on the bones) were recorded as skeleton. Skeletons were chopped and returned to the river. These were included in the tally for the section, but were not tagged, as carcasses in this condition may not have the same probability of recapture as that of fresher carcasses (Heyne 2001). Fresh and decayed carcasses were tagged with a uniquely numbered jaw tag applied to the lower jaw, and colored flagging to denote the week of survey, and then returned into the river current where they were collected. Each carcass

encountered was assessed for the presence of a numbered jaw tag from previous surveys. Jaw tag number from previously tagged carcasses was recorded and the carcass was released back to the water.

All fish were checked for an adipose fin clip. If clipped, the upper portion of the head was taken and data recorded on the head tag following the protocol supplied by the California Department of Fish and Game (CDFG) Ocean Salmon Project. By leaving the lower jaw the fish was still available for the mark-recapture portion of the survey and was tagged with a jaw tag for carcass sampling.

All fish were assessed as to sex, spawning condition and fork length (cm). Fish were measured to the nearest 5 centimeters, sexed, and females were assessed for spawning condition. Females were rated as unspawned (all or nearly all eggs intact), partially spawned (<50% of eggs intact), or spawned out (no eggs).

Tissue samples were collected from eight fresh carcasses for deposit in the "Central Valley Salmonid Tissue Archive". Tissue were collected according to the "DNA Fin Clip Collection Protocol – Dry Method" (Navicky 2003).

Data analysis for carcass surveys can be conducted in a number of ways: One seasonal Peterson estimate can be developed from overall mark/recapture numbers for the entire survey; a Schaeffer estimate can be developed by summing weekly Peterson estimates; or a Jolly-Seber estimate can be developed which is an open population model and accounts for additions to and losses from the population throughout the duration of the survey. The Jolly-Seber model works better with populations of >3,000, so the Schaeffer methodology was used to analyze the Mokelumne carcass data (Glenn Szerlong, NOAA, pers.comm.).

RESULTS AND DISCUSSION

Native Anadromous Fish

Chinook Salmon (video/trapping)

The fall-run Chinook salmon escapement estimate in the LMR for 2003/2004 is 10,240 spawners entering the river between August 2003 and January 2003 (Figure 2). Fifty percent of the run passed WIDD by November 13, 2003 as compared to November 7th of last year (Table 1). Highest daily passage of 540 fish occurred on November 7, 2003. The sex and life stage was positively determined for 9,997 fish including 4,112 (41%) adult (>60 cm FL) females, 3,628 (33%) adult males, 617 (6%) grilse (≤60 cm FL) females and 2,000 (20%) grilse males (Figure 3). In addition there were 26 unknown sex adults, 188 unknown sex grilse, and 29 unknown sex and size fish. Data are in Appendix A.

Over the past twelve years we have observed a 1:3 grilse to adult ratio, and the same ratio exists for 2003. However, in 2003 we observed a larger number of very small grilse fish (< 55 cm) than has been observed in past years (Figure 4).

Table 1. Dates when 10%, 50%, and 90% of fall-run Chinook salmon passed the Woodbridge Irrigation District Dam, 1990-2003.

Year	10%	50%	90%
1990	Oct. 23	Nov. 18	Dec. 12
1991	n/a	n/a	n/a
1992	Oct. 28	Nov. 13	Dec. 2
1993	Oct. 22	Nov. 3	Nov. 21
1994	Oct. 21	Nov. 7	Dec. 2
1995	Sept. 28	Oct. 30	Nov. 23
1996	Oct. 18	Oct. 31	Nov. 20
1997	Oct. 15	Nov. 8	Nov. 22
1998	Oct. 11	Nov. 4	Nov. 24
1999	Oct. 16	Nov. 3	Nov. 20
2000	Oct. 12	Oct. 30	Nov. 16
2001	Oct. 29	Nov. 11	Nov. 25
2002	Oct. 24	Nov. 7	Nov. 24
2003	Sep. 4	Nov. 11	Dec. 4

Since 1990 more fish have passed upstream during daylight hours than nighttime hours (Table 2). Day is defined as ½ hour before sunrise to ½ hour after sunset.

In the 2003/2004 monitoring season 73% of fish passing the video monitor occurred during the day, and 27% during the night. Daytime passage has been consistently higher than nighttime passage (Table 2). In 2000, passage was crepuscular, with peaks between 08:00-10:00 and 16:00-18:00 (Workman 2001). Data from the past three seasons show only an early morning peak, but not a corresponding late afternoon peak (Workman 2002, Workman 2003)(Figure 5).

Table 2. Percent of annual fall-run Chinook salmon passing Woodbridge Irrigation District Dam during day and night, 1990-2003.

Year	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*
Day	57	64	69	59	61	68	52	56	56	62	68	58	55	73
Night	43	36	31	41	39	32	48	44	44	38	32	42	45	27

Clipped adipose fins were evident on 1,315 (12.9%) of the observed fall-run Chinook salmon. Of the identifiable grilse and adults 11.4% (319), and 13.4% (996), respectively, had adipose fin clips. The percentage of adipose clipped adults has ranged from 0.9% in 1993 to a high of 14.4% in 2002. The range for grilse has been from 1.7% in 1993 and 1997 to a high of 18.6% in 2001 (Table 3).

In addition to adipose-fin clips, observations of hook scars, fungal infections, abrasions, predator wounds and lacerations were recorded. Observations of hook scars this year, like last year, were lower than previous years. Hook scars in grilse were recorded for 0.8% of observable grilse. Hook scars in adults were recorded for 1.6% of observable adults. Other injuries and anomalies were categorized as abrasions, fungal infections, lacerations, and predator wounds. The most frequent injury for both age classes was abrasions. All injuries combined occurred in 4.5 % of adults and 1.8 % of grilse (Table 3).

Table 3. Incidence of adipose fin clips, hook-scars and injuries on fall-run Chinook salmon passing Woodbridge Irrigation District Dam, 1992-2003.

	Adipose Fin Clips		Hook Scars		Other Injuries	
Year	Number	Percent	Number	Percent	Number	Percent
			Adult			
1992	10	1.4	24	3.4	20	2.8
1993	11	0.9	56	4.5	83	6.7
1994	244	10.3	151	6.3	218	9.2
1995	161	7.8	74	3.6	289	14.1
1996	169	9.2	97	5.3	258	14.1
1997/98	152	2.9	105	2	785	14.7
1998/99	427	7.4	38	1.2	615	10.7
1999/2000	327	10.8	46	1.5	392	13
2000/2001	225	4.0	87	1.2	855	11.7
2001/2002	326	8.5	36	0.9	594	15.6
2002/2003	1,228	14.4	68	.08	222	2.6
2003/2004	996	13.4	122	1.6	337	4.5
			Grilse			
1992	35	3.8	41	4.4	21	2.3
1993	8	1.7	33	6.8	15	3.1
1994	22	4	59	10.6	27	4.9
1995	55	15.2	27	7.4	25	6.9
1996	47	3.5	68	5.0	44	3.2
1997/98	7	1.7	3	0.7	18	4.5
1998/99	175	12	9	1.1	55	3.8
1999/2000	139	6.1	46	2.0	160	7.0
2000/2001	83	8	7	0.5	71	5.5
2001/2002	188	18.6	3	0.3	58	5.8
2002/2003	363	16.2	11	0.4	25	1.1
2003/2004	319	12.7	24	0.8	52	1.8

River flow, rainfall, temperature, turbidity, and barometric pressure have been investigated for their relationship to salmon returns over the past 12 years. Regression analyses comparing these factors to number of fish on the ascending portion of the curve were run for the 2003/2004 escapement. All regression coefficients for environmental variable to number of fish, by date, appear in parenthesis following the variable description.

For the 2003/2004 chinook salmon migration period, defined here as 08/01/2003 through 1/14/2004, Camanche Dam releases ranged from 325-804 cfs (99-245 m^3/s). Average flow was 399.3 cfs (121.3 m^3/s) (R^2= 0.05, p< .04)(Figure 6a). Flows below WID ranged from 67-528 cfs (20.4-161 m^3/s) and averaged 235 cfs (71.6 m^3/s)(R^2=0.003, p<.6186). Temperatures for the August through January monitoring period ranged from 52.0-61.3^{o}F (11.1-16.3^{o}C) at Camanche Dam (R^2= 0.27, p< .0001) and 47.8-68.5^{o}F (8.8^o-20.3^{o}C) at WIDD(R^2= 0.41, p< .0001) (Figure 6b). Turbidity increases in the LMR with rainfall. Total rainfall for the survey period was 2.08 inches (5.28 cm). Peak daily rainfall was 0.8 inches (2.0 cm)(R^2=0.28, p< .0001). Turbidity ranged from 1.9 to 14.5 ntu (R^2= 0.64. p<0.0001) (Figures 6c and 6d). The combined effects of temperature, flow and turbidity at WIDD, and precipitation explain 81% of the variability in the number of salmon migrating upstream past WIDD (p<0.0001).

