

Downstream Fish Migration Monitoring at Woodbridge Irrigation District Dam Lower Mokelumne River, January 2005 through July 2005

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SUMMARY

One rotary screw trap was operated downstream of the Lower Sacramento Road Bridge crossing on the lower Mokelumne River from January 4, 2005 through July 27, 2005, captured 7,602 naturally produced young-of-year (YOY) Chinook salmon (*Oncorhynchus tshawytscha*) and 74 YOY (FL <150 mm) steelhead (*O. mykiss*). In addition to natural production this year, one hatchery volitional release of hatchery fingerling Chinook was made of which 984 were captured.

The first YOY Chinook salmon was captured on January 13, 2005. The estimate of abundance for naturally produced YOY Chinook salmon passing WIDD from January 4, 2005 through July 28, 2005 is 432,874 (95% CI: 274,012-1,527,356). Estimated fry and smolt passing WIDD were 197,390 and 235,484, respectively.

The first YOY steelhead (*O. mykiss*) was captured on March 10, 2005. Estimated abundance of steelhead based on salmon trap calibrations was 5,467 (C.I.: 3,669-10,783). In addition, 5 wild age 1+ steelhead were captured between January and April ranging in size from 133-240 mm FL (\bar{x} = 178 mm). Also, 32 adclipped steelhead ranging in size from 79-297 mm FL (\bar{x} = 204 mm) were captured between February 16th and July 14th.

Twenty-six fish species were recorded in the rotary screw traps. The most common species, in order of abundance, were Chinook salmon, Pacific lamprey (*Lampetra tridentata*), prickly sculpin (*Cottus asper*), and bluegill (*Lepomis macrochirus*).

Camanche release during the monitoring period ranged from 254 cubic feet per second (cfs) (7.19 cubic meters per second (m³/s)) to 2509 cfs (71.0 m³/s).

INTRODUCTION

East Bay Municipal Utility District (EBMUD) has been monitoring the lower Mokelumne River (LMR) juvenile salmonid emigration since 1990 (Bianchi et al 1992, Marine 2000). Most adult salmonid spawning on the LMR occurs in the first 10 river miles (16 km) downstream of Camanche Dam. The screw traps are operated at river mile 39 (RKM 63) below Woodbridge Irrigation District Dam (WIDD) to assess juvenile emigration. WIDD is approximately 15 river miles (24 km) below the lowest extent of

salmonid spawning habitat. This report presents the monitoring results for rotary screw trap operations from January 2005 through July 2005.

OBJECTIVES

The objectives of this study are to:

- 1) Monitor the abundance and emigration patterns of naturally produced anadromous salmonids on the lower Mokelumne River past Woodbridge Irrigation District Dam;
- 2) Monitor movement patterns and timing of all fish species utilizing the LMR from January through July;
- 3) Coded-wire tag a portion of naturally produced YOY Chinook salmon; and,
- 4) Monitor the migration patterns of a volitional release of hatchery reared Chinook salmon.

METHODS

Rotary Screw traps

One 8-foot diameter (2.4 m) rotary screw trap (EG Solutions, Inc.) was operated below the Lower Sacramento Road Bridge on the lower Mokelumne River. Due to fish ladder and dam construction at Woodbridge Irrigation District Dam (WIDD), trap placement was approximately 1/8 mile (201 m) downstream of the location used from 1993-2003 (Figure 1). The trap was checked twice daily, 5 days per week, and not operated on the weekends. Estimates were generated for the non-trapping days (two daytime periods and three nighttime periods) by averaging the catch (and rounding to the nearest 1 fish) for three days before and after the non-trapping period. Efforts were made to operate the trap to maintain a rotational speed of two rotations per minute (RPM) or greater (USFWS 1997). Rotations were measured using a stopwatch to record the time for three full rotations. RPMs were taken at each trap check. Trap cables were adjusted to optimize rotations. Morning checks were conducted within one hour of sunrise, and evening checks were conducted within one hour of sunset.

Cone rotations since the previous trap check were read off of a Remington® mechanical counter mounted on side rails near the mouth of the cone, and the counter was reset to zero. Turbidity samples were collected by submerging an inverted sample jar to a depth of 1 foot (0.3 m) and then allowing it to fill with water. Temperature, DO and turbidity samples were taken at the downstream end of the screw trap. Water samples for turbidity were read in the lab on a Hach® P1000 turbidimeter. The trap was cleared of debris and fish were offloaded into 5 gallon (19 liter) buckets. pontoons, cones, live boxes, and decks were scrubbed each day to reduce algal build up and maintain trap rotation. The cables, pulleys, counter, and cone were inspected daily to ensure proper function.

Fish Handling

Fish were processed on the trap. Clove oil was used to anesthetize fish. Fish were anesthetized and the first 50 Chinook salmon and the first 20 of any other species

recovered from the trap were weighed to the nearest 0.1 gram with an Ohaus® Scout portable scale and measured to the nearest millimeter. Life stage of each fish and any observations of marks, injuries or anomalies were recorded. Fish were allowed to recover in oxygenated water and were then transported by boat, via 5 gallon (19 liter) buckets equipped with battery operated aerators, to the lower Mokelumne River just downstream of the Lower Sacramento Road Bridge. Release locations varied within a 250 meter (820 ft) area to reduce predation on released fish.

Coded Wire Tagging

Coded wire tagging (CWT) was conducted from February 10, 2005 through July 21, 2004. Chinook salmon fry ≥ 37 mm fork length (FL) and completely buttoned-up fry were tagged on site at WIDD. One Northwest Marine Technologies, Inc. Mark IV tagging machine was used to implant CWTs in juvenile Chinook salmon. Standard coded-wire tagging methods for juvenile salmon, as described in Vogel and Marine (1999a), were followed.

Calibrations

Calibration tests using hatchery produced Chinook were conducted to assess what portion of emigrating Chinook were being caught in the traps. Ten calibration tests for Chinook salmon captures were conducted at the WIDD spill release location, consisting of five nighttime tests and five daytime tests. Calibration fish were marked using caudal clips or a NewWest® photonic tagging gun.

Fish were held overnight in live cars in the live box of the rotary screw trap. Mark retention and mortality rates were determined before releasing the fish. Releases were conducted after the morning trap check for the am release (between 8:00 am and 10:00 am), and at full darkness for the pm release (between 6:00 pm and 9:00 pm). Fish were released at the crest of the spill of Woodbridge Dam.

RESULTS/DISCUSSION

Chinook salmon

During monitoring 7,602 naturally produced juvenile Chinook salmon were captured. Estimates for weekend catch were added to actual catch to produce a count of 12,653 to which the trap efficiencies were applied to develop the overall estimate. The estimate of abundance for naturally produced juvenile fall-run Chinook salmon passing WIDD from January 4, 2005 through July 27, 2005 is 432,874 (95% CI:274,012-1,527,356). This estimate consists of 197,390 fry and 235,484 smolts. Captures were classified as fry for all dates when average fork length did not exceed 60 mm. This was the case until April 6, 2005. Smolt numbers are based on the period of April 7th to July 27th (Figure 2).

Juvenile salmon were described to lifestage as fry, parr, silvery parr, or smolt based on appearance. Average fork length (FL) for fry was 33.6 mm (28-40 mm, n=1,560); parr averaged 39.0 mm (30-57 mm, n=437), silvery parr averaged 55.6 mm (40-83 mm, n=387) and smolts were 83.8 mm (53-137 mm, n=2,844) on average. Average condition factor (weight in grams/fork length in mm³ x 100,000) ranged from 0.55 for fry in May to 1.15 for silvery parr in June (Figures 3 and 4).

A small number of yearling smolts are observed in most years migrating out of the Mokelumne River (Marine 2000; Workman 2003). This year only 2 fish in this size and development range were observed: One 134 mm Chinook in January, and one 137 mm Chinook in April. During the 147 days of trap operation the minimum recorded rotational speed was 1.6 RPM and maximum was 5.50. Average rotational speed over the course of the monitoring season was 3.86 RPM, which is above the CAMP recommended minimum rotation of 2 RPM. Only 8 days, all in January, of RPM < 2.0 occurred this year during monitoring. The low numbers of yearling smolts could be related to the relatively high flows this spring, and having only one trap operating.

Camanche release during the monitoring period ranged from 254 cfs (7.2 m³/s) to 2,509 cfs (71.0 m³/s), \bar{x} = 1318 cfs (37.3 m³/s) (Figures 5 and 6).

Water temperatures recorded at Camanche Dam during the monitoring period were between 9.7 and 15.5 °C, with an average of 12.0 °C. Daily water temperature recorded at WIDD ranged from 8.3 to 17.6 °C with an average of 12.5 °C during the monitoring period, around 2 °C cooler than last year (Workman 2004) (Figures 7 and 8).

Young-of-year Chinook emigration numbers were compared to flow, temperature, turbidity, and precipitation both graphically and statistically (Figures 5-10). Simple linear regressions explained little of the total variation in daily abundance of fish as a function of the environmental variables examined. The square of the correlation coefficient (R^2) values for temperature and flow compared to fish numbers were each $R^2 < .05$ ($p < .01$), and no statistical relationship between precipitation or turbidity with fish movement was observed. Combined effect of flow below Woodbridge, turbidity and temperature at Woodbridge only produced an R^2 value of 0.14 ($p < .0001$) when compared to daily estimated emigration.

Diel Abundance

Nocturnal passage accounted for 92% of estimated emigration at the screw traps. This was consistent across the entire monitoring period. Very few fish were captured during the day (Figure 11).

