UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Turlock Irrigation District	)	
	)	
and	)	Project No. 2299
	)	
Modesto Irrigation District	)	

2008 LOWER TUOLUMNE RIVER ANNUAL REPORT

Report 2008-3

2008 Seine Report and Summary Update

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and

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EXECUTIVE SUMMARY

The 2008 seining survey was conducted at two-week intervals from 22 January to 27 May for a total of 10 sample periods. This was the 23rd consecutive annual seining study on the Tuolumne River conducted by the Turlock and Modesto Irrigation Districts.

A total of 198 natural Chinook salmon were caught in the Tuolumne River and none in the San Joaquin River. This was the 5th lowest number of salmon caught during the 1986-2008 period and salmon were captured downstream to the Shiloh Rd. location (RM 3.4). Peak density of salmon caught in the Tuolumne was 2.9 salmon per 1,000 square feet on 18 March. Maximum fork length (FL) in the Tuolumne River increased from 38 mm FL to 84 mm FL from 22 January to 01 April and minimum FL was 33 mm.

Flows during the sampling period ranged from about 160 to 1300 cubic feet per second (cfs) in the Tuolumne River at La Grange and from about 1,500 to 4,500 cfs in the San Joaquin River at Vernalis. Flows in 2008 were relatively low due to below average precipitation.

Water temperature in the Tuolumne ranged from 8.8°C to 19.4°C and in the San Joaquin from 9.1°C to 19.8°C. Conductivity in the Tuolumne River ranged from 30 to 239 μS and in the San Joaquin from 341 to 1,571 μS.

A comparative review of fork length and salmon density for the 2003-2008 period is included. Increase in average fork length in 2008 was typical in timing and magnitude to the pattern observed in other years through March. After that, average fork length was highly variable due to low catch numbers and the outmigration of smolts.

Density of fry (≤ 50 mm) peaked on 19 February, about midway in timing to other years of the 2003-2008 period. The density of juveniles (> 50 mm) peaked on 18 March, which was similar in timing to other years in the period. In 2008, the average density of salmon in the Tuolumne River was 1.4 salmon per 1,000 ft^2, similar to 1992 and 2007.

CONTENTS

1 INTRODUCTION

Stillwater Sciences with assistance from FISHBIO conducted seine studies in the Tuolumne and San Joaquin Rivers in 2008 for the Turlock and Modesto Irrigation Districts (TID/MID).

Seine sampling was done in both rivers pursuant to the Don Pedro Project river-wide monitoring program. A primary objective was to document juvenile salmonid size, abundance and distribution, including the relationship of flow and other environmental variables. The salmon in 2008 were the progeny of the 2007 fall spawning run, estimated at about 211 fish. This was the 23rd consecutive annual TID/MID seining study and a summary of salmonid data since 1986 is contained in this report.

1.1 STUDY SITES

The area studied was the Tuolumne River from La Grange Dam (river mile [RM] 52.0) to its confluence (RM 0) with the San Joaquin River at RM 83.8, and the San Joaquin River from Laird Park (RM 90.2) to Gardner Cove (RM 79.4) (Fig. 1). A total of ten sites were sampled each survey period, eight on the Tuolumne and two on the San Joaquin. The locations of the sites were as follows:

Site	Location	River Mile
	Tuolumne River	
1	Old La Grange Bridge (OLGB)	50.5[a]
2	Riffle 5	48.0
3	Tuolumne River Resort (TRR)	42.4
4	Hickman Bridge	31.6
5	Charles Road	24.9
6	Legion Park	17.2
7	Service Rd.	8.7
8	Shiloh Road	3.4
	San Joaquin River	
9	Laird Park	90.2[b]
10	Gardner Cove	79.4

a. From the confluence with the San Joaquin River.
b. From the confluence with the Sacramento River.

The Tuolumne River was stratified into three sections. The upper section (RM 52 to 34), sites 1-3, is a higher gradient area that includes most of the primary spawning riffles in the river. The middle section (RM 34 to 17), sites 4-6, is the transitional area from the gravel-bedded to sand-bedded river reaches. This section contains much of the in-channel sand/gravel mined areas. The lower section (RM 17 to 0), sites 7-8, is a lower gradient, mostly sand-bottom reach downstream of the Dry Creek confluence.

1.2 2008 TUOLUMNE AND SAN JOAQUIN RIVER SAMPLING CONDITIONS

Flows released in the Tuolumne River below La Grange Dam were approximately 170 cfs in January when the surveys began. Winter rain runoff events occurred through February and were evident in flows at Modesto. Releases began increasing on 19 April during the spring pulse flow period (Fig. 2). During April and May, there were two pulse flows of about 1,300 cfs. In late May flows began to decrease to about 170 cfs by early June and then to about 75 cfs.

Flows in the San Joaquin River at Vernalis (RM 72.5) ranged from 1,500-4,500 cfs from January through June.

Flows upstream of Vernalis, at Patterson Bridge (RM 98.5) and Maze Road (RM 77.3), represent flow levels at the sampling locations of Laird Park upstream of the Tuolumne and Gardner Cove downstream of the Tuolumne, respectively.

The minimum water temperature recorded in the Tuolumne River during the study period, based on hand-held temperature measurements, was 8.8 °C (47.8 °F) at Hickman Bridge on 05 February, and the maximum temperature was 19.4 °C (66.9 °F) at Shiloh Road on 27 May (Fig. 3). The lowest San Joaquin River water temperature, 9.1 °C (48.4 °F) was at Gardner Cove on 05 February; the highest was 19.8 °C (67.6°F) at Gardner Cove on 27 May.

2 METHODS

2.1 STUDY TIMING

The 2008 seining study began on 22 January and ended on 27 May. Sampling was done at two-week intervals, with a total of 10 sampling dates.

2.2 SAMPLING METHODS AND DATA RECORDING

Seining was done using 4-ft high, 1/8-inch mesh nylon seine nets in lengths of 20 or 30 feet. The same general areas were sampled each time, to permit comparisons through the sampling period, but sample areas varied somewhat as a result of changes in flow. Seine hauls were made with the current and parallel to shore. The salmon caught were anesthetized with MS-222, measured (FL in mm) and then revived before being released. Other measurements taken were area sampled, (determined from estimating average length and width of a seine haul) water temperature, visibility, conductivity, and maximum depth of the area sampled. Other observations include time of day, weather conditions, habitat type, and substrate type. Other fish species were recorded separately. Any salmon undergoing outward signs of smoltification, such as losing scales during handling, were also noted.

2.3 DATA ANALYSIS

Seining catch data was examined by location, river section, and river. Catch densities of salmon were divided into two size groups for analysis. The density index for “fry” (fish ≤50 mm FL)

and for "juveniles" (>50 mm), by site and by section, were computed by multiplying the number of salmon caught by 1,000 and dividing it by the area sampled. These indices of population density (relative abundance), were used for comparisons. Densities and sizes of salmon fry and juveniles by upper, middle, and lower river sections were examined.

3 RESULTS AND DISCUSSION

3.1 SEINE CATCH

A total of 198 salmon were caught in the Tuolumne River and 0 in the San Joaquin (Table 1). All salmon were measured and riverwide peak density for the Tuolumne was 2.9 salmon per 1,000 ft^2 on 18 March.

3.1.1 Density of Fry and Juvenile Salmon

Salmon up to 38 mm fork length (FL) were caught in the Tuolumne River on 22 January in the first sampling period. The highest density of salmon fry in the Tuolumne was 2.4 fry/1,000 ft^2 found on 19 February (Table 2). The highest density of juvenile salmon in the Tuolumne was 1.8 juveniles/1,000 ft^2 also found on 18 March.