Chinook Salmon (carcass surveys)

The 2003/2004 carcass survey encountered 503 carcasses. Of these, 306 were tagged producing 72 recaptures, 125 were rated as skeletons on first capture, and 19 were adipose fin clipped (Table 4). When using these numbers to run the Shaeffer model the estimate of river spawners is 1,804.

Table 4. Carcass survey data collected between Camanche Dam and Elliott Rd. on the lower Mokelumne River from October 6, 2003 through 1/12/2004

Date	Skeleton	Tagged	Recoveries	Total Counted	Adclipped
10/6/03	0	0	0	0	0
10/13/03	0	0	0	0	0
10/20/03	1	3	0	4	0
10/27/03	0	3	0	3	0
11/3/03	1	1	0	2	0
11/10/03	3	11	0	21	1
11/17/03	10	45	4	59	0
11/24/03	20	70	9	99	5
12/1/03	16	65	20	101	5
12/8/03	19	33	11	63	3
12/15/03	16	34	11	61	1
12/22/03	19	22	5	46	2
12/29/03	19	16	5	40	2
1/5/04	1	3	6	10	0
1/12/04	0	0	1	1	0
Totals	**125**	**306**	**72**	**503**	**19**

Results of video monitoring and trap monitoring was a count of 10,240 fall-run Chinook escaping to the Mokelumne River to spawn. The Mokelumne River Fish Hatchery (MRFH) counted 8,117 into the hatchery. This leaves an effective spawning population in the river of 2,123 salmon in the river.

All female fish were checked for spawning condition. Eighty-seven percent were completely spawned out, 6% were partially spawned out, and 7% were unspawned.

A length frequency distribution for the carcass data was compared to the video/trap data. This comparison shows a clear size bias in the carcass surveys, with smaller fish being underrepresented in the carcass surveys. (Figure 7).

Comparison of age and sex composition (adult male:adult female; grilse male:grilse female; and adult:grilse ratios) between video/trap data, carcass data, and hatchery count were performed using Chi-square analysis (Table 5). The only tests that showed a significant difference were the adult to grilse ratios between carcass surveys and hatchery counts, and carcass surveys and video counts. There was no significant difference between male to female ratios for adults or grilse or for adult to grilse ratios between hatchery and video counts, suggesting that the carcass count is underestimating the grilse proportion, but is not selective for sex of fish.

Table 5. Results of Chi-square analysis of age and sex ratio for chinook salmon data collected from video/trap, hatchery counts, and carcass surveys on the lower Mokelumne River, Ca. 2003.

	Carcass v. Hatchery	Carcass v. Video	Video v. Hatchery
Adult			
Male:Female	0.015	0.04	0.46
Grilse			
Male:Female	N/A	0.2	N/A
Adult:Grilse	**43.02**	**16.06**	1.94

$X^2_{0.05, 1}=3.841$

* bold indicates statistically significant results

Steelhead (video/trapping)

Steelhead have been observed since monitoring began in 1990 (Table 6). In all years prior to 1997, adult monitoring ended in December. Spawning, however, typically occurs between January and March for winter steelhead in the Central Valley (IEP Steelhead PWT 1999).

Table 6. Steelhead observed moving upstream during video monitoring at Woodbridge Irrigation District Dam, 1990-2003.

Monitoring Period	*Number*	*Monitoring Period*	*Number*
Oct. - Dec. 1990	4	Sept. 1997 – Feb. 1998	6
Oct. - Dec. 1991	n/a	Aug. 1998 – Mar. 1999	12
Oct. - Dec. 1992	7	Aug. 1999 – Mar. 2000	80
Oct. - Dec. 1993	8	Aug. 2000 – Apr. 2001	48
Oct. - Dec. 1994	19	Aug. 2001 – July 2002	91
Sept. - Dec. 1995	76	Aug. 2002 – July 2003	62
Sept. - Dec. 1996	12	Aug. 2003 – July 2004	39

Thirty-nine adult steelhead (≥380 mm FL) were observed moving upstream through WIDD from October 08, 2003 through May 5, 2004. Of the 39 observed, 8 were males, 12 were females, 19 were not distinguishable to sex, and 31 were adipose fin clipped. This season we saw two adults migrating upstream in May. This is later than any of the last three years of year round monitoring. In June and July of 2004 one adult male steelhead (500 mm FL) has been observed moving up and down through the ladder, but resulted in no net passage by July 31st. Highest monthly abundance of steelhead was in December (13) (Figure 8).

Yearling steelhead (FL <200mm) and subadult steelhead (FL ≤350mm) were observed in video monitoring from August 2003 through May 2004. Accurate counts of these fish are unattainable due to their ability to pass behind and underneath the camera.

Pacific Lamprey (video/trapping)

Prior to the fall of 1996, adult Pacific lamprey observations at WIDD were not recorded. Numbers of adult lamprey observed during video monitoring on the LMR have been sporadic since recording began in 1996, from a high of 979 in fall 1999, to one recorded passing upstream during video-monitoring in 2000/2001. The years 1996 and 1999 are the only years we saw more than 100 adult lamprey ascending the ladders at Woodbridge (Table 7). Pacific lamprey are in decline in the Columbia and Snake River Basins and the same may be true in the Central Valley (Close et al 1995; Brown and Moyle 1993). This season 38 lamprey were observed in the fish ladder throughout the monitoring season.

Table 7. Adult Pacific lamprey observed moving upstream during video monitoring at Woodbridge Irrigation District Dam, 1996-2003.

Year	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
1996	n/a	123	13	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1997	n/a	12	7	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1998	14	0	0	0	0	0	0	0	n/a	n/a	n/a	n/a
1999	323	606	50	0	0	0	0	0	n/a	n/a	n/a	n/a
2000	1	0	0	0	0	0	0	0	-1	n/a	n/a	n/a
2001	0	0	0	0	0	0	0	0	0	0	1	2
2002	0	0	0	0	1	0	1	1	0	2	0	8
2003	16	4	0	0	1	0	0	0	0	3	11	3

Native Resident Fish

Native resident fishes observed using the ladder include Hitch, Sacramento pikeminnow, Sacramento sucker, Sacramento splittail, and tule perch (Table 8). One hitch was observed in April ascending the ladder, and then descending the ladder a few days later. Hitch are relatively small cyprinids and may not be able to swim through exit velocities in the high stage ladder.

Sacramento pikeminnow were observed in much lower numbers in the fall and winter months than previous seasons. Moyle (2002) states ripe pikeminnow usually move upstream to spawn in April and May. We began observing pikeminnow in April, and their numbers remained high through July.

Table 8. Native and non-native resident fish observed in the Woodbridge Irrigation District Dam fish ladders, Aug 01, 2003-July 31, 2004*.

Species	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Jan.*	*Feb.*	*Mar.*	*April*	*May*	*June*	*July*
American Shad	0	0	0	0	0	0	0	0	0	0***	0***	0***
Black bass	0	0	1	0	0	0	0	4	2	0	0	0
Common carp	1	0	-1	0	0	0	0	0	0	0	0	0
Goldfish	0	0	0	0	0	0	0	0	-1	0	0	0
Sacramento pikeminnow	2	1	0	1	0	0	0	0	215	426	62	160
Sacramento splittail	0	0	0	0	0	0	0	0	5	2	0	0
Sacramento sucker	2	1	1	1	0	-1	0	67	148	80	30	63
Tule perch	0	1	0	0	0	0	0	0	11	0	0	-2

* native species appear in bold print.
** negative numbers indicate net downstream movement
*** large number of American shad occupied the ladder from May 13-July 31. No net passage was observed.

Sacramento suckers typically congregate and begin moving toward spawning areas from February to June with peak activity in March and April (Moyle 2002). Sacramento suckers were observed in relatively large numbers this season from March through July.

Tule perch were observed sporadically, mainly as downstream movements through the ladder. Tule perch have been observed both above and below WID fishladders during fish community surveys (EBMUD unpublished data). Tule perch are small enough to navigate the ladders through the drain holes at the base of each weir, and may use these to pass upstream unobserved.

Non-native Resident Fish

Non-native resident fish using the fish ladders at WIDD include black bass, common carp, and goldfish.

Non-native Anadromous Fish

Only one species of non-native anadromous fish, American shad, was observed using the ladders at WIDD. American shad were only observed from May 13th of 2004 through July 31st. Although there was no net upstream passage, a school of around 60 adult AMS was observed in the high stage fish ladder for 11 weeks. American shad are native to the Atlantic coast and were introduced into the Sacramento River in the 1870s as a sport fish (Moyle 2002). Adults on the Mokelumne River have been observed in May through August in the basin below WIDD during fish community surveys. No American shad have been observed above WIDD during fish community surveys (EBMUD unpub. data).