Calibrations

Rotary screw trap efficiencies for Chinook salmon ranged from 0.015 to 0.072 (Table 1). The number of calibration fish released was 200-800 fish per release. Efficiencies were slightly higher earlier in the season, with smaller fish, than later in the season with larger fish. But, the overall range of efficiencies was small. Larger fish may be better able to avoid the traps. Efficiencies were also lower during higher flows. During lower flows most of the WIDD spill and ladder flow is directed at the screw traps. During higher flows, more of the flow is directed away from the traps and therefore a greater chance for migrating fish, including calibration fish, to avoid the traps. Daily catch numbers and associated calibration coefficients (trap efficiencies), for Chinook salmon, are presented in Appendix A.

Table 1. Trap efficiency test results for rotary screw traps fished at Woodbridge Irrigation District Dam, January 4, 2005 through July 27, 2005.

Date	Release Site	Day Release		Night Release		Trap Efficiency	
		Marked	Recaptured	Marked	Recaptured	Day	Night
2/7/2005	WIDD Spill	219	14	180	5	0.064	0.028
2/15/2005	WIDD Spill	507	17	502	36	0.034	0.072
3/15/2005	WIDD Spill	515	18	507	24	0.035	0.047
3/29/2005	WIDD Spill	506	10	505	20	0.020	0.040
4/11/2005	WIDD Spill	536	8	510	15	0.015	0.029
5/9/2005	WIDD Spill	712	20	701	11	0.028	0.016
6/7/2005	WIDD Spill	812	20	823	16	0.025	0.019

Coded Wire Tagging

Natural production tagging conducted at WIDD began on February 10, 2005 and ended on July 21, 2005. One tag code (06-01-05-02-01) was used to tag 3,082 YOY Chinook salmon. Fish tagged ranged in size from 36 mm to 118 mm, averaging 77 mm FL, and all were released less than 250 m (820 ft) below WIDD.

Volitional Release of Hatchery Chinook

On May 5, 2005 a group of 102,963 coded wire tagged and adipose-fin clipped chinook fingerlings was allowed to volitionally leave the Mokelumne River Fish Hatchery just below Camanche Dam. The first of the volitional release fish was picked up in the screw traps on the morning of May 7, 2005. Over the monitoring period we captured 984 of these fish. The estimate of abundance for the volitional release was 51,669 (Figure 12). Data are in Appendix A

Steelhead

Seventy-four YOY steelhead were captured in rotary screw traps from March through June. The estimate for young-of-year steelhead during this period, based on Chinook calibrations, is 5,467 (C.I:3,669-10,783). Data are in Appendix B.

Young-of-year steelhead were described to lifestage as fry or parr or silvery parr. Fry averaged 23 mm (21-25 mm, n=2). Parr averaged 73.7 mm (37-107 mm, n=64). Silvery parr averaged 85.6 mm (74-92mm, n=4) In addition, 37 age 1+ steelhead were captured between February and July. These fish averaged 198 mm (79-297 mm). Thirty-two of these steelhead were adipose-fin clipped.

Incidental Species

Twenty-six fish observed in rotary screw traps were identified to species. Some juvenile black bass, and centrarchid hybrids were only identified to genus. The most common black bass species observed in the LMR are spotted bass (*Micropterus punctulatus*) and largemouth bass (*M. salmoides*) and these two species most likely composed the unknown black bass component. Typical centrarchid hybrids are some combination of bluegill (*Lepomis macrochirus*), redear sunfish (*L. microlophus*) and green sunfish (*L. cyanellus*). Eight native species and 18 non natives were captured. The most abundant fish observed were Chinook salmon, followed by prickly sculpin, Pacific lamprey, , and bluegill, in order of abundance (Table 2).

Table 2 . Raw capture data of fish species trapped below Woodbridge Dam on the Lower Mokelumne River, January 4 - July 27, 2005. (Native species are in bold)

Species	Life Stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
Bluegill <i>Lepomis macrochirus</i>	Juvenile	10	115	75	52	12	14	7	285
	Adult	1	6	17	11	6	8	1	50
Common Carp <i>Cyprinus carpio</i>	Juvenile	1					5	2	8
	Adult								
Chinook salmon <i>Oncorhynchus tshawytscha</i>	YOY	126	2924	1266	551	1849	853	33	7602
	YOY Adclipped					973	11		984
Channel Catfish <i>Ictalurus punctatus</i>	Juvenile						1		1
	Adult								
Goldfish <i>Carassius auratus</i>	Juvenile	5							5
	Adult								
Golden Shiner <i>Notemigonus crysoleucas</i>	Juvenile	2	2			1			5
	Adult	8	6	8	3	3	2		30
Green Sunfish <i>Lepomis cyanellus</i>	Juvenile		1	1	1	3			6
	Adult								
Hitch <i>Lavinia exilicauda</i>	Juvenile					1		22	23
	Adult	1			1	1			3
Inland Silverside <i>Menidia beryllina</i>	Juvenile								
	Adult	1	1						2
Kokanee <i>Oncorhynchus nerka</i>	Juvenile		1		4	13	2	1	21
Largemouth bass <i>Micropterus salmoides</i>	Juvenile	1	1		1				3
Lepomis hybrid <i>Lepomis sp.</i>	Juvenile				1	1			2
	Adult								
Mosquitofish <i>Gambusia affinis</i>	Juvenile								
	Adult			2	1	1			4
Pacific Lamprey <i>Lampetra tridentata</i>	Adult			3	1	1	2		7
	Ammocoete	1	2	3	1	1			8
	Juvenile	279	33	46	3	1			362
Prickly Sculpin <i>Cottus asper</i>	Juvenile	11	8	10	1	2	718	837	1587
	Adult	43	59	17	2				121

Table 2 (cont.). Raw capture data of fish species trapped below Woodbridge Dam on the Lower Mokelumne River, January 4 - July 27, 2005. (Native species are in bold)

Redeye Bass <i>Micropterus coosae</i>	Juvenile Adult				1					1
Redear Sunfish <i>Lepomis microlophus</i>	Juvenile Adult			1	14	3	13	1		32
Smallmouth Bass <i>Micropterus dolomieu</i>	Juvenile Adult				1					1
Spotted Bass <i>Micropterus punctulatus</i>	Juvenile Adult	1	1	4	1	2	2			11
Sacramento Sucker <i>Catostomus occidentalis</i>	Juvenile Adult	1					4	12		17
Sacramento Pikeminnow <i>Ptychochilus grandis</i>	Juvenile Adult	3	1		1			1		6
Striped Bass <i>Morone saxatilis</i>	Juvenile Adult					1		1		2
Steelhead Trout <i>Oncorhynchus mykiss</i>	YOY 1+ 1+ Adclipped			2	1	7	35	29		74
		1	2		2					5
			13	15	2		1	1		32
Tule Perch <i>Hysterocarpus traski</i>	Juvenile Adult	2	2	3		1	8	12		28
		1		2	3	4	1	6		17
Unknown Black Bass <i>Micropterus sp.</i>	Juvenile Adult	3					1	101		105
White Catfish <i>Ameiurus catus</i>	Juvenile Adult					1				1
White Crappie <i>Pomoxis annularis</i>	Juvenile Adult					1	1			2

Acknowledgements

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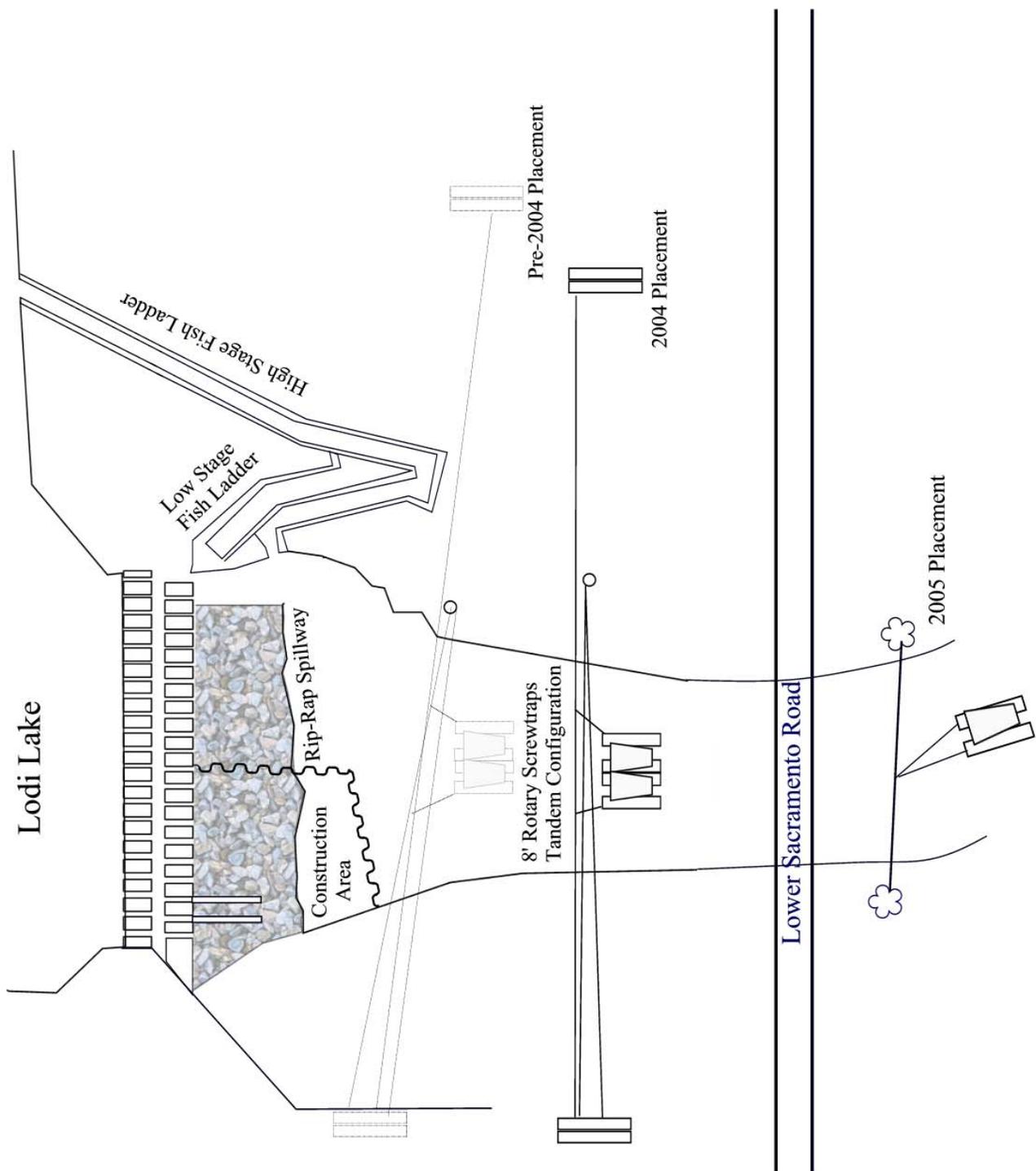