The density of salmon fry exhibited a peak for most sites from 22 January to 19 February. The density of juveniles generally peaked from 18 March to 01 April for most locations (Fig. 4).

The density of salmon fry in the Tuolumne River peaked in the upper section on 22 January, in the middle section on 19 February and in the lower section on 18 March (Fig. 5).

The density of juveniles peaked in the upper and middle and lower sections on 18 March. No salmon were caught in the San Joaquin River.

3.1.2 Size, Growth, and Smoltification

The fork length of salmon caught ranged from 33 mm to 85 mm. The average fork length (FL) of salmon generally increased from 22 January to 15 April (Fig. 6). An indirect method to estimate growth rate was made by dividing the increase in maximum FL, over a period of time. Maximum FL in the Tuolumne River increased from 38 to 84 mm during the 22 January to 01 April period (Fig. 6), indicating a potential FL increase of approximately .66 mm per day (46 mm / 70 days).

Length frequency distributions by survey period are in Figs. 7 & 8. The change in FL by location generally shows an increase from late January to late April at most of the Tuolumne River sampling locations (Fig. 9). Salmon estimated to be large enough to undergo smoltification (usually > 70 mm FL) were present by 18 March. The first salmon exhibiting smolting characteristics were caught on 01 April. Fry were present through 27 May during the 2008 seine survey period.

3.1.3 Conductivity and Turbidity

Conductivity in the Tuolumne River generally increased with increasing distance below La Grange Dam, from a low of 30 µS at Riffle 5 to a high of 239 µS at Shiloh Road (Table 3). Conductivity also decreased as flows increased during the spring pulse flows (Fig. 10).

Conductivity in the San Joaquin River was much higher than in the Tuolumne and ranged from a low of 341 µS at Gardner Cove to a high of 1571 µS at Laird Park.

Turbidity in the Tuolumne River was less than 19.0 Nephelometric Turbidity Units (NTU) except for 3 readings at Hickman (145 NTU), Service Rd.(35.3 NTU) and Shiloh Rd.(43.2 NTU) on 05 February that were the result of storm runoff from Lake Rd. (via Peaslee Cr.) and Dry Creek (near Modesto). Turbidity also generally increased with increasing distance below La Grange Dam and generally decreased with higher flows.

Turbidity in the San Joaquin River ranged from 17.3 at Gardner Cove to 53.4 NTU at Laird Park.

3.1.4 Other Fish Species Caught

The numbers of other fish species caught during the seining study by species, location, and date are in Table 4. Fourteen species other than Chinook salmon were caught in the Tuolumne River and 8 other species in the San Joaquin River. Six of these species were common to both rivers and 16 species were caught overall. Four rainbow trout fry (28-49 mm FL) were caught in the Tuolumne River between 29 April to 13 May at OLGB and R5. The number of fish species caught in the San Joaquin River was again low in comparison to most other years, similar to 2007.

4 COMPARATIVE REVIEW

4.1 SEINE: 1986-2008

Annual TID/MID Tuolumne River seining surveys began in 1986, with the number, location, and sampling frequency of sites having varied over time (Tables 5 & 6). The number of salmon captured in the Tuolumne has ranged from 120 (1991) to 14,825 (1987) - the total number of salmon captured in 2008 (198) is the fifth lowest for all years. In 2008, the average density of salmon in the river was 1.4 salmon per 1,000 ft^2 and was similar to densities found in 1992 and 2007.

The San Joaquin River has been sampled upstream and downstream of the Tuolumne River confluence in each of the study years. The total number of salmon caught has ranged from 0 to 854 with average density much lower than the Tuolumne (Table 5). No salmon were captured in the San Joaquin River this year and in six other years.

4.1.1 Size and Growth

The comparative review of fork length and density is primarily for the 2003-2008 period in this report. Minimum FL found in 2008 remained low, less than 40 mm FL, through late May (Fig. 11). In 2008, the increase in average FL during the January to March period was similar in timing and magnitude to the pattern observed in the 2003-2008 period (Fig. 12). Beginning in

April the average FL was highly variable due to low numbers of salmon caught and the outmigration of smolts. Maximum FL in 2008 was about average from January to late April (Fig. 13). The estimated 2008 growth rate of .66 mm per day was slightly above average for 1986-2008 (Table 5).

4.1.2 Fry and Juvenile Salmon Density

In 2008, the density of salmon fry (≤ 50 mm) in the Tuolumne River peaked on 19 February at the lowest level for the 2003-2008 period (Fig. 14).

The density of salmon juveniles (>50 mm) in 2008 peaked on 18 March and was also at the lowest level for the same period of years (Fig. 15).

Combined fry and juvenile densities for the Tuolumne River are shown for the years 2003-2008 (Fig. 16). The 2008 densities peaked on 18 March at a very low level.

4.1.2.1 Tuolumne River Section Density

Upper section density of fry generally peaks from early February to early March and steadily declines through March (Fig. 17). For 2008, the density of fry peaked during the first survey on 22 January and remained low through March. Upper section density of juveniles typically increases beginning in late February and peaks in early April to late May. In 2008, juvenile salmon density was low throughout the entire survey period with only two caught through May.

Middle section density of fry generally peaks from early February to mid-March similar timing to the upper section. In 2008, the density of fry peaked on 19 February. Middle section density of juveniles often peak from late February to late March. In 2008 juvenile density peaked on 18 March.

Lower section density of fry and juvenile salmon has been relatively low in most years. This section was often sampled only at the Shiloh Road location in prior years. Since 1999, two sites have been sampled. Peak density of fry ranged from early March (2005) to mid-March (2006) during the 2003-2008 period. In 2008, only 1 salmon fry was caught in the lower section at Shiloh Rd. on 18 March. Peak density of juveniles ranged from late March (2003, 2004, 2006) to late April (2005) with 1 juvenile captured in 2008 on 18 March and 1 on 15 April.

Section abundance indices of fry and juvenile salmon combined were standardized as a percent of the annual riverwide average abundance index and plotted at section midpoints for recent years (Fig. 18). In 2008 the standardized section abundance indices was highest in the middle section similar to 2006 and 2007.

4.1.2.2 San Joaquin River Density

Densities of salmon caught in the San Joaquin River at Laird Park and Gardner Cove or nearby sites were reviewed to compare relative abundance of salmon upstream and downstream of the Tuolumne River confluence. The abundance indices were calculated for fry and juvenile salmon combined due to low numbers caught. The average salmon abundance at Laird Park, downstream of the Merced confluence, was extremely low for all years during the 1986-2008

period (Fig. 19). The total number of wild salmon caught at Laird Park during this period was 148. No salmon were caught at Laird Park in 2008. The average abundance at Gardner Cove, downstream of the Tuolumne River confluence, was much higher in 1986 and 1999 and moderately higher in 1995, 1998, 2001 and 2006. A total of 1082 salmon were caught at this location during the 1986-2008 period, 509 of which were caught in 1999. No salmon were caught at Gardner Cove in 2008.

4.1.3 Tuolumne River Fry Density Versus Number of Female Spawners

A polynomial equation analysis of peak fry density in the Tuolumne River and the estimated total number of female spawners (TID/MID data), from the preceding fall-run, resulted in an R-squared of .71 for the 1986-2008 period (Fig. 20, Table 7). A similar result with R-squared of .76 was found using average fry density from 15 January -15 March (Figure 21).