Acknowledgements

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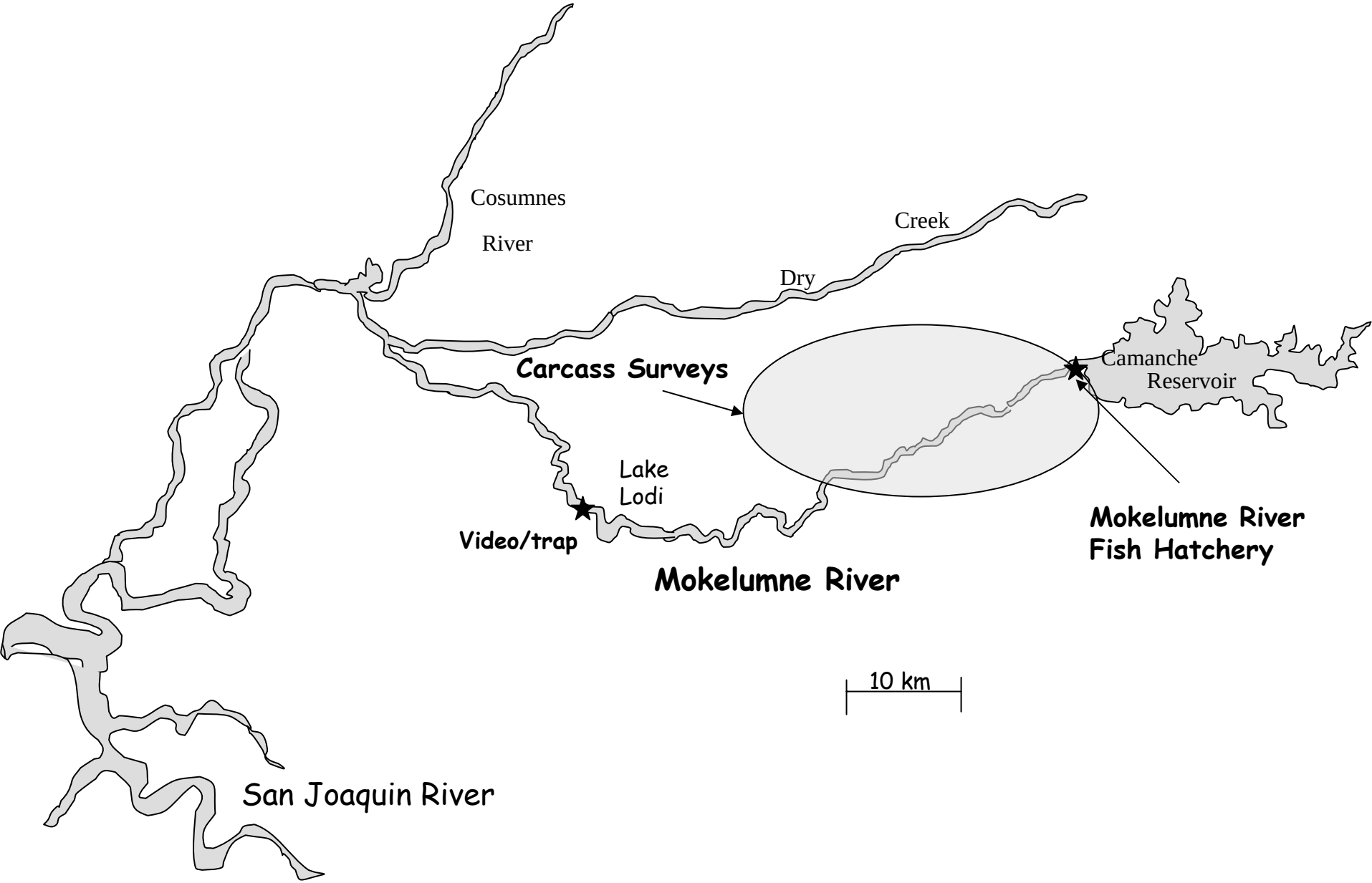


Figure 1. Location of carcass surveys and video/trap monitoring on the lower Mokelumne River, Ca.

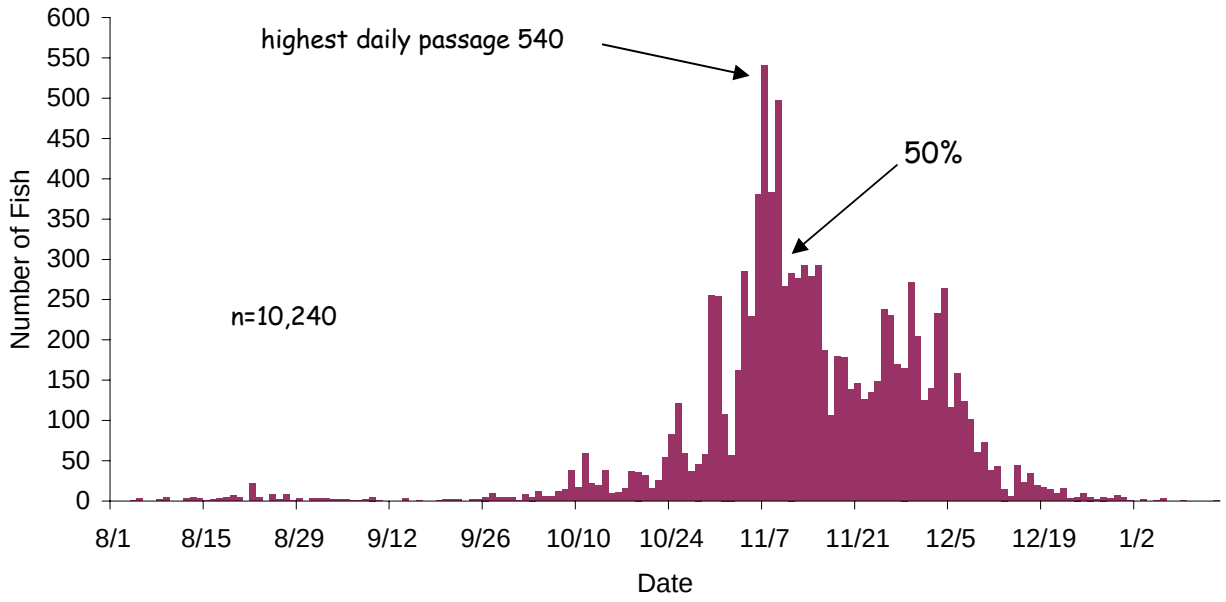


Figure 2. Daily abundance and timing of fall-run chinook salmon migrating past Woodbridge Irrigation District Dam, August 1, 2003 - January 14, 2004 (Data in Appendix A).

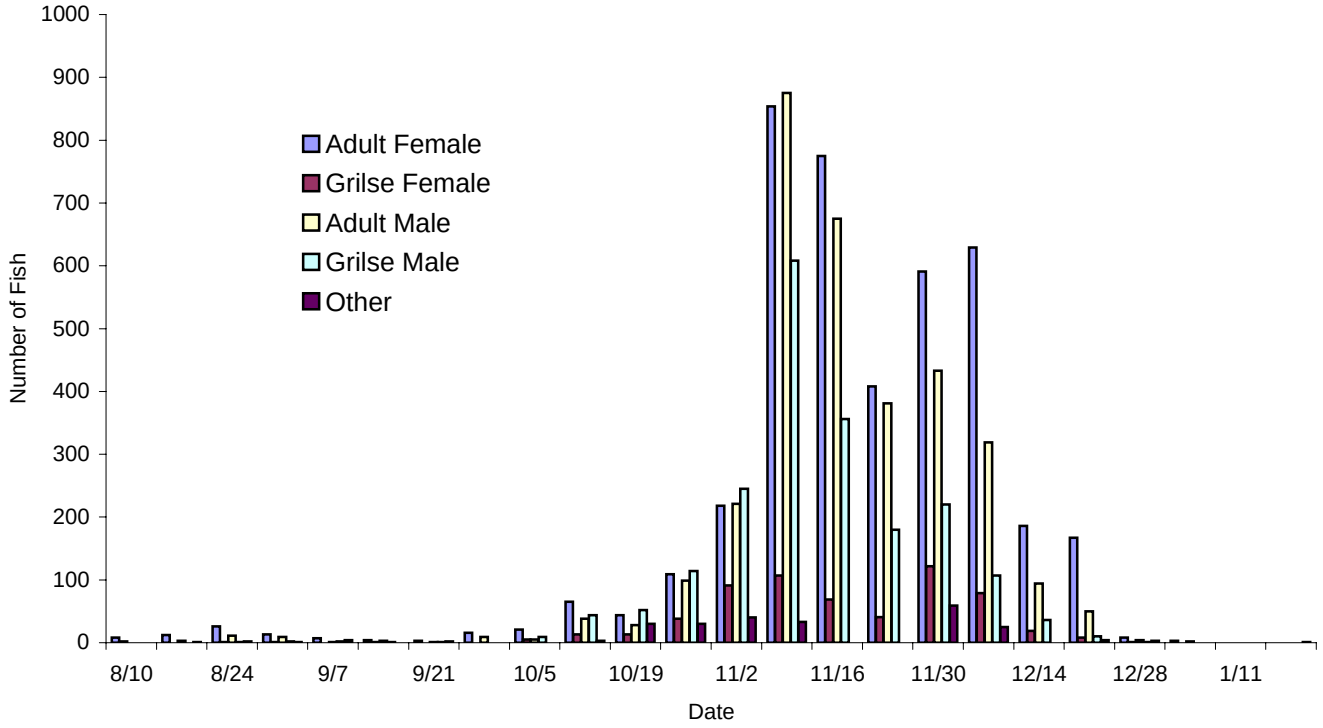


Figure 3. Weekly sex/age composition of fall-run Chinook salmon passing Woodbridge Irrigation District Dam, August 4, 2003 - January 18, 2004. (Data in Appendix A)