Figure 1. 2005 placement of a single eight foot diameter rotary screw trap on the lower Mokelumne River, California.

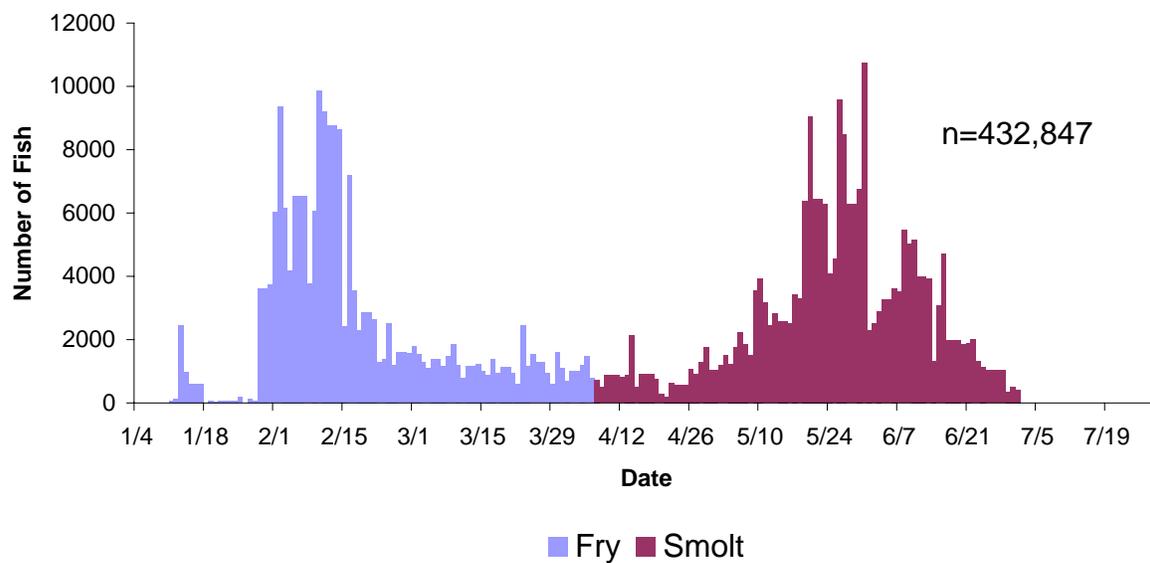


Figure 2. Estimated abundance of young-of-year chinook salmon emigrating out of the lower Mokolumne River from January 4, 2005 through July 27, 2005.

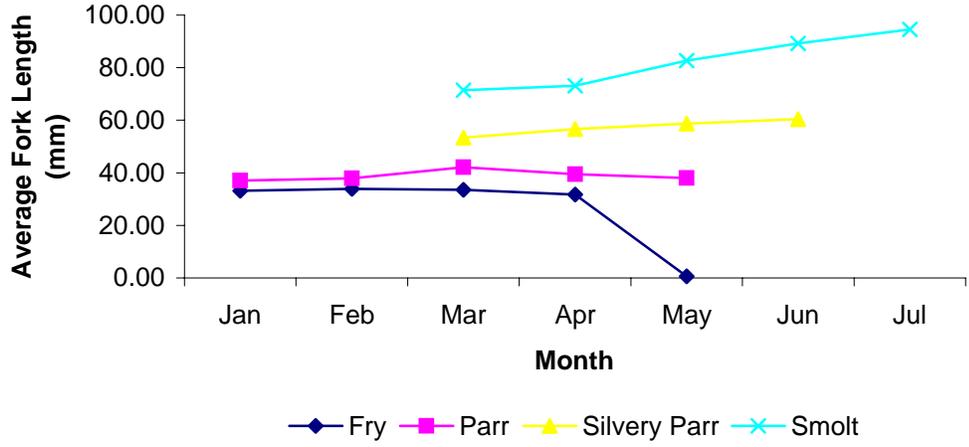


Figure 3. Average fork length (mm) of juvenile chinook salmon lifestages by month, on the lower Mokelumne River from January 4, 2005 through July 27, 2005.

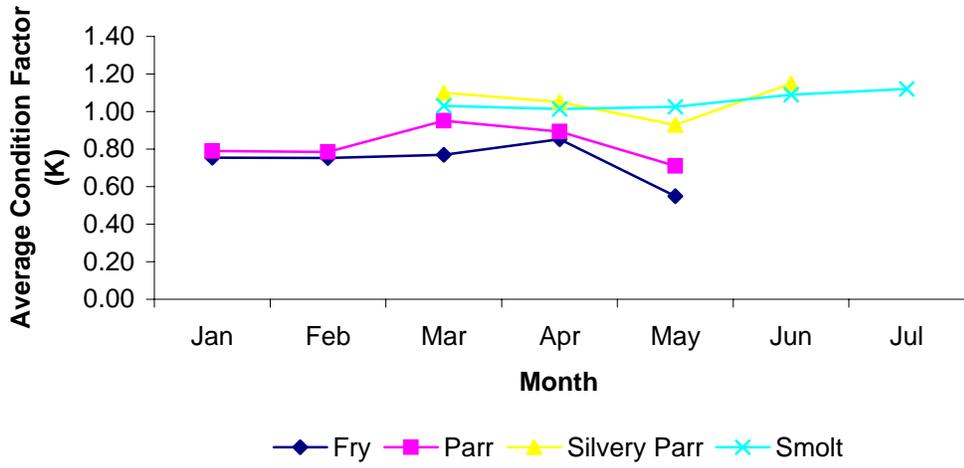


Figure 4. Average condition factor (K) of juvenile chinook salmon lifestages by month, on the lower Mokelumne River from January 4, 2005 through July 27, 2005.

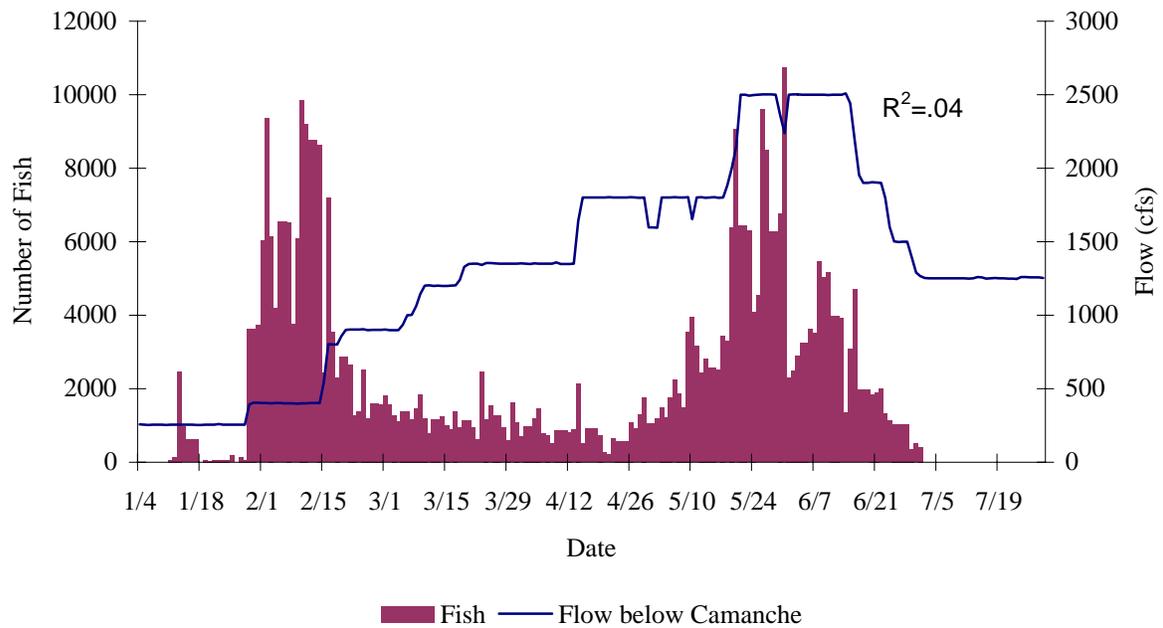


Figure 5. Juvenile chinook salmon emigration on the lower Mokelumne River and Camanche release flows, January 4, 2005 - July 27, 2005.