4.1.4 Other Fish Species

The number of fish species, other than Chinook salmon, caught during 1986-2008 has ranged from 10 to 16 on the Tuolumne River. Table 4 has the counts from each site and date for fish species caught in 2008. Fourteen other species were caught, including 5 native species, in the Tuolumne; 8 fish species, including 3 native, were caught on the San Joaquin River in 2008. The number of species caught in the San Joaquin River was low, similar to last year.

Of native species, rainbow trout, hardhead, and riffle sculpin were caught only in the Tuolumne River and Sacramento pikeminnow and Sacramento sucker were caught in both rivers. Tule perch were caught only in the San Joaquin River. Native species recorded in prior years, but not caught in either river in 2008, were Pacific lamprey, Sacramento blackfish, hitch, Sacramento splittail, and prickly sculpin.

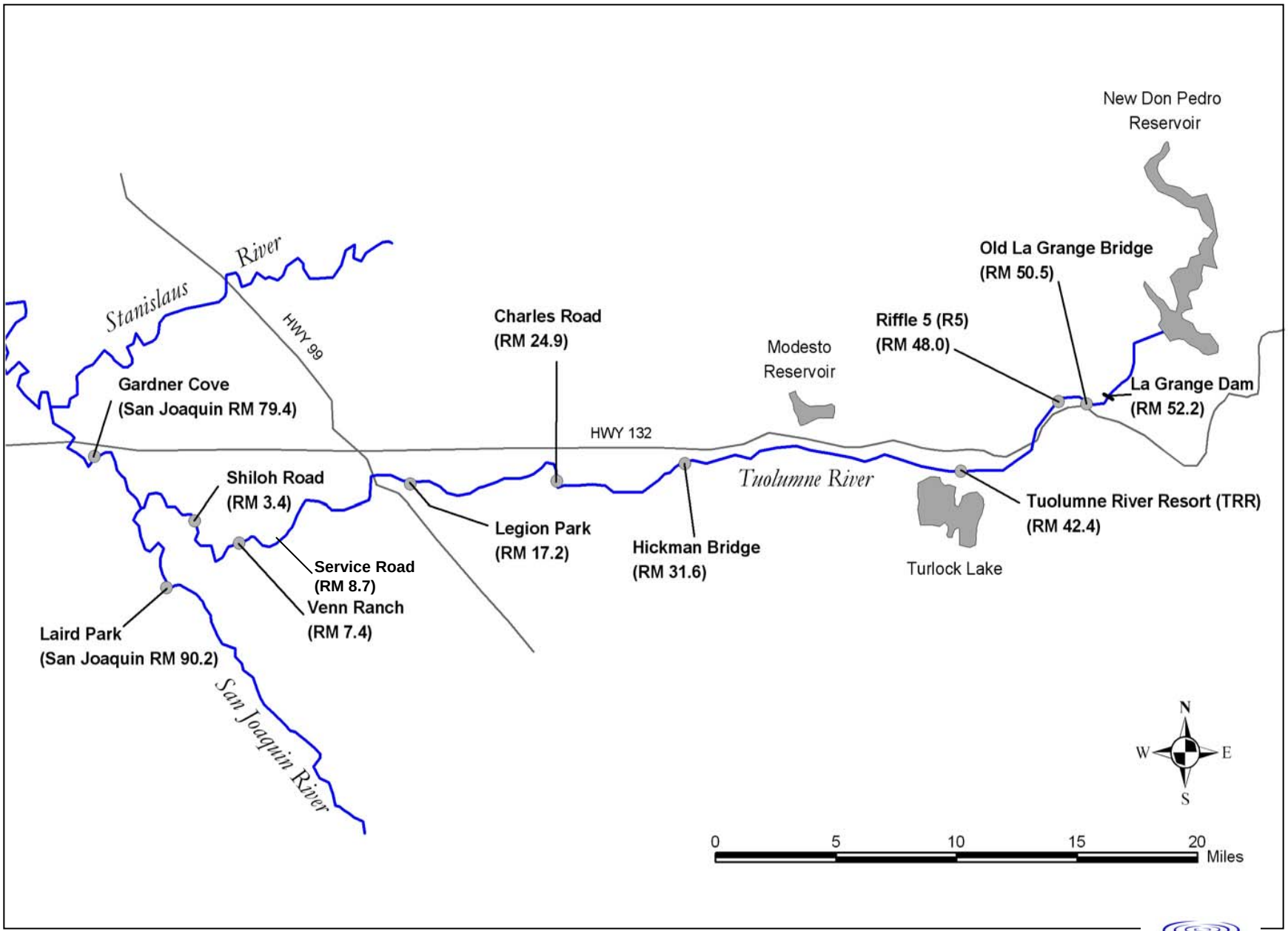

Figure 1. Locations of seine sampling sites on the lower Tuolumne and San Joaquin Rivers, 2008.

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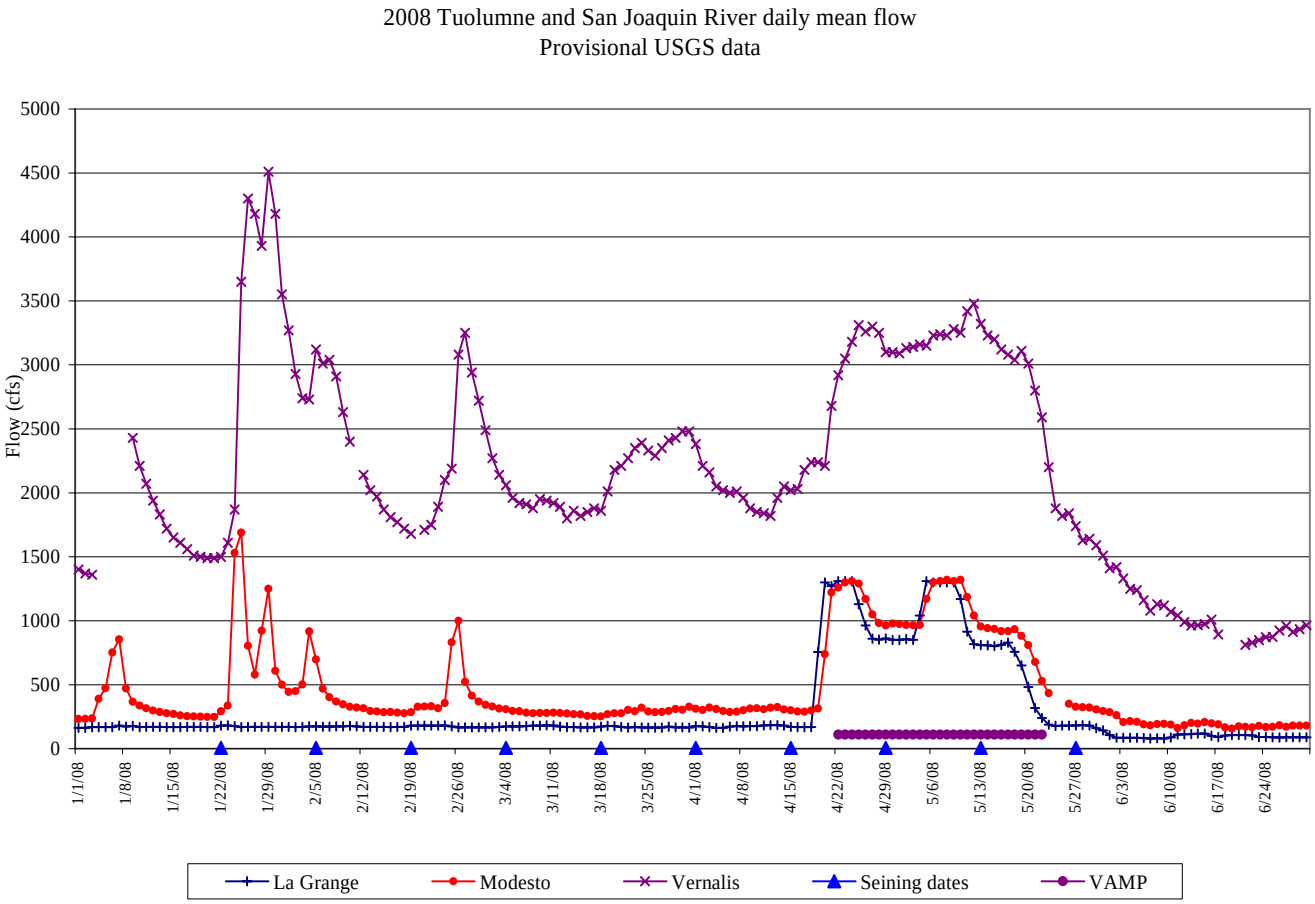