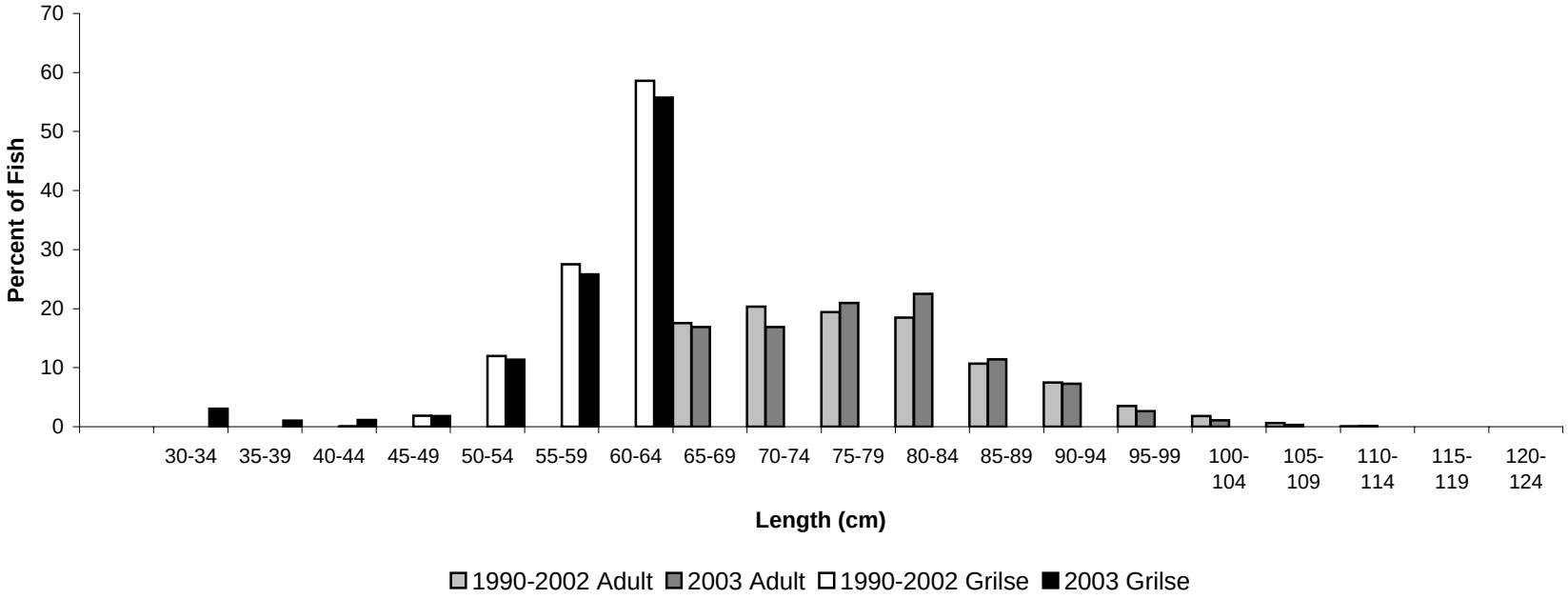


Figure 4. Length frequency of adult and grilse chinook salmon (% by size class) passing Woodbridge Irrigation District Dam in 2003 compared to the cumulative length frequency from 1990-2002.

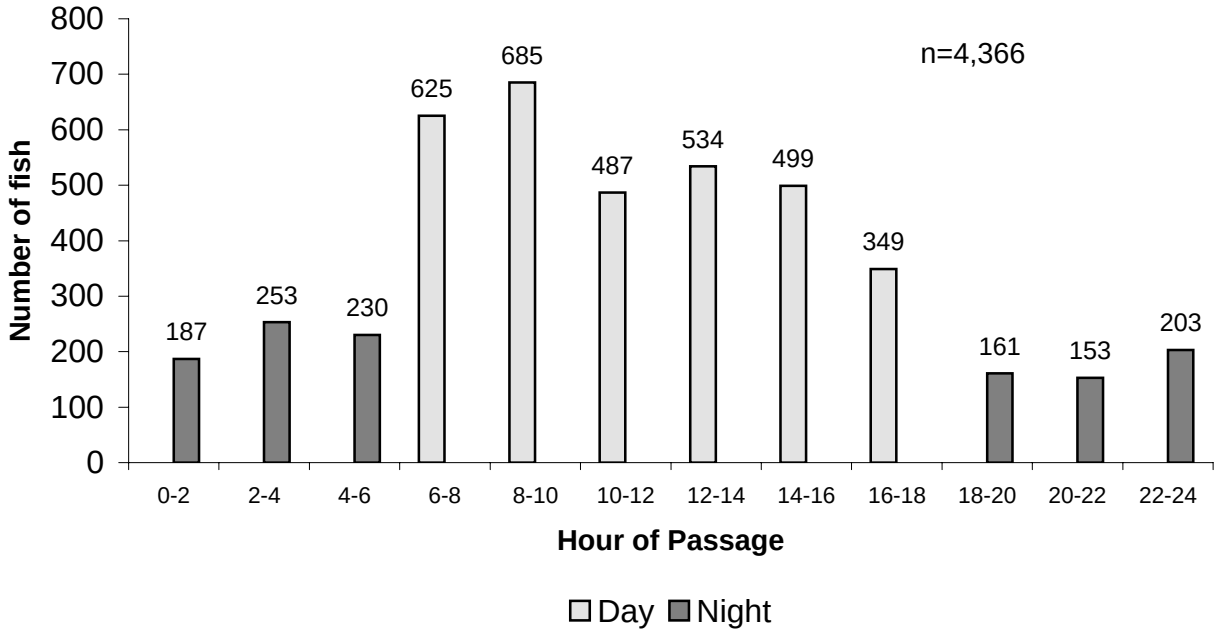


Figure 5. Chinook salmon passage (2 hour intervals) recorded from video monitoring at the Woodbridge Irrigation District Dam, August 4, 2003-January 18, 2004.