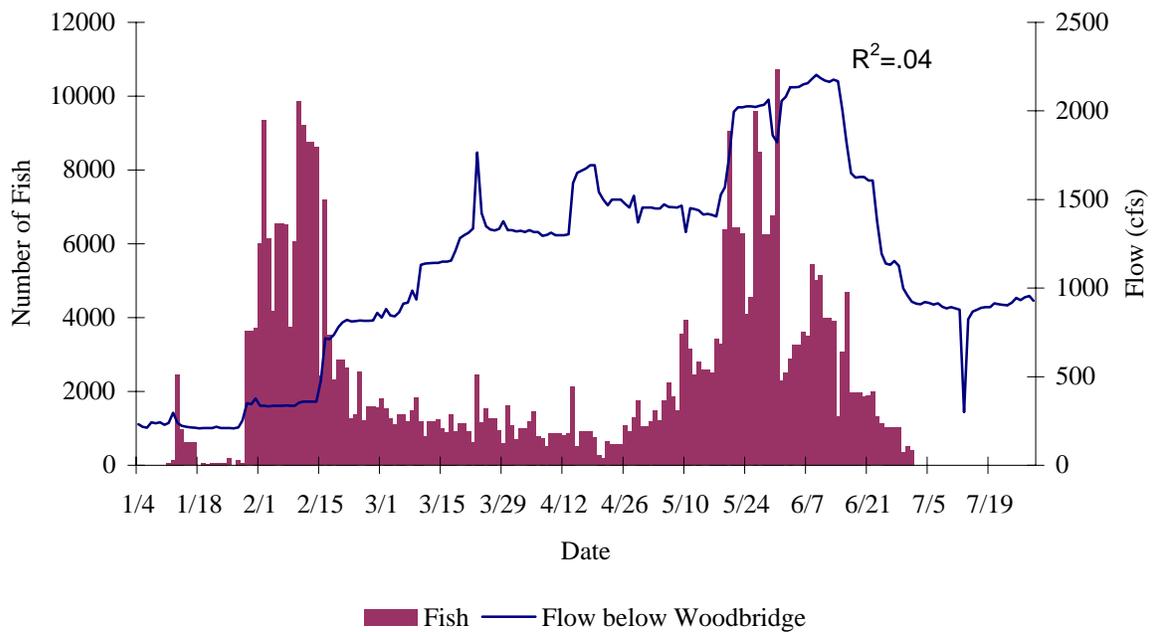


Figure 6. Juvenile chinook salmon emigration on the lower Mokelumne River and flow below Woodbridge, January 4, 2005 - July 27, 2005.

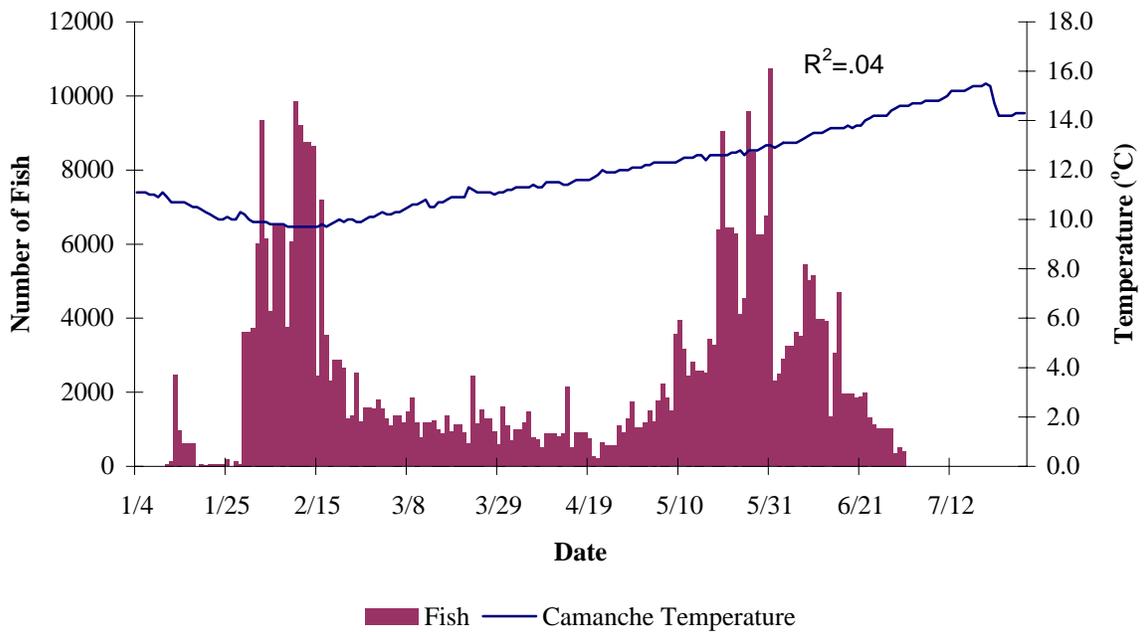


Figure 7. Juvenile chinook salmon emigration on the lower Mokelumne River and Camanche release water temperature, January 4, 2005 - July 27, 2005.

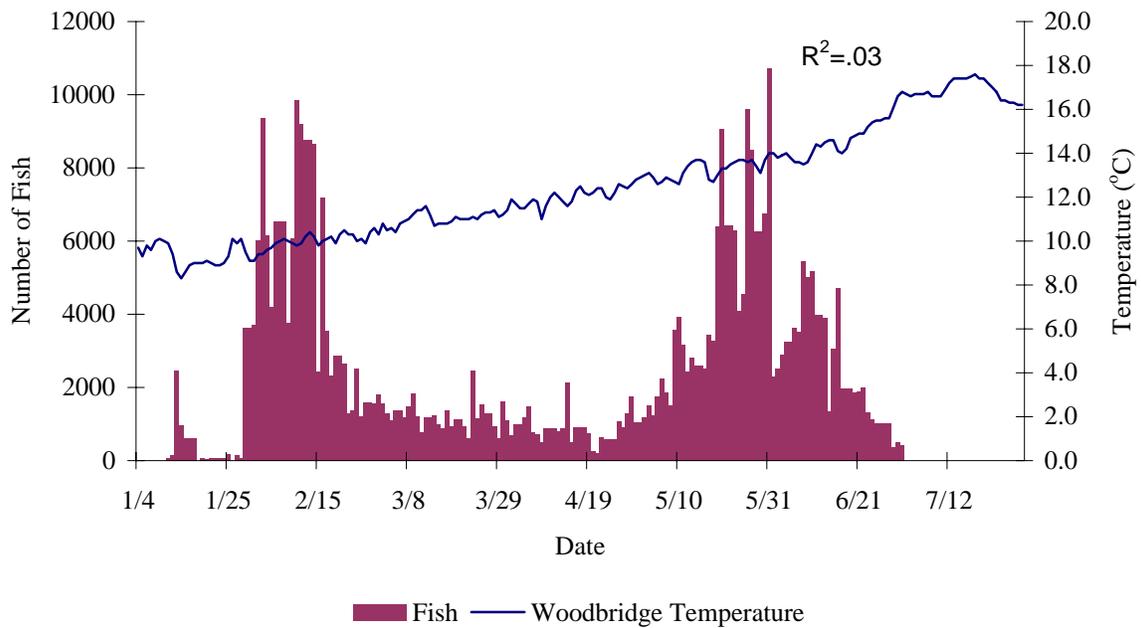


Figure 8. Juvenile chinook salmon emigration on the lower Mokelumne River and water temperature at Woodbridge Dam, January 4, 2005 - July 27, 2005.

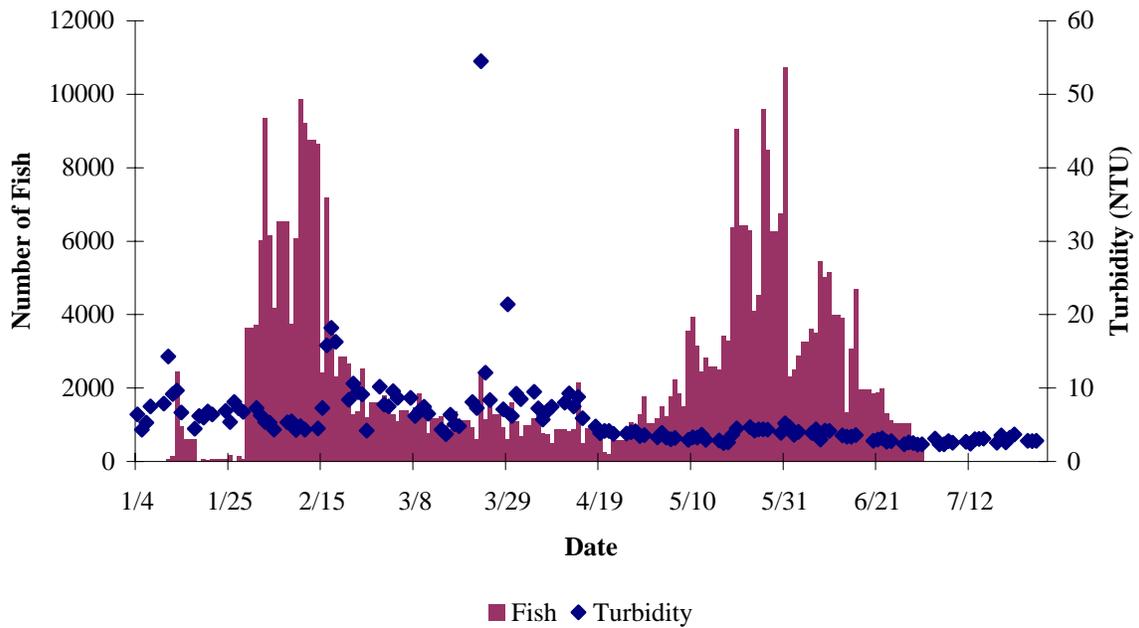


Figure 9. Juvenile chinook salmon emigration on the lower Mokelumne River and turbidity, January 4, 2005 - July 27, 2005.