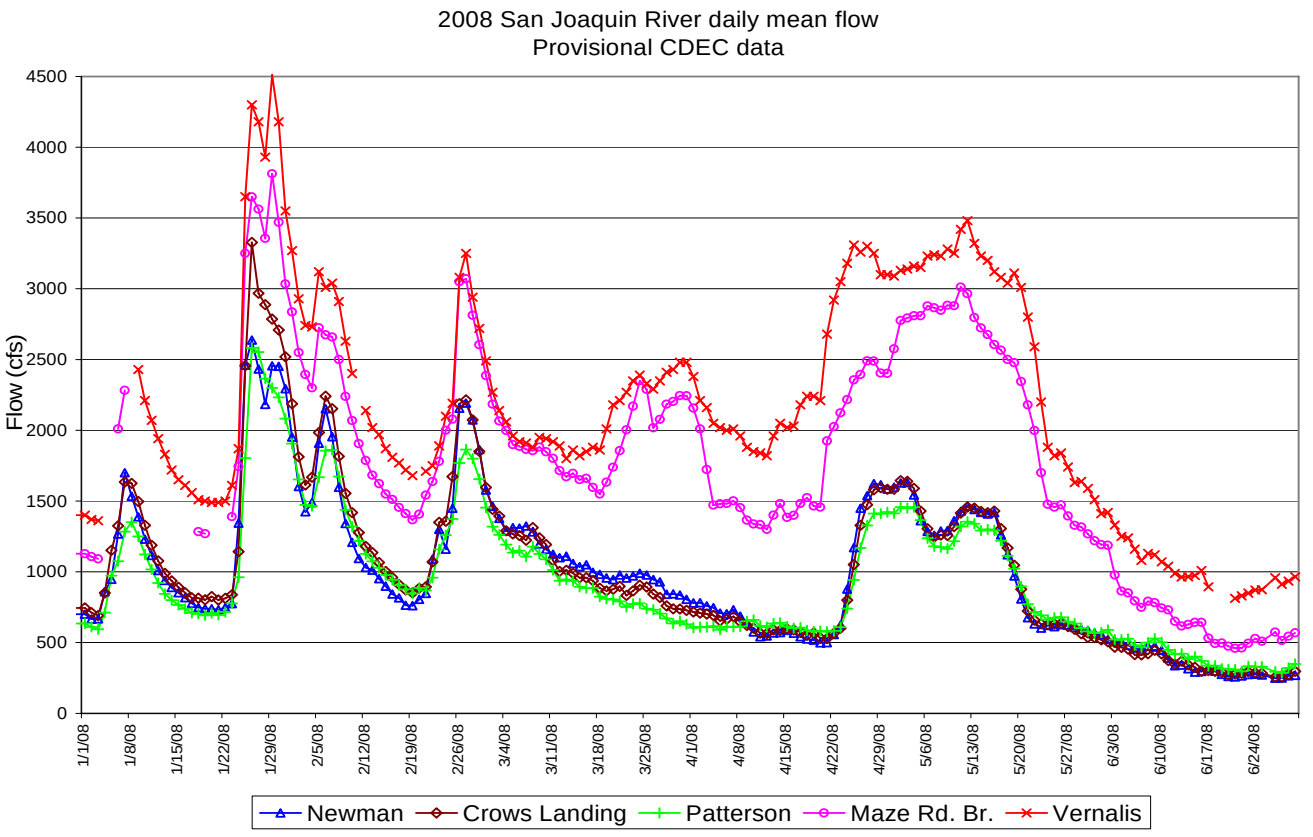


Figure 2. Tuolumne and San Joaquin River daily average flow.