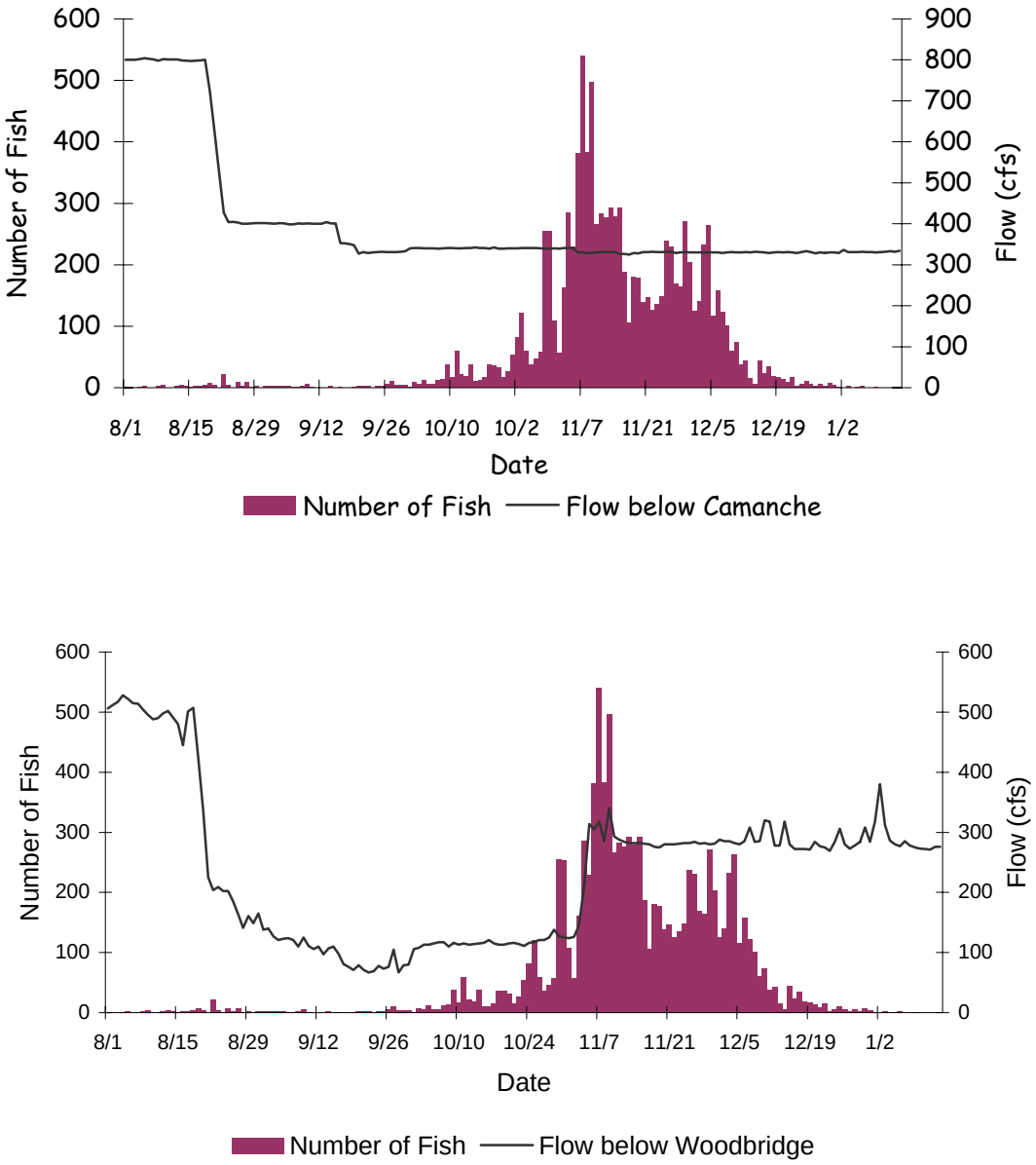
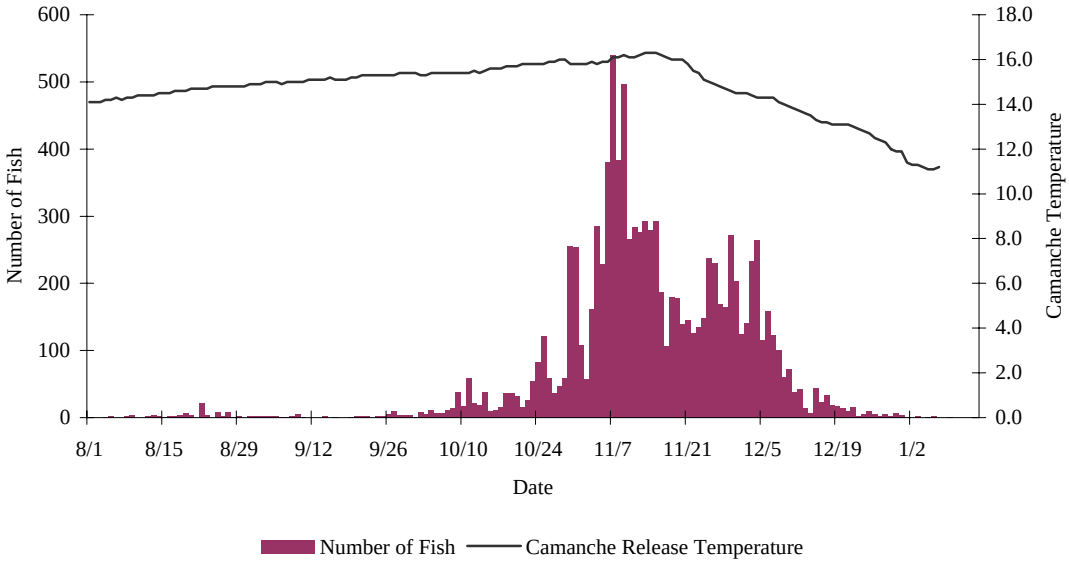


Figure 6a. Daily abundance of chinook salmon passing Woodbridge Irrigation District Dam and flow, August 4, 2003-January 18, 2004.



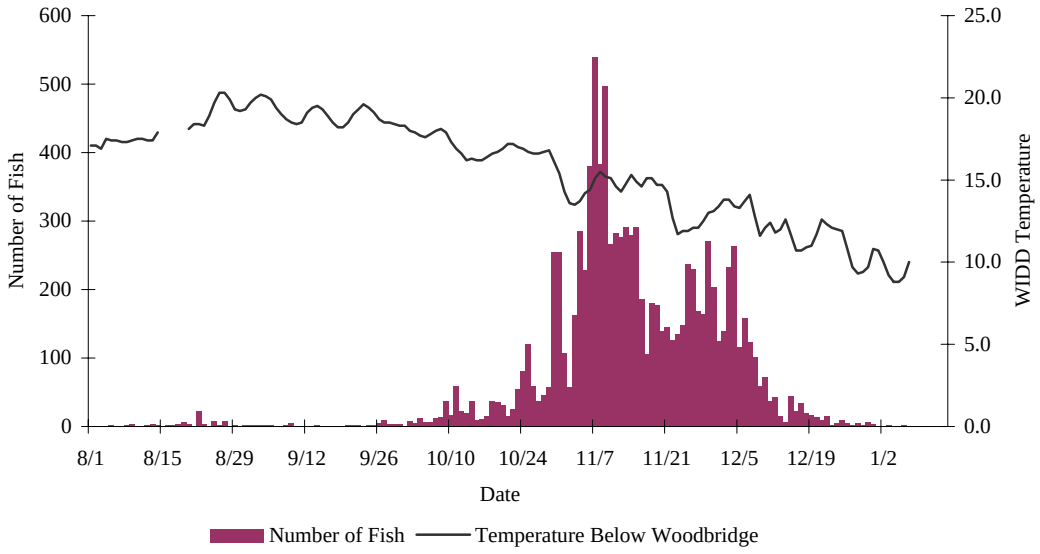


Figure 6b. Daily abundance of chinook salmon passing Woodbridge Irrigation District Dam and temperature, August 4, 2003-January 18, 2004.

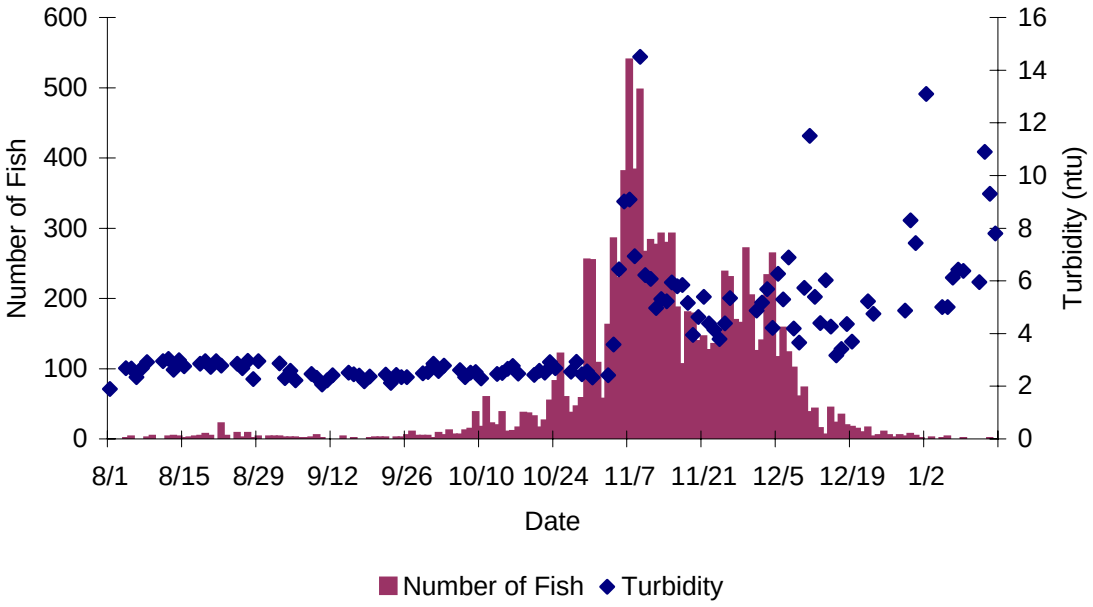


Figure 6c. Daily abundance of chinook salmon passing Woodbridge Irrigation District Dam and turbidity, August 4, 2003-January 18, 2004.