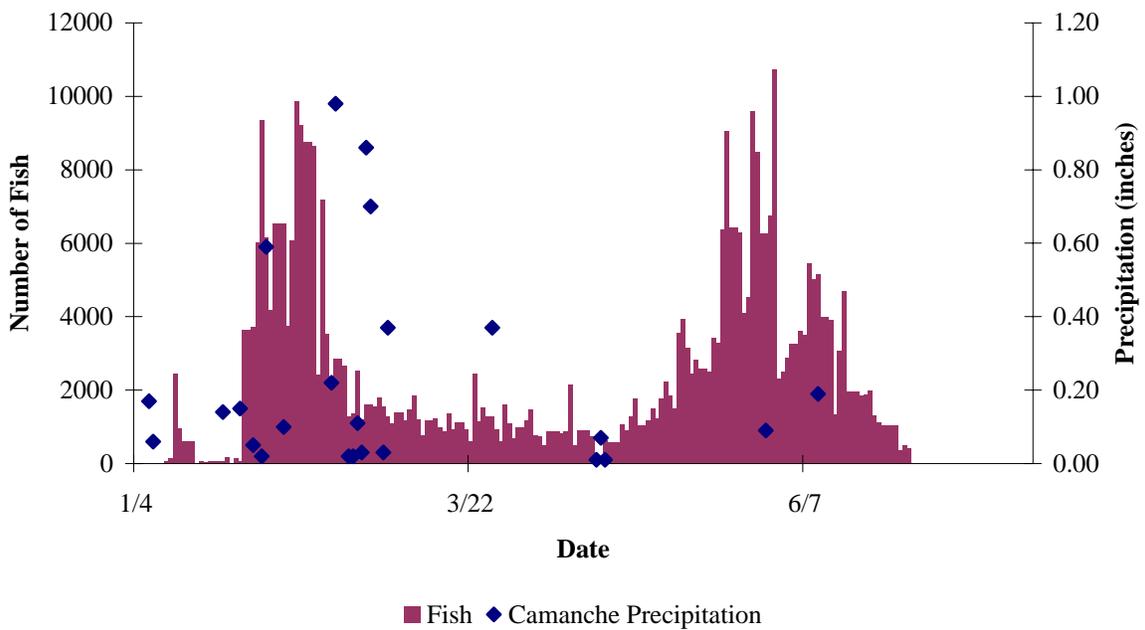


Figure 10. Juvenile chinook salmon emigration on the lower Mokelumne River and precipitation, January 4, 2005 - July 27, 2005.

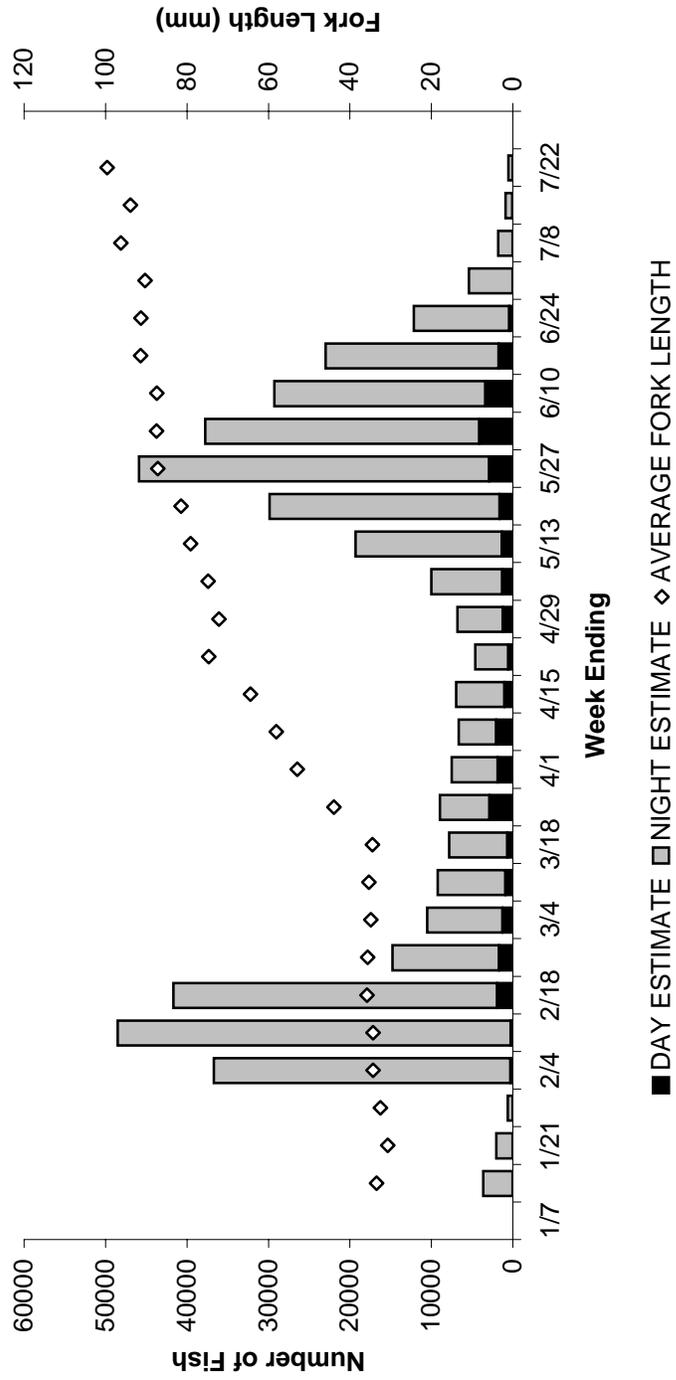


Figure 11. Weekly diel abundance of young-of-year Chinook Salmon emigrating past Woodbridge Irrigation District Dam from January 04, 2005 through July 27, 2005.

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Appendix A. Daily abundance of juvenile chinook salmon migrating past Woodbridge Irrigation District Dam, January 04-July 31, 2005. Shaded areas represent estimates for non-trapping periods.

Date	YOY Day		YOY Night		Trap Efficiency		Trap Efficiency		Estimated YOY		Estimated YOY		95% Confidence Interval		Volitional Release		Volitional Release	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Low	High	Catch Total	Estimate	Catch Total	Estimate
1/4/2005	0	0	0.063927	0.027778	0	0	0	0	0	0	0	0	0	0				
1/5/2005	0	0	0.063927	0.027778	0	0	0	0	0	0	0	0	0	0				
1/6/2005	0	0	0.063927	0.027778	0	0	0	0	0	0	0	0	0	0				
1/7/2005	0	0	0.063927	0.027778	0	0	0	0	0	0	0	0	0	0				
1/8/2005	0	0	0.063927	0.027778	0	0	0	0	0	0	0	0	0	0				
1/9/2005	0	0	0.063927	0.027778	0	0	0	0	0	0	0	0	0	0				
1/10/2005	0	0	0.063927	0.027778	0	0	0	0	0	0	0	0	0	0				
1/11/2005	0	2	0.063927	0.027778	0	72	0	72	72	39	72	39	530	530				
1/12/2005	0	4	0.063927	0.027778	0	144	0	144	144	77	144	77	1061	1061				
1/13/2005	1	68	0.063927	0.027778	16	2448	0	2448	2464	1323	2464	1323	18069	18069				
1/14/2005	0	27	0.063927	0.027778	0	972	0	972	972	521	972	521	7162	7162				
1/15/2005	0	17	0.063927	0.027778	0	612	0	612	612	328	612	328	4509	4509				
1/16/2005	0	17	0.063927	0.027778	0	612	0	612	612	328	612	328	4509	4509				
1/17/2005	0	17	0.063927	0.027778	0	612	0	612	612	328	612	328	4509	4509				
1/18/2005	0	0	0.063927	0.027778	0	0	0	0	0	0	0	0	0	0				
1/19/2005	0	2	0.063927	0.027778	0	72	0	72	72	39	72	39	530	530				
1/20/2005	0	1	0.063927	0.027778	0	36	0	36	36	19	36	19	265	265				
1/21/2005	0	2	0.063927	0.027778	0	72	0	72	72	39	72	39	530	530				
1/22/2005	0	2	0.063927	0.027778	0	72	0	72	72	39	72	39	530	530				
1/23/2005	0	2	0.063927	0.027778	0	72	0	72	72	39	72	39	530	530				
1/24/2005	0	2	0.063927	0.027778	0	72	0	72	72	39	72	39	530	530				
1/25/2005	0	5	0.063927	0.027778	0	180	0	180	180	97	180	97	1326	1326				
1/26/2005	0	0	0.063927	0.027778	0	0	0	0	0	0	0	0	0	0				
1/27/2005	0	4	0.063927	0.027778	0	144	0	144	144	77	144	77	1061	1061				
1/28/2005	0	2	0.063927	0.027778	0	72	0	72	72	39	72	39	530	530				
1/29/2005	2	100	0.063927	0.027778	31	3600	0	3600	3631	1952	3631	1952	26588	26588				
1/30/2005	2	100	0.063927	0.027778	31	3600	0	3600	3631	1952	3631	1952	26588	26588				
1/31/2005	8	100	0.063927	0.027778	125	3600	0	3600	3725	2014	3725	2014	26779	26779				
2/1/2005	3	166	0.063927	0.027778	47	5976	0	5976	6023	3237	6023	3237	44127	44127				
2/2/2005	2	259	0.063927	0.027778	31	9324	0	9324	9355	5022	9355	5022	68763	68763				
2/3/2005	0	171	0.063927	0.027778	0	6156	0	6156	6156	3302	6156	3302	45358	45358				

Appendix A. Daily abundance of juvenile chinook salmon migrating past Woodbridge Irrigation District Dam, January 04-July 31, 2005. Shaded areas represent estimates for non-trapping periods.