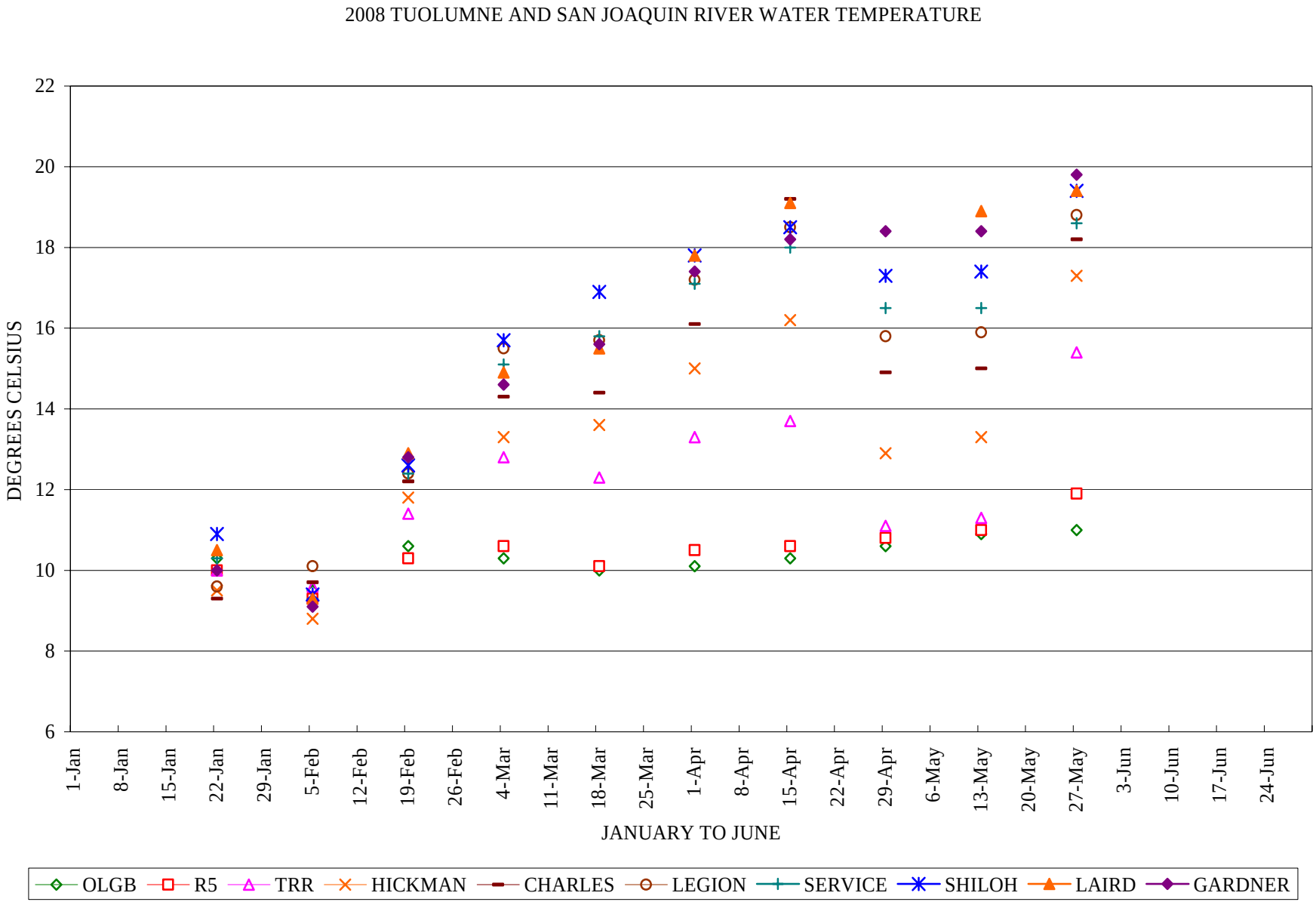


Figure 3. 2008 San Joaquin and Tuolumne River water temperature.

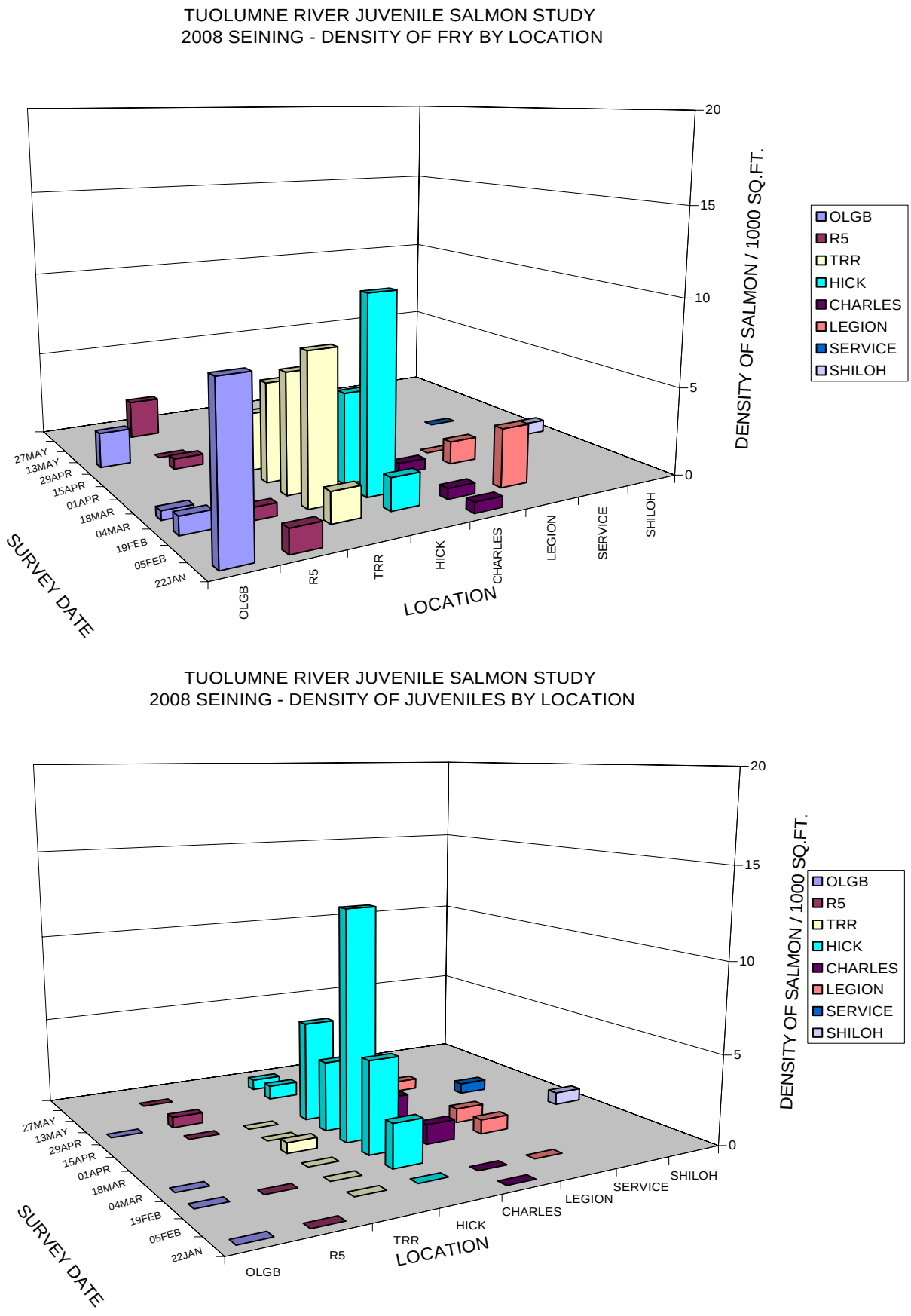


Figure 4. Tuolumne River density of fry and juvenile salmon by location.