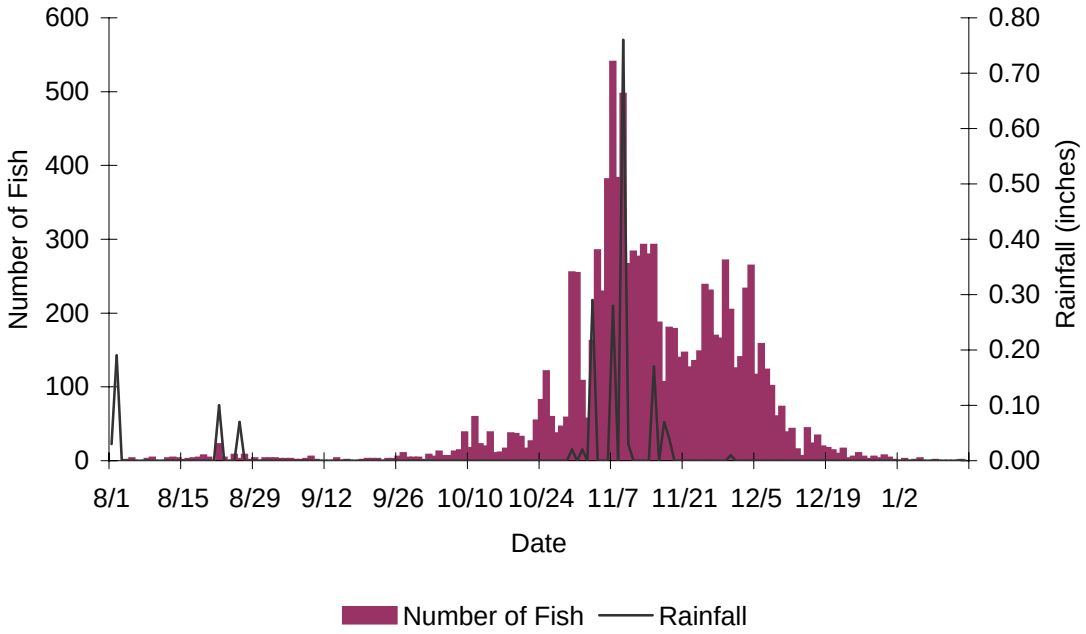


Figure 6d. Daily abundance of chinook salmon passing Woodbridge Irrigation District Dam and rainfall, August 4, 2003-January 18, 2004.

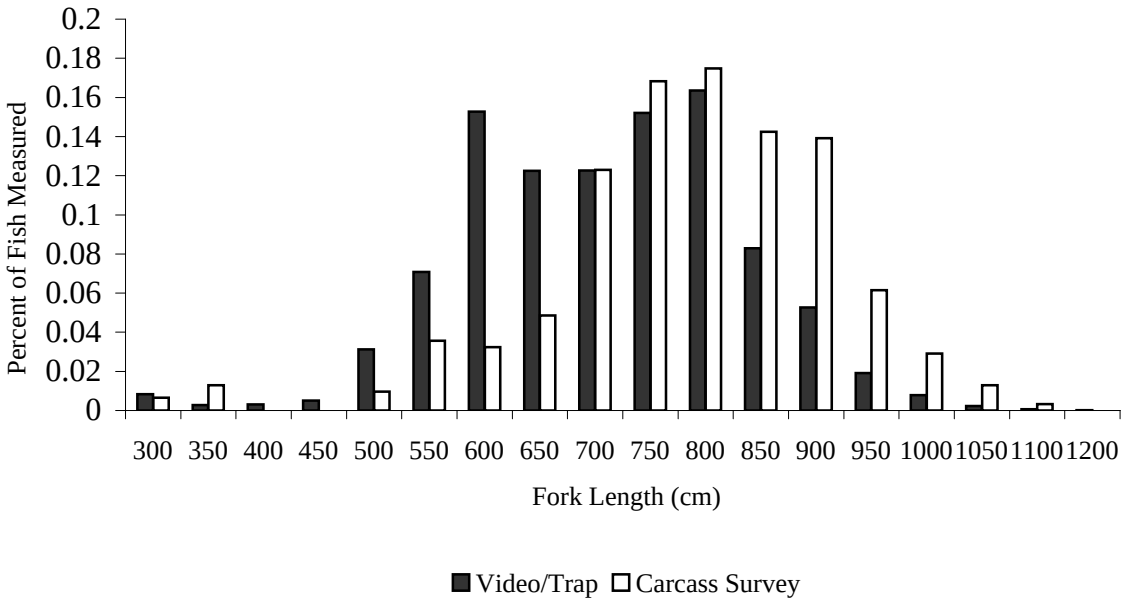


Figure 7. Comparison of length frequency data for chinook salmon from video/trap monitoring and carcass surveys on the lower Mokelumne River, Ca. 2003.

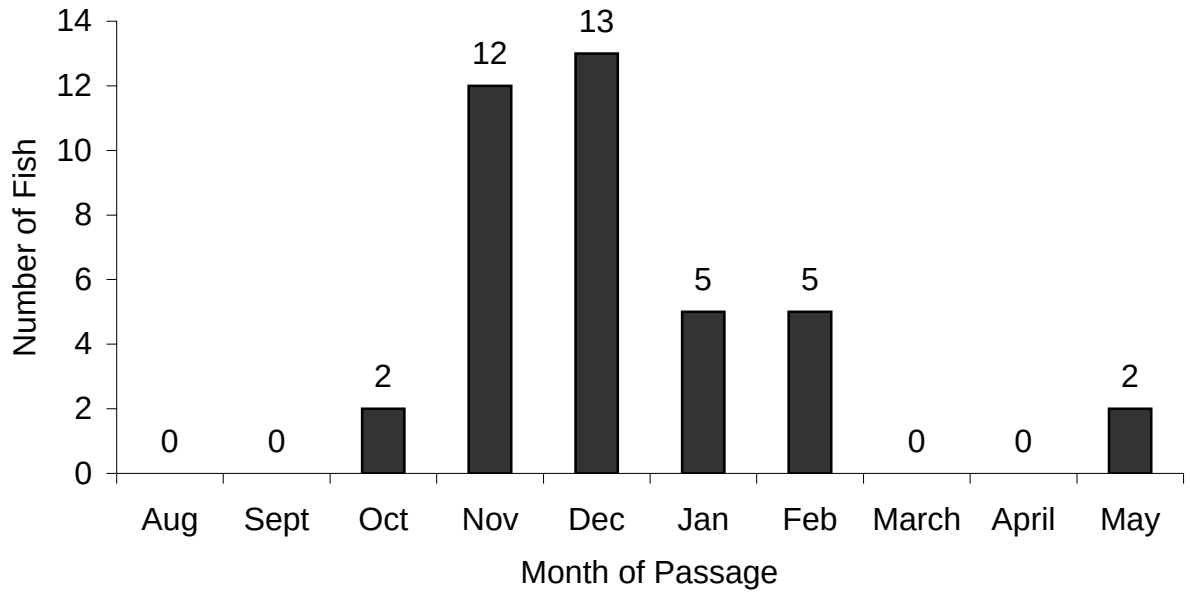


Figure 8. Monthly upstream passage of adult steelhead observed in the fish ladders at Woodbridge Irrigation District Dam on the Lower Mokelumne River, Ca. 2003/2004.

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Appendix A. Daily passage of Chinook and steelhead at Woodbridge Dam. August 04, 2003-July 31, 2004.

	Chinook Salmon										Steelhead			
Date	Adult Male	Adult Female	Unknown adult	Grilse Male	Grilse Female	Unknown grilse	Unknown Male	Unknown Female	Unknown sex and size	Total	Male	Female	Unknown	Total
8/4/2003	0	1	0	0	0	0	0	0	0	1	0	0	0	0
8/5/2003	0	2	0	0	1	0	0	0	0	3	0	0	-1	0
8/6/2003	0	0	0	0	0	0	0	0	0	0	0	0	-1	0
8/7/2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/8/2003	0	1	0	0	1	0	0	0	0	2	0	0	0	0
8/9/2003	0	4	0	0	0	0	0	0	0	4	0	0	0	0
8/10/2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/11/2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/12/2003	0	3	0	0	0	0	0	0	0	3	0	0	-1	0
8/13/2003	2	2	0	0	0	0	0	0	0	4	0	0	0	0
8/14/2003	1	2	0	0	0	0	0	0	0	3	0	0	0	0
8/15/2003	0	0	0	0	0	1	0	0	0	1	0	0	0	0
8/16/2003	0	2	0	0	0	0	0	0	0	2	0	0	0	0
8/17/2003	0	3	0	0	0	0	0	0	0	3	0	0	0	0
8/18/2003	2	1	1	0	0	0	0	0	0	4	0	0	0	0
8/19/2003	1	5	0	0	0	1	0	0	0	7	0	0	0	0
8/20/2003	0	4	0	0	0	0	0	0	0	4	0	0	0	0
8/21/2003	0	0	0	0	0	0	0	0	0	0	0	0	-1	0
8/22/2003	5	15	0	1	1	0	0	0	0	22	0	0	-1	0
8/23/2003	3	1	0	0	0	0	0	0	0	4	0	0	0	0
8/24/2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/25/2003	1	7	0	0	0	0	0	0	0	8	0	0	0	0
8/26/2003	0	2	0	0	0	0	0	0	0	2	0	0	0	0
8/27/2003	3	1	1	2	1	0	0	0	0	8	0	0	0	0
8/28/2003	0	1	0	0	0	0	0	0	0	1	0	0	0	0
8/29/2003	3	0	0	0	0	0	0	0	0	3	0	0	0	0
8/30/2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/31/2003	2	1	0	0	0	0	0	0	0	3	0	0	0	0
9/1/2003	0	3	0	0	0	0	0	0	3	6	0	0	0	0
9/2/2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/3/2003	0	2	0	0	0	0	0	0	0	2	0	0	0	0
9/4/2003	0	2	0	0	0	0	0	0	0	2	0	0	0	0

Appendix A. Daily passage of Chinook and steelhead at Woodbridge Dam. (cont.) August 04, 2003-July 31, 2004.