Date	YOY Day		YOY Night		Trap Efficiency		Trap Efficiency		YOY Day		YOY Night		YOY Total		95% Confidence Interval		Volitional Release		Volitional Release	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	YOY Total	Low	High	Catch Total	Estimate			
2/4/2005	1	116	0.063927	0.03	16	4176	4192	2250	30801											
2/5/2005	2	181	0.063927	0.03	31	6516	6547	3516	48074											
2/6/2005	2	181	0.063927	0.03	31	6516	6547	3516	48074											
2/7/2005	1	181	0.063927	0.027778	16	6516	6532	3506	48042											
2/8/2005	3	103	0.063927	0.027778	47	3708	3755	2020	27416											
2/9/2005	4	167	0.063927	0.027778	63	6012	6075	3266	44424											
2/10/2005	2	273	0.063927	0.027778	31	9828	9859	5293	72477											
2/11/2005	2	255	0.063927	0.027778	31	9180	9211	4945	67702											
2/12/2005	8	240	0.063927	0.027778	125	8640	8765	4718	63914											
2/13/2005	8	240	0.063927	0.027778	125	8640	8765	4718	63914											
2/14/2005	0	240	0.063927	0.027778	0	8640	8640	4635	63660											
2/15/2005	20	59	0.063927	0.027778	313	2124	2437	1347	16284											
2/16/2005	19	475	0.033531	0.071713	567	6624	7190	5424	10730											
2/17/2005	19	213	0.033531	0.071713	567	2970	3537	2645	5398											
2/18/2005	7	151	0.033531	0.071713	209	2106	2314	1744	3465											
2/19/2005	11	182	0.033531	0.071713	328	2538	2866	2154	4319											
2/20/2005	11	182	0.033531	0.071713	328	2538	2866	2154	4319											
2/21/2005	4	182	0.033531	0.071713	119	2538	2657	2012	3927											
2/22/2005	7	77	0.033531	0.071713	209	1074	1282	959	1959											
2/23/2005	13	71	0.033531	0.071713	388	990	1378	1017	2173											
2/24/2005	8	164	0.033531	0.071713	239	2287	2525	1902	3785											
2/25/2005	2	82	0.033531	0.071713	60	1143	1203	910	1781											
2/26/2005	6	102	0.033531	0.071713	179	1422	1601	1204	2412											
2/27/2005	6	102	0.033531	0.071713	179	1422	1601	1204	2412											
2/28/2005	5	102	0.033531	0.071713	149	1422	1571	1183	2356											
3/1/2005	0	129	0.033531	0.071713	0	1799	1799	1368	2625											
3/2/2005	11	88	0.033531	0.071713	328	1227	1555	1157	2407											
3/3/2005	8	75	0.033531	0.071713	239	1046	1284	958	1974											
3/4/2005	6	66	0.033531	0.071713	179	920	1099	822	1679											
3/5/2005	10	78	0.033531	0.071713	298	1088	1386	1031	2147											
3/6/2005	10	78	0.033531	0.071713	298	1088	1386	1031	2147											
3/7/2005	3	78	0.033531	0.071713	89	1088	1177	888	1755											

Appendix A. Daily abundance of juvenile chinook salmon migrating past Woodbridge Irrigation District Dam, January 04-July 31, 2005. Shaded areas represent estimates for non-trapping periods.

Date	YOY Day		YOY Night		Trap Efficiency		Trap Efficiency		YOY Day		YOY Night		YOY Total		95% Confidence Interval		Volitional Release		Volitional Release	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Low	High	Catch	Total	Estimate	Estimate
3/8/2005	3	99	0.033531	0.071713	89	1381	1470	1111	2183											
3/9/2005	1	86	0.034951	0.047337	29	1817	1845	1326	3033											
3/10/2005	2	54	0.034951	0.047337	57	1141	1198	860	1976											
3/11/2005	2	34	0.034951	0.047337	57	718	775	556	1283											
3/12/2005	2	53	0.034951	0.047337	57	1120	1177	845	1942											
3/13/2005	2	53	0.034951	0.047337	57	1120	1177	845	1942											
3/14/2005	4	53	0.034951	0.047337	114	1120	1234	884	2046											
3/15/2005	1	46	0.034951	0.047337	29	972	1000	719	1647											
3/16/2005	4	37	0.034951	0.047337	114	782	896	641	1492											
3/17/2005	4	60	0.034951	0.047337	114	1268	1382	990	2289											
3/18/2005	6	36	0.034951	0.047337	172	761	932	665	1562											
3/19/2005	10	40	0.034951	0.047337	286	845	1131	804	1910											
3/20/2005	10	40	0.034951	0.047337	286	845	1131	804	1910											
3/21/2005	3	40	0.034951	0.047337	86	845	931	667	1544											
3/22/2005	6	21	0.034951	0.047337	172	444	615	437	1042											
3/23/2005	40	62	0.034951	0.047337	1144	1310	2454	1729	4244											
3/24/2005	23	24	0.034951	0.047337	658	507	1165	817	2037											
3/25/2005	8	62	0.034951	0.047337	229	1310	1539	1099	2568											
3/26/2005	16	39	0.034951	0.047337	458	824	1282	907	2190											
3/27/2005	16	39	0.034951	0.047337	458	824	1282	907	2190											
3/28/2005	4	39	0.034951	0.047337	114	824	938	671	1561											
3/29/2005	4	23	0.034951	0.047337	114	486	600	428	1007											
3/30/2005	19	51	0.034951	0.047337	544	1077	1621	1149	2763											
3/31/2005	2	49	0.034951	0.047337	57	1035	1092	784	1803											
4/1/2005	3	29	0.034951	0.047337	86	613	698	500	1162											
4/2/2005	11	32	0.034951	0.047337	315	676	991	703	1685											
4/3/2005	11	32	0.034951	0.047337	315	676	991	703	1685											
4/4/2005	18	32	0.034951	0.047337	515	676	1191	840	2052											
4/5/2005	24	37	0.034951	0.047337	687	782	1468	1034	2540											
4/6/2005	2	34	0.034951	0.047337	57	718	775	556	1283											
4/7/2005	5	28	0.034951	0.047337	143	592	735	524	1232											
4/8/2005	0	24	0.034951	0.047337	0	507	507	365	832											

Appendix A. Daily abundance of juvenile chinook salmon migrating past Woodbridge Irrigation District Dam, January 04-July 31, 2005. Shaded areas represent estimates for non-trapping periods.

Date	YOY Day		YOY Night		Trap Efficiency		Trap Efficiency		YOY Day		YOY Night		YOY Total		95% Confidence Interval		Volitional Release	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Low	High	Catch Total	Estimate
4/9/2005	4	36	0.034951	0.047337	114	761	875	626	1457									
4/10/2005	4	36	0.034951	0.047337	114	761	875	626	1457									
4/11/2005	4	36	0.034951	0.047337	114	761	875	626	1457									
4/12/2005	7	29	0.034951	0.047337	200	613	813	578	1372									
4/13/2005	5	35	0.034951	0.047337	143	739	882	630	1475									
4/14/2005	0	63	0.014925	0.029412	0	2142	2142	1429	4272									
4/15/2005	5	5	0.014925	0.029412	335	170	505	312	1412									
4/16/2005	2	23	0.014925	0.029412	134	782	916	601	1989									
4/17/2005	2	23	0.014925	0.029412	134	782	916	601	1989									
4/18/2005	2	23	0.014925	0.029412	134	782	916	601	1989									
4/19/2005	0	22	0.014925	0.029412	0	748	748	499	1492									
4/20/2005	0	8	0.014925	0.029412	0	272	272	182	542									
4/21/2005	0	6	0.014925	0.029412	0	204	204	136	407									
4/22/2005	2	15	0.014925	0.029412	134	510	644	420	1446									
4/23/2005	2	13	0.014925	0.029412	134	442	576	374	1311									
4/24/2005	2	13	0.014925	0.029412	134	442	576	374	1311									
4/25/2005	2	13	0.014925	0.029412	134	442	576	374	1311									
4/26/2005	1	30	0.014925	0.029412	67	1020	1087	720	2249									
4/27/2005	4	19	0.014925	0.029412	268	646	914	590	2147									
4/28/2005	3	32	0.014925	0.029412	201	1088	1289	845	2814									
4/29/2005	4	44	0.014925	0.029412	268	1496	1764	1157	3842									
4/30/2005	3	25	0.014925	0.029412	201	850	1051	686	2339									
5/1/2005	3	25	0.014925	0.029412	201	850	1051	686	2339									
5/2/2005	5	25	0.014925	0.029412	335	850	1185	766	2768									
5/3/2005	3	38	0.014925	0.029412	201	1292	1493	981	3220									
5/4/2005	1	34	0.014925	0.029412	67	1156	1223	811	2520									
5/5/2005	2	48	0.014925	0.029412	134	1632	1766	1168	3684									
5/6/2005	2	62	0.014925	0.029412	134	2108	2242	1486	4633									
5/7/2005	4	47	0.014925	0.029412	268	1598	1866	1225	4045							29	1019	
5/8/2005	0	44	0.014925	0.029412	0	1496	1496	998	2983							105	3669	
5/9/2005	9	87	0.014925	0.029412	603	2958	3561	2331	7830							276	9417	
5/10/2005	2	112	0.014925	0.029412	134	3808	3942	2620	8023							192	6693	

Appendix A. Daily abundance of juvenile chinook salmon migrating past Woodbridge Irrigation District Dam, January 04-July 31, 2005. Shaded areas represent estimates for non-trapping periods.