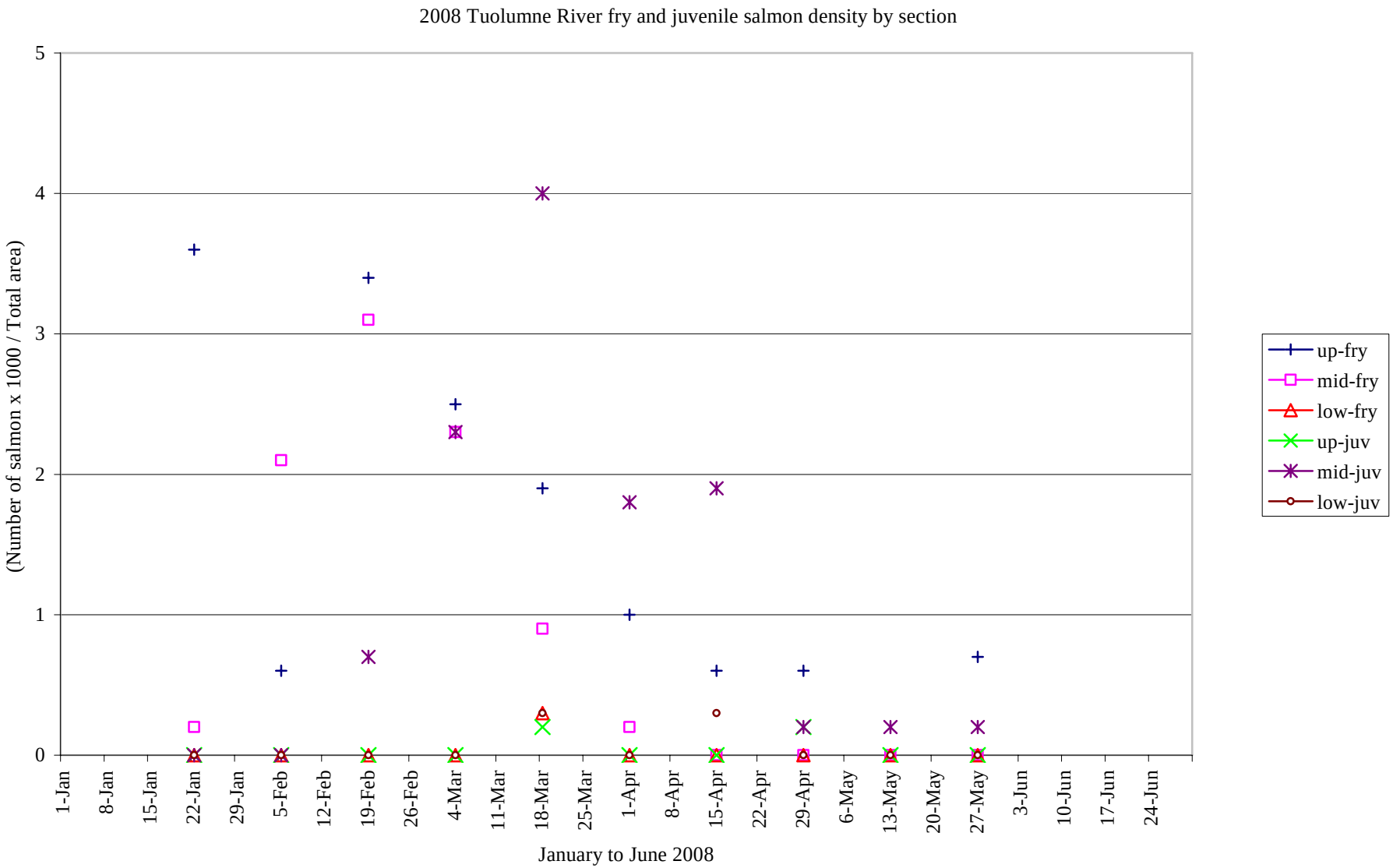


Figure 5. 2008 Tuolumne River fry and juvenile salmon density by section.

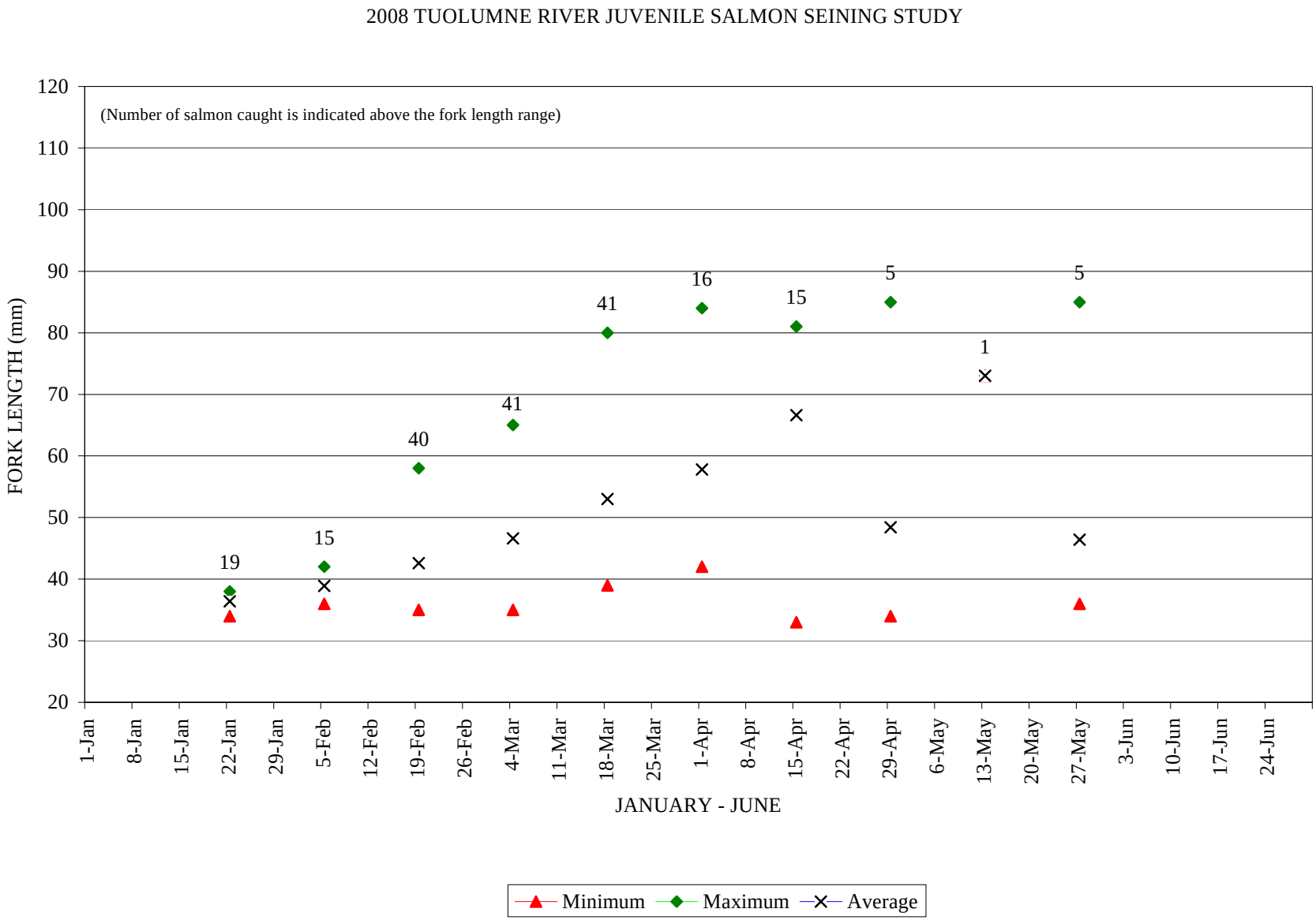


Figure 6. Fork length ranges of wild salmon in the Tuolumne River, 2008.