	Chinook Salmon										Steelhead			
Date	Adult Male	Adult Female	Unknown adult	Grilse Male	Grilse Female	Unknown grilse	Unknown Male	Unknown Female	Unknown sex and size	Total	Male	Female	Unknown	Total
9/5/2003	0	0	1	1	0	0	0	0	0	2	0	0	0	0
9/6/2003	0	0	0	1	0	0	0	0	0	1	0	0	0	0
9/7/2003	1	0	0	0	0	0	0	0	0	1	0	0	0	0
9/8/2003	0	2	0	0	0	0	0	0	0	2	0	0	0	0
9/9/2003	1	3	0	0	1	0	0	0	0	5	0	0	0	0
9/10/2003	1	0	0	0	0	0	0	0	0	1	0	0	0	0
9/11/2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/12/2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/13/2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/14/2003	1	1	0	1	0	0	0	0	0	3	0	0	0	0
9/15/2003	0	0	0	0	0	0	0	0	0	0	0	0	1	1
9/16/2003	0	0	0	1	0	0	0	0	0	1	0	0	0	0
9/17/2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/18/2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/19/2003	0	1	0	0	0	0	0	0	0	1	0	0	0	0
9/20/2003	1	0	0	0	0	1	0	0	0	2	0	0	0	0
9/21/2003	0	2	0	0	0	0	0	0	0	2	0	0	0	0
9/22/2003	0	2	0	0	0	0	0	0	0	2	0	0	0	0
9/23/2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/24/2003	0	2	0	0	0	0	0	0	0	2	0	0	0	0
9/25/2003	0	2	0	0	0	0	0	0	0	2	0	0	-1	-1
9/26/2003	4	1	0	0	0	0	0	0	0	5	0	0	1	1
9/27/2003	4	6	0	0	0	0	0	0	0	10	0	0	0	0
9/28/2003	1	3	0	0	0	0	0	0	0	4	0	0	0	0
9/29/2003	0	2	0	0	2	0	0	0	0	4	0	0	0	0
9/30/2003	0	2	0	2	0	0	0	0	0	4	0	0	0	0
10/1/2003	0	1	0	0	0	0	0	0	0	1	0	0	1	1
10/2/2003	1	6	0	0	1	0	0	0	0	8	0	0	1	1
10/3/2003	0	4	0	0	1	0	0	0	0	5	0	0	0	0
10/4/2003	3	5	0	4	0	0	0	0	0	12	0	0	0	0
10/5/2003	1	1	0	3	1	0	0	0	0	6	0	0	0	0
10/6/2003	2	2	0	2	0	0	0	0	0	6	0	0	0	0

Appendix A. Daily passage of Chinook and steelhead at Woodbridge Dam. (cont.) August 04, 2003-July 31, 2004.

	Chinook Salmon										Steelhead			
Date	Adult Male	Adult Female	Unknown adult	Grilse Male	Grilse Female	Unknown grilse	Unknown Male	Unknown Female	Unknown sex and size	Total	Male	Female	Unknown	Total
10/7/2003	3	6	0	2	1	0	0	0	0	12	0	0	0	0
10/8/2003	4	7	0	3		0	0	0	0	14	0	0	1	1
10/9/2003	7	20	0	5	4	2	0	0	0	38	0	0	0	0
10/10/2003	3	3	0	7	3	1	0	0	0	17	0	0	0	0
10/11/2003	16	17	0	22	4	0	0	0	0	59	0	0	1	1
10/12/2003	4	10	0	7	1	0	0	0	0	22	0	0	0	0
10/13/2003	3	5	0	9	1	1	0	0	0	19	0	0	0	0
10/14/2003	4	2	0	9	1	0	0	0	22	38	0	0	0	0
10/15/2003	2	1	0	0	1	0	0	0	6	10	0	0	0	0
10/16/2003	5	5	0	0	1	0	0	0	0	11	0	0	0	0
10/17/2003	3	4	0	10	1	0	-2	0	0	16	0	0	0	0
10/18/2003	6	10	0	16	3	2	0	0	0	37	0	0	0	0
10/19/2003	5	17	0	8	5	1	0	0	0	36	0	0	0	0
10/20/2003	3	13	0	9	3	4	0	0	0	32	0	0	0	0
10/21/2003	3	3	0	8	2	0	0	0	0	16	0	0	0	0
10/22/2003	5	9	0	4	3	4	0	0	1	26	0	0	0	0
10/23/2003	14	13	0	20	3	4	0	0	0	54	0	0	0	0
10/24/2003	20	26	0	21	11	4	0	0	0	82	-1	0	1	0
10/25/2003	40	32	3	30	13	4	1	0	-2	121	0	0	0	0
10/26/2003	15	13	1	21	3	6	0	0	0	59	0	0	0	0
10/27/2003	7	8	0	14	4	4	0	0	0	37	0	0	0	0
10/28/2003	13	6	0	21	2	4	0	0	0	46	0	0	0	0
10/29/2003	9	10	0	27	8	4	-1	0	1	58	0	0	0	0
10/30/2003	74	75	1	67	28	9	1	0	0	255	0	0	0	0
10/31/2003	65	77	0	75	30	7	0	0	0	254	0	0	0	0
11/1/2003	35	27	0	29	11	6	0	0	0	108	0	0	0	0
11/2/2003	18	15	0	12	8	4	0	0	0	57	0	0	0	0
11/3/2003	27	51	0	60	12	11	0	0	1	162	0	0	0	0
11/4/2003	62	60	3	115	27	19	-1	0	0	285	0	0	0	0
11/5/2003	86	84	0	43	16	0	0	0	0	229	0	2	0	2
11/6/2003	151	142	0	78	10	0	0	0	0	381	0	0	0	0
11/7/2003	204	195	0	125	16	0	0	0	0	540	0	0	0	0

Appendix A. Daily passage of Chinook and steelhead at Woodbridge Dam. (cont.) August 04, 2003-July 31, 2004.

	Chinook Salmon										Steelhead			
Date	Adult Male	Adult Female	Unknown adult	Grilse Male	Grilse Female	Unknown grilse	Unknown Male	Unknown Female	Unknown sex and size	Total	Male	Female	Unknown	Total
11/8/2003	151	133	0	86	13	0	0	0	0	383	0	1	0	1
11/9/2003	194	189	0	101	13	0	0	0	0	497	0	1	0	1
11/10/2003	94	108	0	54	10	0	0	0	0	266	0	0	2	2
11/11/2003	90	119	0	60	14	0	0	0	0	283	0	1	0	1
11/12/2003	108	119	0	41	8	0	0	0	0	276	0	0	0	0
11/13/2003	97	121	0	62	12	0	0	0	0	292	0	0	0	0
11/14/2003	99	113	0	59	8	0	0	0	0	279	0	0	0	0
11/15/2003	107	125	0	46	14	0	0	0	0	292	0	0	0	0
11/16/2003	79	70	0	35	3	0	0	0	0	187	0	0	0	0
11/17/2003	35	36	0	28	7	0	0	0	0	106	0	0	0	0
11/18/2003	64	75	0	33	8	0	0	0	0	180	0	0	0	0
11/19/2003	64	71	0	38	5	0	0	0	0	178	0	0	0	0
11/20/2003	54	54	0	19	12	0	0	0	0	139	0	0	0	0
11/21/2003	69	63	0	14		0	0	0	0	146	0	0	0	0
11/22/2003	41	61	0	19	5	0	0	0	0	126	0	0	0	0
11/23/2003	54	48	0	29	4	0	0	0	0	135	0	0	0	0
11/24/2003	65	61	0	18	4	0	0	0	0	148	0	0	0	0
11/25/2003	86	93	0	37	18	4	0	0	0	238	0	2	0	2
11/26/2003	72	76	0	51	23	8	0	0	0	230	0	0	0	0
11/27/2003	46	81	-1	18	21	4	0	0	0	169	0	0	1	1
11/28/2003	54	70	9	16	16	0	0	0	0	165	0	0	1	1
11/29/2003	66	127	3	43	21	12	0	-1	0	271	0	0	0	0
11/30/2003	44	83	3	37	19	17	0	0	1	204	0	0	1	1
12/1/2003	26	71	0	12	10	8	0	0	-2	125	0	1	1	2
12/2/2003	45	62	0	17	9	7	0	0	0	140	0	0	-2	-2
12/3/2003	59	104	1	33	30	6	0	0	0	233	0	0	1	1
12/4/2003	87	137	0	20	15	3	0	0	1	263	0	0	0	0
12/5/2003	22	81	0	6	6	1	0	0	0	116	0	0	0	0
12/6/2003	47	96	0	9	6	0	0	0	0	158	0	0	0	0
12/7/2003	32	76	0	11	4	0	0	0	0	123	0	0	0	0
12/8/2003	31	54	0	7	9	0	0	0	0	101	0	1	0	1
12/9/2003	18	30	0	9	3	0	0	0	0	60	0	0	0	0

Appendix A. Daily passage of Chinook and steelhead at Woodbridge Dam. (cont.) August 04, 2003-July 31, 2004.