Date	YOY Day		YOY Night		Trap Efficiency		Trap Efficiency		YOY Day		YOY Night		YOY Total		95% Confidence Interval		Volitional Release		Volitional Release Estimate
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	YOY Total	Low	High	Catch Total	Estimate		
5/11/2005	1	91	0.014925	0.029412	67	3094	3161	2104	6385	1	67	1	67						
5/12/2005	3	66	0.014925	0.029412	201	2244	2445	1617	5119	75	2550	75	2550						
5/13/2005	1	81	0.014925	0.029412	67	2754	2821	1877	5707	44	1496	44	1496						
5/14/2005	2	72	0.014925	0.029412	134	2448	2582	1713	5311	33	1122	33	1122						
5/15/2005	2	72	0.014925	0.029412	134	2448	2582	1713	5311	33	1122	33	1122						
5/16/2005	1	72	0.014925	0.029412	67	2448	2515	1673	5097	33	1122	33	1122						
5/17/2005	0	101	0.014925	0.029412	0	3434	3434	2292	6848	35	1190	35	1190						
5/18/2005	7	83	0.014925	0.029412	469	2822	3291	2161	7130	25	850	25	850						
5/19/2005	4	98	0.02809	0.015692	142	6245	6388	4036	15347	19	1211	19	1211						
5/20/2005	18	132	0.02809	0.015692	641	8412	9053	5750	21462	31	1976	31	1976						
5/21/2005	9	96	0.02809	0.015692	320	6118	6438	4080	15352	28	1756	28	1756						
5/22/2005	9	96	0.02809	0.015692	320	6118	6438	4080	15352	28	1756	28	1756						
5/23/2005	5	96	0.02809	0.015692	178	6118	6296	3981	15102	27	1721	27	1721						
5/24/2005	4	62	0.02809	0.015692	142	3951	4093	2590	9802	7	446	7	446						
5/25/2005	15	63	0.02809	0.015692	534	4015	4549	2904	10645	6	214	6	214						
5/26/2005	19	140	0.02809	0.015692	676	8922	9598	6097	22757	78	4971	78	4971						
5/27/2005	20	122	0.02809	0.015692	712	7775	8487	5398	20047	25	1537	25	1537						
5/28/2005	15	90	0.02809	0.015692	534	5735	6269	3988	14804	22	1346	22	1346						
5/29/2005	15	90	0.02809	0.015692	534	5735	6269	3988	14804	22	1346	22	1346						
5/30/2005	29	90	0.02809	0.015692	1032	5735	6768	4337	15682	20	1275	20	1275						
5/31/2005	33	150	0.02809	0.015692	1175	9559	10734	6846	25175	20	1218	20	1218						
6/1/2005	11	30	0.02809	0.015692	392	1912	2303	1479	5311	2	99	2	99						
6/2/2005	4	37	0.02809	0.015692	142	2358	2500	1586	5950	1	64	1	64						
6/3/2005	8	41	0.02809	0.015692	285	2613	2898	1846	6817	1	64	1	64						
6/4/2005	11	45	0.02809	0.015692	392	2868	3259	2081	7622	1	64	1	64						
6/5/2005	11	45	0.02809	0.015692	392	2868	3259	2081	7622	1	64	1	64						
6/6/2005	21	45	0.02809	0.015692	748	2868	3615	2330	8248	2	99	2	99						
6/7/2005	11	49	0.02809	0.015692	392	3123	3514	2242	8238	1	64	1	64						
6/8/2005	10	80	0.02809	0.015692	356	5098	5454	3462	12950	1	64	1	64						

Appendix A. Daily abundance of juvenile chinook salmon migrating past Woodbridge Irrigation District Dam, January 04-July 31, 2005. Shaded areas represent estimates for non-trapping periods.

Date	YOY Day		YOY Night		Trap Efficiency		Trap Efficiency		YOY		Estimated		YOY		YOY		95% Confidence Interval		Volitional Release		Volitional Release	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Total	Total	Low	High	Total	Total	Estimate	Estimate
6/9/2005	21	67	0.02809	0.015692	748	4270	5017	3214	11637	1	64											
6/10/2005	9	76	0.02809	0.015692	320	4843	5164	3277	12272	1	64											
6/11/2005	10	57	0.02809	0.015692	356	3632	3988	2538	9407	0	0											
6/12/2005	10	57	0.02809	0.015692	356	3632	3988	2538	9407	0	0											
6/13/2005	8	57	0.02809	0.015692	285	3632	3917	2489	9282	0	0											
6/14/2005	9	16	0.02809	0.015692	320	1020	1340	867	3029	1	64											
6/15/2005	4	46	0.02809	0.015692	142	2931	3074	1947	7337	0	0											
6/16/2005	3	89	0.024361	0.019441	123	4578	4701	3168	9110	0	0											
6/17/2005	3	36	0.024361	0.019441	123	1852	1975	1333	3814	0	0											
6/18/2005	3	36	0.024361	0.019441	123	1852	1975	1333	3814	0	0											
6/19/2005	3	36	0.024361	0.019441	123	1852	1975	1333	3814	0	0											
6/20/2005	0	36	0.024361	0.019441	0	1852	1852	1247	3597	0	0											
6/21/2005	1	36	0.024361	0.019441	41	1852	1893	1275	3670	0	0											
6/22/2005	1	38	0.024361	0.019441	41	1955	1996	1345	3869	0	0											
6/23/2005	2	24	0.024361	0.019441	82	1235	1317	888	2543	0	0											
6/24/2005	0	22	0.024361	0.019441	0	1132	1132	762	2198	0	0											
6/25/2005	0	20	0.024361	0.019441	0	1029	1029	693	1998	0	0											
6/26/2005	0	20	0.024361	0.019441	0	1029	1029	693	1998	0	0											
6/27/2005	0	20	0.024361	0.019441	0	1029	1029	693	1998	0	0											
6/28/2005	0	20	0.024361	0.019441	0	1029	1029	693	1998	0	0											
6/29/2005	0	7	0.024361	0.019441	0	360	360	242	699	0	0											
6/30/2005	0	10	0.024361	0.019441	0	514	514	346	999	0	0											
7/1/2005	0	8	0.024361	0.019441	0	412	412	277	799	0	0											
7/2/2005	0	6	0.024361	0.019441	0	309	309	208	600	0	0											
7/3/2005	0	6	0.024361	0.019441	0	309	309	208	600	0	0											
7/4/2005	0	6	0.024361	0.019441	0	309	309	208	600	0	0											
7/5/2005	0	6	0.024361	0.019441	0	309	309	208	600	0	0											
7/6/2005	0	4	0.024361	0.019441	0	206	206	139	400	0	0											
7/7/2005	0	6	0.024361	0.019441	0	309	309	208	600	0	0											

Appendix A. Daily abundance of juvenile chinook salmon migrating past Woodbridge Irrigation District Dam, January 04-July 31, 2005. Shaded areas represent estimates for non-trapping periods.

Date	YOY Day		YOY Night		Trap Efficiency		Trap Efficiency		Estimated YOY		Estimated YOY		95% Confidence Interval		Volitional Release		Volitional Release	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Low	High	Catch	Total	Estimate	Total
7/8/2005	0	1	0.024361	0.019441	0	51	0	51	0	51	35	100	0	0	0	0	0	0
7/9/2005	0	3	0.024361	0.019441	0	154	0	154	154	154	104	300	0	0	0	0	0	0
7/10/2005	0	3	0.024361	0.019441	0	154	0	154	154	154	104	300	0	0	0	0	0	0
7/11/2005	0	3	0.024361	0.019441	0	154	0	154	154	154	104	300	0	0	0	0	0	0
7/12/2005	0	3	0.024361	0.019441	0	154	0	154	154	154	104	300	0	0	0	0	0	0
7/13/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200	0	0	0	0	0	0
7/14/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200	0	0	0	0	0	0
7/15/2005	1	1	0.024361	0.019441	41	51	41	92	92	92	63	172	0	0	0	0	0	0
7/16/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200	0	0	0	0	0	0
7/17/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200	0	0	0	0	0	0
7/18/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200	0	0	0	0	0	0
7/19/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200	0	0	0	0	0	0
7/20/2005	0	1	0.024361	0.019441	0	51	0	51	51	51	35	100	0	0	0	0	0	0
7/21/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200	0	0	0	0	0	0
7/22/2005	0	0	0.024361	0.019441	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/23/2005	0	0	0.024361	0.019441	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/24/2005	0	0	0.024361	0.019441	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/25/2005	0	0	0.024361	0.019441	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/26/2005	0	0	0.024361	0.019441	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/27/2005	0	0	0.024361	0.019441	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Capture	704	6,898			33,121	399,753	432,874	984										
Total Estimate	979	11,674			33,121	399,753	432,874	984										

Appendix B. Daily abundance of juvenile steelhead migrating past Woodbridge Irrigation District Dam, March 1-July 27, 2005.