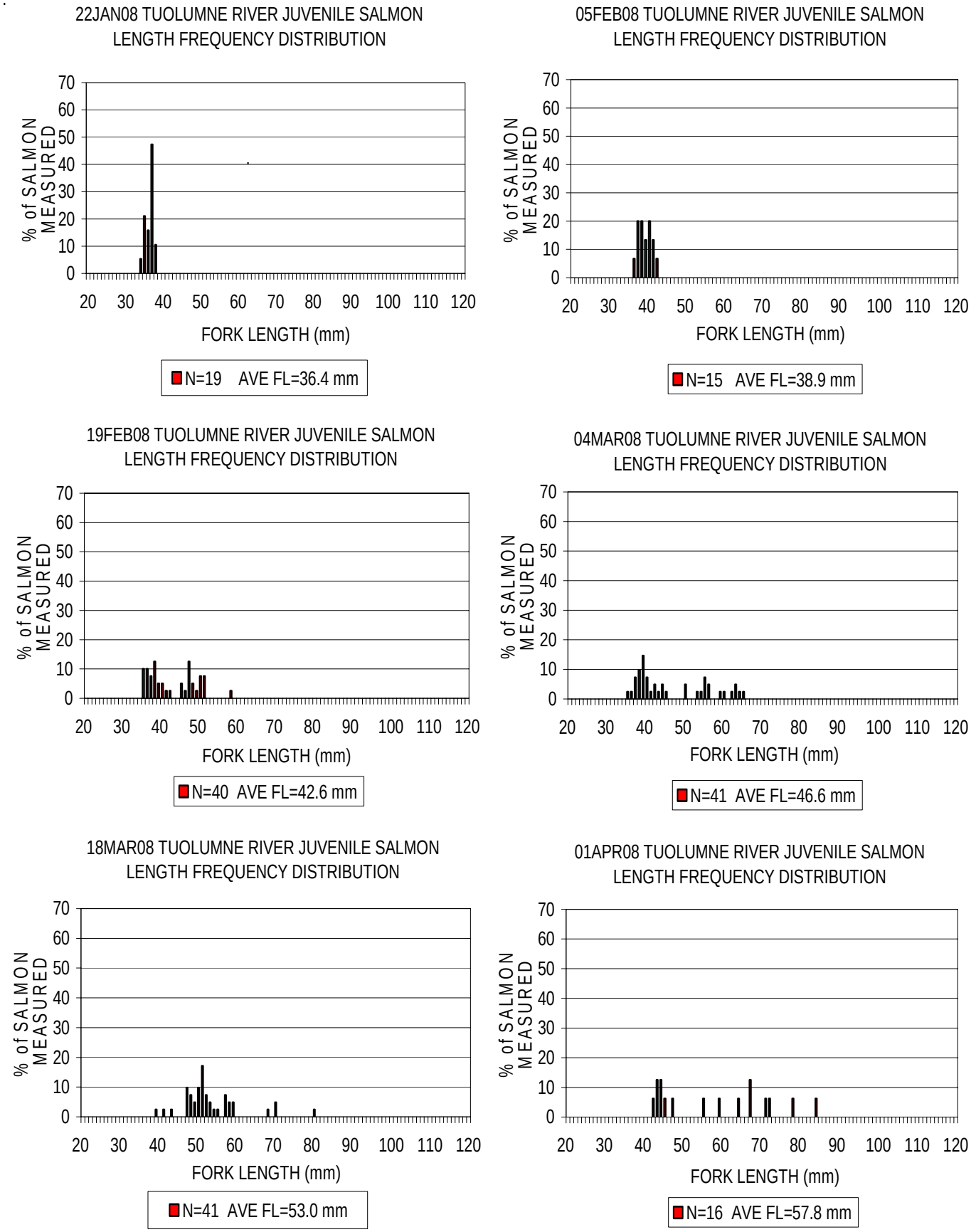
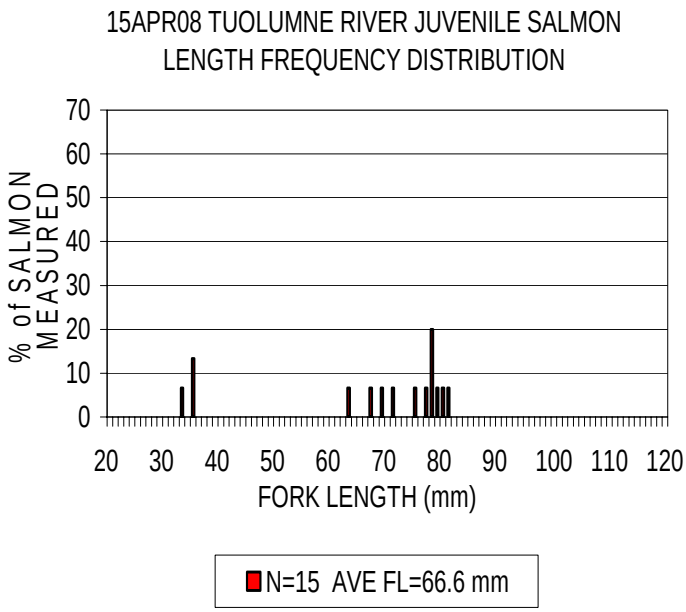
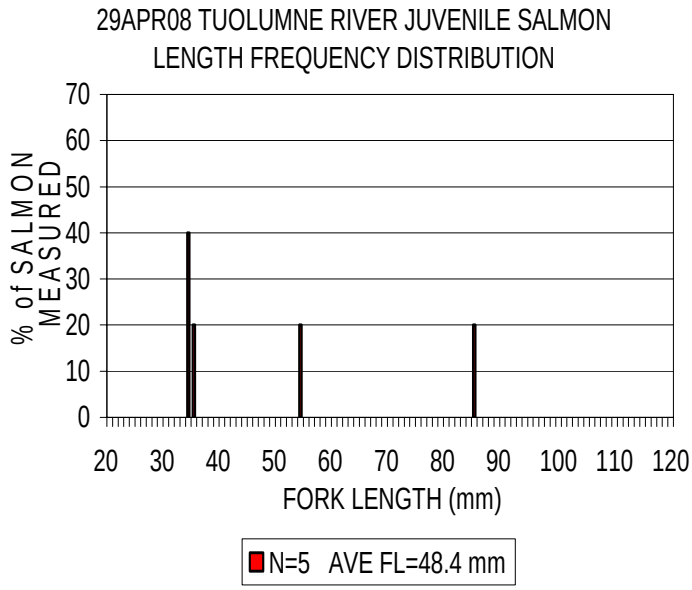
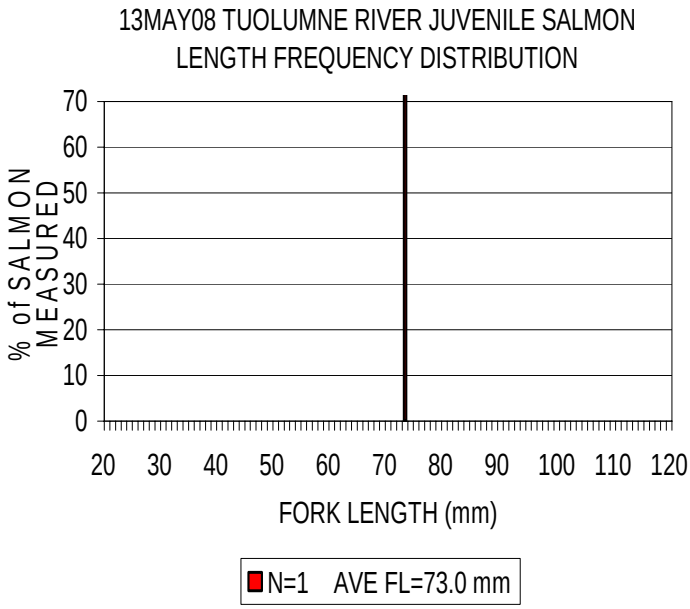


Figure 7. Length frequency distribution by date of salmon in the Tuolumne River, 2008.







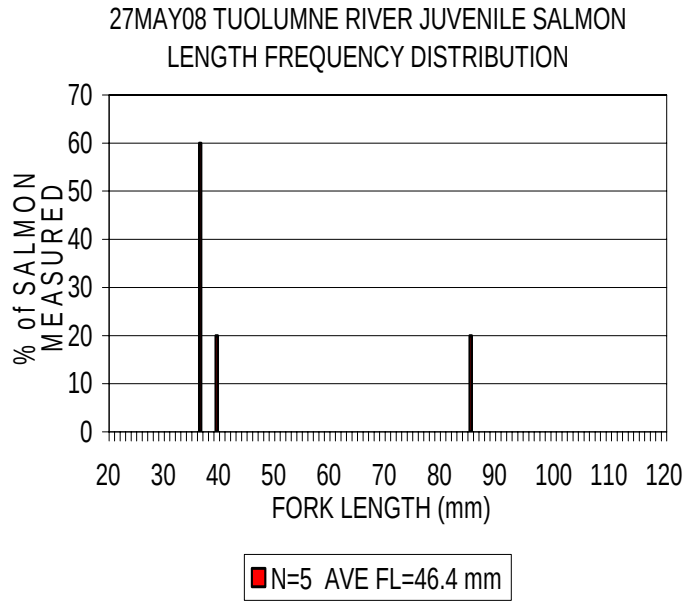


Figure 8. Length frequency distribution by date of salmon in the Tuolumne River, 2008.