	Chinook Salmon										Steelhead			
Date	Adult Male	Adult Female	Unknown adult	Grilse Male	Grilse Female	Unknown grilse	Unknown Male	Unknown Female	Unknown sex and size	Total	Male	Female	Unknown	Total
12/10/2003	16	49	0	8	0	0	0	0	0	73	0	1	0	1
12/11/2003	14	17	0	5	2	0	0	0	0	38	0	0	0	0
12/12/2003	10	26	0	4	3	0	0	0	0	43	1	1	0	2
12/13/2003	3	6	0	4	2	0	0	0	0	15	0	0	0	0
12/14/2003	2	4	0	0	0	0	0	0	0	6	0	0	0	0
12/15/2003	9	27	0	4	3	1	0	0	0	44	0	0	1	1
12/16/2003	8	14	0	0	0	1	0	0	0	23	1	0	0	1
12/17/2003	15	11	1	3	3	1	0	0	0	34	1	0	0	1
12/18/2003	5	12	0	1	1	0	0	0	0	19	0	0	-1	-1
12/19/2003	2	13	0	1	1	0	0	0	0	17	0	0	0	0
12/20/2003	10	4	0	0	0	0	0	0	0	14	0	0	-1	-1
12/21/2003	1	7	0	1	0	0	0	0	0	9	0	0	0	0
12/22/2003	4	7	0	2	3	0	0	0	0	16	-1	0	1	0
12/23/2003	-1	4	0	0	0	0	0	0	0	3	0	0	-1	-1
12/24/2003	2	1	0	2	0	0	0	0	0	5	0	0	0	0
12/25/2003	1	5	4	0	0	0	0	0	0	10	0	0	0	0
12/26/2003	0	5	0	0	0	0	0	0	0	5	1	0	1	2
12/27/2003	0	2	0	0	0	0	0	0	0	2	0	0	2	2
12/28/2003	1	1	0	1	1	1	0	0	0	5	1	0	-2	-1
12/29/2003	0	2	0	1	0	0	0	0	0	3	0	0	1	1
12/30/2003	2	2	2	0	1	0	0	0	0	7	0	0	-1	-1
12/31/2003	1	2	0	0	1	0	0	0	0	4	0	0	0	0
1/1/2004	1	0	0	0	0	0	0	0	0	1	0	0	0	0
1/2/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/3/2004	0	1	1	0	0	0	0	0	0	2	0	0	0	0
1/4/2004	0	0	0	0	0	0	0	0	0	0	0	0	1	1
1/5/2004	0	1	0	0	0	0	0	0	0	1	0	0	0	0
1/6/2004	1	2	0	0	0	0	0	0	0	3	0	0	0	0
1/7/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/8/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/9/2004	0	1	0	0	0	0	0	0	0	1	0	1	0	1
1/10/2004	1	0	0	0	0	0	0	0	0	1	1	0	0	1

Appendix A. Daily passage of Chinook and steelhead at Woodbridge Dam. (cont.) August 04, 2003-July 31, 2004.

	Chinook Salmon										Steelhead			
Date	Adult Male	Adult Female	Unknown adult	Grilse Male	Grilse Female	Unknown grilse	Unknown Male	Unknown Female	Unknown sex and size	Total	Male	Female	Unknown	Total
1/11/2004	0	0	0	0	0	0	0	0	0	0	0	0	2	2
1/12/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/13/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/14/2004	0	0	1	0	0	0	0	0	0	1	0	0	0	0
1/15/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/16/2004	0	0	1	0	0	0	0	0	0	1	0	0	0	0
1/17/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/18/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/19/2004	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1
1/20/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/21/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/22/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/23/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/24/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/25/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/26/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/27/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/28/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/29/2004	0	0	0	0	0	0	0	0	0	0	1	0	0	1
1/30/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1/31/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/1/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/2/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/3/2004	0	0	0	0	0	0	0	0	0	0	1	0	1	2
2/4/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/5/2004	0	0	0	0	0	0	0	0	0	0	0	0	1	1
2/6/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/7/2004	0	0	0	0	0	0	0	0	0	0	0	0	1	1
2/8/2004	0	0	0	0	0	0	0	0	0	0	0	0	1	1
2/9/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/10/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/11/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A. Daily passage of Chinook and steelhead at Woodbridge Dam. (cont.) August 04, 2003-July 31, 2004.

	Chinook Salmon										Steelhead			
Date	Adult Male	Adult Female	Unknown adult	Grilse Male	Grilse Female	Unknown grilse	Unknown Male	Unknown Female	Unknown sex and size	Total	Male	Female	Unknown	Total
2/12/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/13/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/14/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/15/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/16/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/17/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/18/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/19/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/20/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/21/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/22/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/23/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/24/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/25/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/26/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/27/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/29/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/1/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/2/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/3/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/4/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/5/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/6/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/7/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/8/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/9/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/10/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/11/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/12/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/13/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/14/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A. Daily passage of Chinook and steelhead at Woodbridge Dam. (cont.) August 04, 2003-July 31, 2004.

	Chinook Salmon										Steelhead			
Date	Adult Male	Adult Female	Unknown adult	Grilse Male	Grilse Female	Unknown grilse	Unknown Male	Unknown Female	Unknown sex and size	Total	Male	Female	Unknown	Total
3/15/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/16/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/17/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/18/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/19/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/20/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/21/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/22/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/23/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/24/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/25/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/26/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/27/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/28/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/29/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/30/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/31/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/1/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/2/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/3/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/4/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/5/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/6/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/7/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/8/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/9/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/10/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/11/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/12/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/13/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/14/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/15/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A. Daily passage of Chinook and steelhead at Woodbridge Dam. (cont.) August 04, 2003-July 31, 2004.

	Chinook Salmon										Steelhead			
Date	Adult Male	Adult Female	Unknown adult	Grilse Male	Grilse Female	Unknown grilse	Unknown Male	Unknown Female	Unknown sex and size	Total	Male	Female	Unknown	Total
4/16/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/17/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/18/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/19/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/20/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/21/2004	0	0	0	0	0	0	0	0	0	0	0	0	-1	0
4/22/2004	0	0	0	0	0	0	0	0	0	0	0	0	-1	0
4/23/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/24/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/25/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/26/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/27/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/28/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/29/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4/30/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/1/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/2/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/3/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/4/2004	0	0	0	0	0	0	0	0	0	0	0	0	1	0
5/5/2004	0	0	0	0	0	0	0	0	0	0	0	0	1	0
5/6/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/7/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/8/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/9/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/10/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/11/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/12/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/13/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/14/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/15/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/16/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/17/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A. Daily passage of Chinook and steelhead at Woodbridge Dam. (cont.) August 04, 2003-July 31, 2004.

	Chinook Salmon										Steelhead			
Date	Adult Male	Adult Female	Unknown adult	Grilse Male	Grilse Female	Unknown grilse	Unknown Male	Unknown Female	Unknown sex and size	Total	Male	Female	Unknown	Total
5/18/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/19/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/20/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/21/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/23/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/24/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/25/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/26/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/27/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/28/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/29/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/30/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/31/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/1/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/2/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/3/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/4/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/5/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/6/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/7/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/8/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/9/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/10/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/11/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/12/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/13/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/14/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/15/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/16/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/17/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/18/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/19/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/20/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A. Daily passage of Chinook and steelhead at Woodbridge Dam. (cont.) August 04, 2003-July 31, 2004.

	Chinook Salmon										Steelhead			
Date	Adult Male	Adult Female	Unknown adult	Grilse Male	Grilse Female	Unknown grilse	Unknown Male	Unknown Female	Unknown sex and size	Total	Male	Female	Unknown	Total
6/21/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/22/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/23/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/24/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/25/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/26/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/27/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/28/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/29/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6/30/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/1/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/2/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/3/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/4/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/5/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/6/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/7/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/8/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/9/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/10/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/11/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/12/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/13/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/14/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/15/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/16/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/17/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/18/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/19/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/20/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/21/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/22/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/23/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/24/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/25/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/26/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A. Daily passage of Chinook and steelhead at Woodbridge Dam. (cont.) August 04, 2003-July 31, 2004.

	Chinook Salmon										Steelhead			
Date	Adult Male	Adult Female	Unknown adult	Grilse Male	Grilse Female	Unknown grilse	Unknown Male	Unknown Female	Unknown sex and size	Total	Male	Female	Unknown	Total
7/27/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/28/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/29/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/30/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/31/2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	3,268	4,111	36	2,000	617	178	-2	-1	32	10,240	8	12	19	39

* -1 values indicate a net downstream migration for the day in question