Date	YOY Day		YOY Night		Trap Efficiency Day		Trap Efficiency Night		Estimated YOY Day		Estimated YOY Night		Estimated YOY Total		95% Confidence Interval	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Low	High
3/1/2005	0	0	0.033531	0.071713	0	0	0	0	0	0	0	0	0	0	0	0
3/2/2005	0	0	0.033531	0.071713	0	0	0	0	0	0	0	0	0	0	0	0
3/3/2005	0	0	0.033531	0.071713	0	0	0	0	0	0	0	0	0	0	0	0
3/4/2005	0	0	0.033531	0.071713	0	0	0	0	0	0	0	0	0	0	0	0
3/5/2005	0	0	0.033531	0.071713	0	0	0	0	0	0	0	0	0	0	0	0
3/6/2005	0	0	0.033531	0.071713	0	0	0	0	0	0	0	0	0	0	0	0
3/7/2005	0	0	0.033531	0.071713	0	0	0	0	0	0	0	0	0	0	0	0
3/8/2005	0	0	0.033531	0.071713	0	0	0	0	0	0	0	0	0	0	0	0
3/9/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/10/2005	0	1	0.034951	0.047337	0	0	0	0	0	21	21	21	15	15	35	35
3/11/2005	0	1	0.034951	0.047337	0	0	0	0	0	21	21	21	15	15	35	35
3/12/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/13/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/14/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/15/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/16/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/17/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/18/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/19/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/20/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/21/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/22/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/23/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/24/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/25/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/26/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/27/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/28/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/29/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
3/30/2005	0	1	0.034951	0.047337	0	0	0	0	0	21	21	15	15	35	35	35
3/31/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
4/1/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B. Daily abundance of juvenile steelhead migrating past Woodbridge Irrigation District Dam, March 1-July 27, 2005.

Date	YOY Day		YOY Night		Trap Efficiency Day		Trap Efficiency Night		Estimated YOY Day		Estimated YOY Night		Estimated YOY Total		95% Confidence Interval	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Low	High
4/2/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
4/3/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
4/4/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
4/5/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
4/6/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
4/7/2005	0	1	0.034951	0.047337	0	0	0	0	21	21	21	0	15	35	0	0
4/8/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
4/9/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
4/10/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
4/11/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
4/12/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
4/13/2005	0	0	0.034951	0.047337	0	0	0	0	0	0	0	0	0	0	0	0
4/14/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/15/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/16/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/17/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/18/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/19/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/20/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/21/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/22/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/23/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/24/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/25/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/26/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/27/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/28/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/29/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
4/30/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
5/1/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
5/2/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0
5/3/2005	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B. Daily abundance of juvenile steelhead migrating past Woodbridge Irrigation District Dam, March 1-July 27, 2005.

Date	YOY Day		YOY Night		Trap Efficiency Day		Trap Efficiency Night		Estimated YOY Day		Estimated YOY Night		Estimated YOY Total		95% Confidence Interval	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Total	Low	High	
5/4/2005	0	0	0.014925	0.029412	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0
5/5/2005	0	0	0.014925	0.029412	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0
5/6/2005	0	0	0.014925	0.029412	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0
5/7/2005	0	0	0.014925	0.029412	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0
5/8/2005	0	0	0.014925	0.029412	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0
5/9/2005	0	1	0.014925	0.029412	0	34	0.014925	0.029412	0	34	34	0	34	23	68	68
5/10/2005	0	0	0.014925	0.029412	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0
5/11/2005	0	0	0.014925	0.029412	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0
5/12/2005	0	1	0.014925	0.029412	0	34	0.014925	0.029412	0	34	34	0	34	23	68	68
5/13/2005	0	0	0.014925	0.029412	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0
5/14/2005	0	0	0.014925	0.029412	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0
5/15/2005	0	0	0.014925	0.029412	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0
5/16/2005	0	0	0.014925	0.029412	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0
5/17/2005	0	1	0.014925	0.029412	0	34	0.014925	0.029412	0	34	34	0	34	23	68	68
5/18/2005	0	0	0.014925	0.029412	0	0	0.014925	0.029412	0	0	0	0	0	0	0	0
5/19/2005	0	0	0.02809	0.015692	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0
5/20/2005	0	0	0.02809	0.015692	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0
5/21/2005	0	0	0.02809	0.015692	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0
5/22/2005	0	0	0.02809	0.015692	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0
5/23/2005	0	0	0.02809	0.015692	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0
5/24/2005	0	0	0.02809	0.015692	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0
5/25/2005	0	0	0.02809	0.015692	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0
5/26/2005	1	0	0.02809	0.015692	36	0	0.02809	0.015692	36	0	36	0	36	25	63	63
5/27/2005	0	0	0.02809	0.015692	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0
5/28/2005	0	0	0.02809	0.015692	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0
5/29/2005	0	0	0.02809	0.015692	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0
5/30/2005	0	0	0.02809	0.015692	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0
5/31/2005	0	3	0.02809	0.015692	0	191	0.02809	0.015692	0	191	191	0	191	121	462	462
6/1/2005	0	0	0.02809	0.015692	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0
6/2/2005	0	2	0.02809	0.015692	0	127	0.02809	0.015692	0	127	127	0	127	80	308	308

Appendix B. Daily abundance of juvenile steelhead migrating past Woodbridge Irrigation District Dam, March 1-July 27, 2005.

Date	YOY Day		YOY Night		Trap Efficiency Day		Trap Efficiency Night		Estimated YOY Day	Estimated YOY Night	Estimated YOY Total	95% Confidence Interval	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Total	Low	High
6/3/2005	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0	0
6/4/2005	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0	0
6/5/2005	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0	0
6/6/2005	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0	0
6/7/2005	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0	0
6/8/2005	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0	0
6/9/2005	0	1	0.02809	0.015692	0	64	64	64	64	64	64	40	154
6/10/2005	0	1	0.02809	0.015692	0	64	64	64	64	64	64	40	154
6/11/2005	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0	0
6/12/2005	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0	0
6/13/2005	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0	0
6/14/2005	1	0	0.02809	0.015692	36	0	36	0	36	0	36	25	63
6/15/2005	0	0	0.02809	0.015692	0	0	0	0	0	0	0	0	0
6/16/2005	0	0	0.024361	0.019441	0	0	0	0	0	0	0	0	0
6/17/2005	0	0	0.024361	0.019441	0	0	0	0	0	0	0	0	0
6/18/2005	0	0	0.024361	0.019441	0	0	0	0	0	0	0	0	0
6/19/2005	0	0	0.024361	0.019441	0	0	0	0	0	0	0	0	0
6/20/2005	0	0	0.024361	0.019441	0	0	0	0	0	0	0	0	0
6/21/2005	0	5	0.024361	0.019441	0	257	257	257	257	257	257	173	500
6/22/2005	0	4	0.024361	0.019441	0	206	206	206	206	206	206	139	400
6/23/2005	0	10	0.024361	0.019441	0	514	514	514	514	514	514	346	999
6/24/2005	0	5	0.024361	0.019441	0	257	257	257	257	257	257	173	500
6/25/2005	0	4	0.024361	0.019441	0	206	206	206	206	206	206	139	400
6/26/2005	0	4	0.024361	0.019441	0	206	206	206	206	206	206	139	400
6/27/2005	0	4	0.024361	0.019441	0	206	206	206	206	206	206	139	400
6/28/2005	0	1	0.024361	0.019441	0	51	51	51	51	51	51	35	100
6/29/2005	0	3	0.024361	0.019441	0	154	154	154	154	154	154	104	300
6/30/2005	0	1	0.024361	0.019441	0	51	51	51	51	51	51	35	100
7/1/2005	0	1	0.024361	0.019441	0	51	51	51	51	51	51	35	100
7/2/2005	0	2	0.024361	0.019441	0	103	103	103	103	103	103	69	200
7/3/2005	0	2	0.024361	0.019441	0	103	103	103	103	103	103	69	200
7/4/2005	0	2	0.024361	0.019441	0	103	103	103	103	103	103	69	200

Appendix B. Daily abundance of juvenile steelhead migrating past Woodbridge Irrigation District Dam, March 1-July 27, 2005.

Date	YOY Day		YOY Night		Trap Efficiency Day		Trap Efficiency Night		Estimated YOY Day		Estimated YOY Night		Estimated YOY Total		95% Confidence Interval	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Low	High
7/5/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200				
7/6/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200				
7/7/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200				
7/8/2005	0	4	0.024361	0.019441	0	206	0	206	206	206	139	400				
7/9/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200				
7/10/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200				
7/11/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200				
7/12/2005	0	1	0.024361	0.019441	0	51	0	51	51	51	35	100				
7/13/2005	0	5	0.024361	0.019441	0	257	0	257	257	257	173	500				
7/14/2005	0	1	0.024361	0.019441	0	51	0	51	51	51	35	100				
7/15/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200				
7/16/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200				
7/17/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200				
7/18/2005	1	2	0.024361	0.019441	41	103	41	103	144	144	98	272				
7/19/2005	1	3	0.024361	0.019441	41	154	41	154	195	195	133	372				
7/20/2005	0	1	0.024361	0.019441	0	51	0	51	51	51	35	100				
7/21/2005	0	1	0.024361	0.019441	0	51	0	51	51	51	35	100				
7/22/2005	0	1	0.024361	0.019441	0	51	0	51	51	51	35	100				
7/23/2005	0	1	0.024361	0.019441	0	51	0	51	51	51	35	100				
7/24/2005	0	1	0.024361	0.019441	0	51	0	51	51	51	35	100				
7/25/2005	0	1	0.024361	0.019441	0	51	0	51	51	51	35	100				
7/26/2005	0	2	0.024361	0.019441	0	103	0	103	103	103	69	200				
7/27/2005	0	1	0.024361	0.019441	0	51	0	51	51	51	35	100				
Total Capture	4	70														
Total Estimate	4	105			153	5313	153	5313	5467	5467	3669	10783				