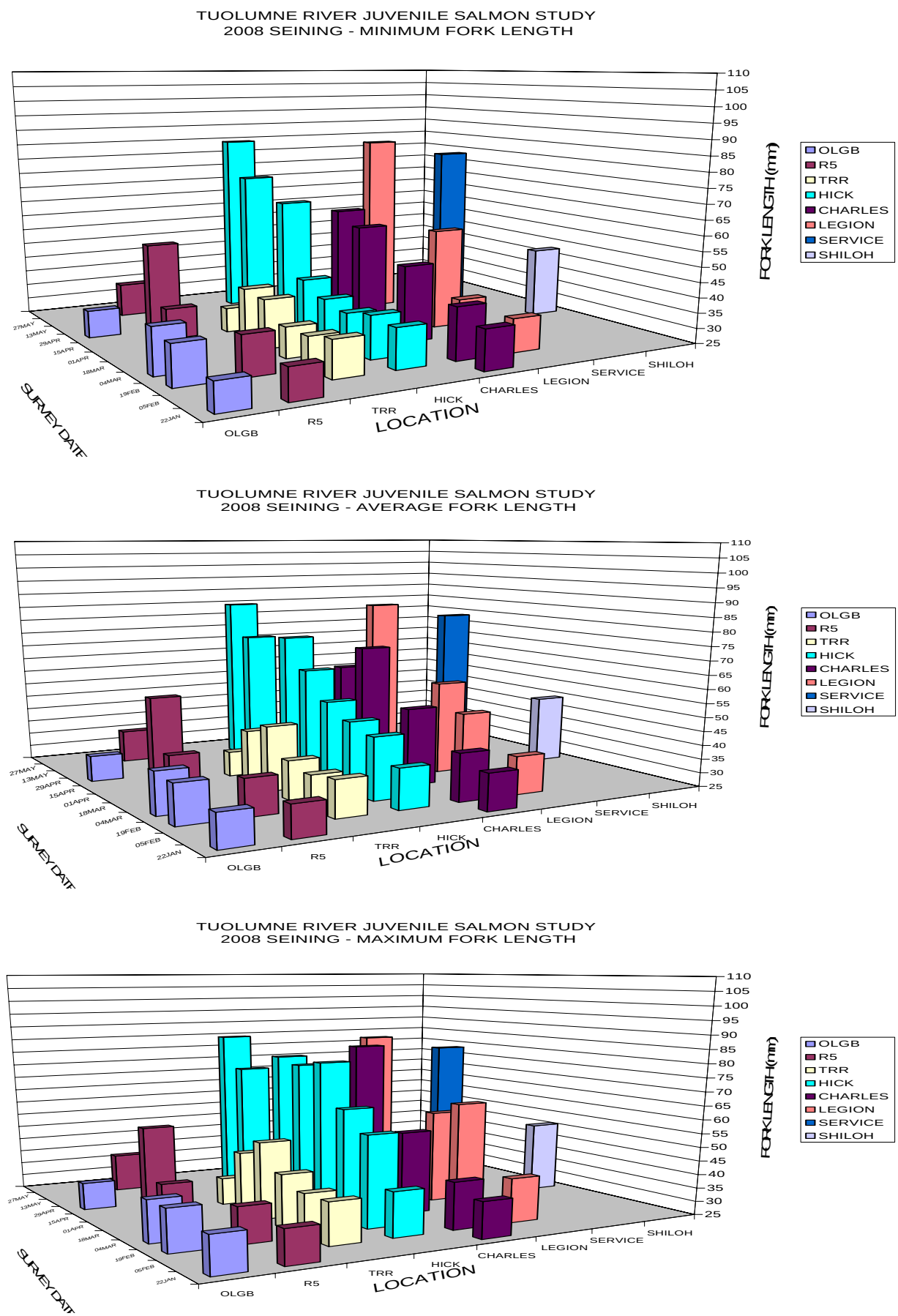
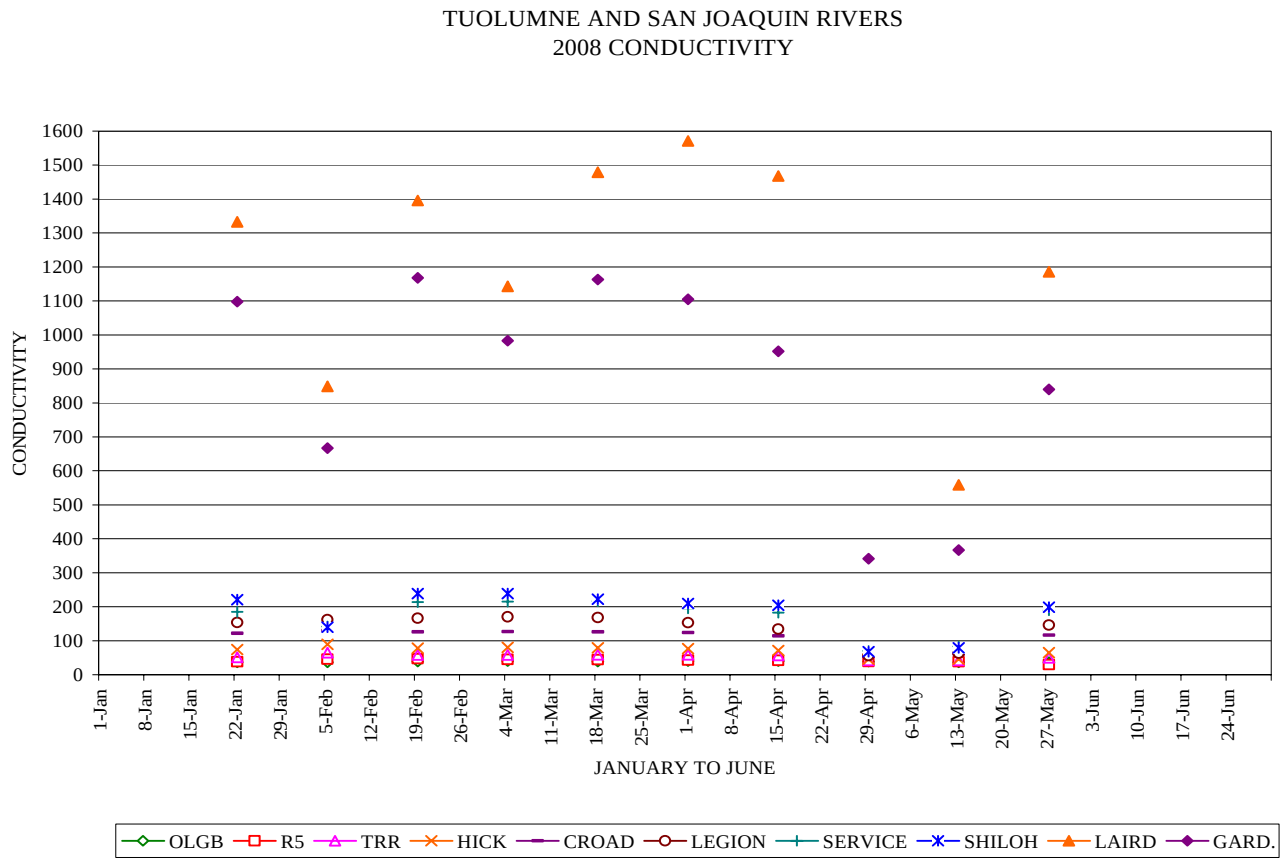


Figure 9. Minimum, average, and maximum fork length by location and survey period, 2008.



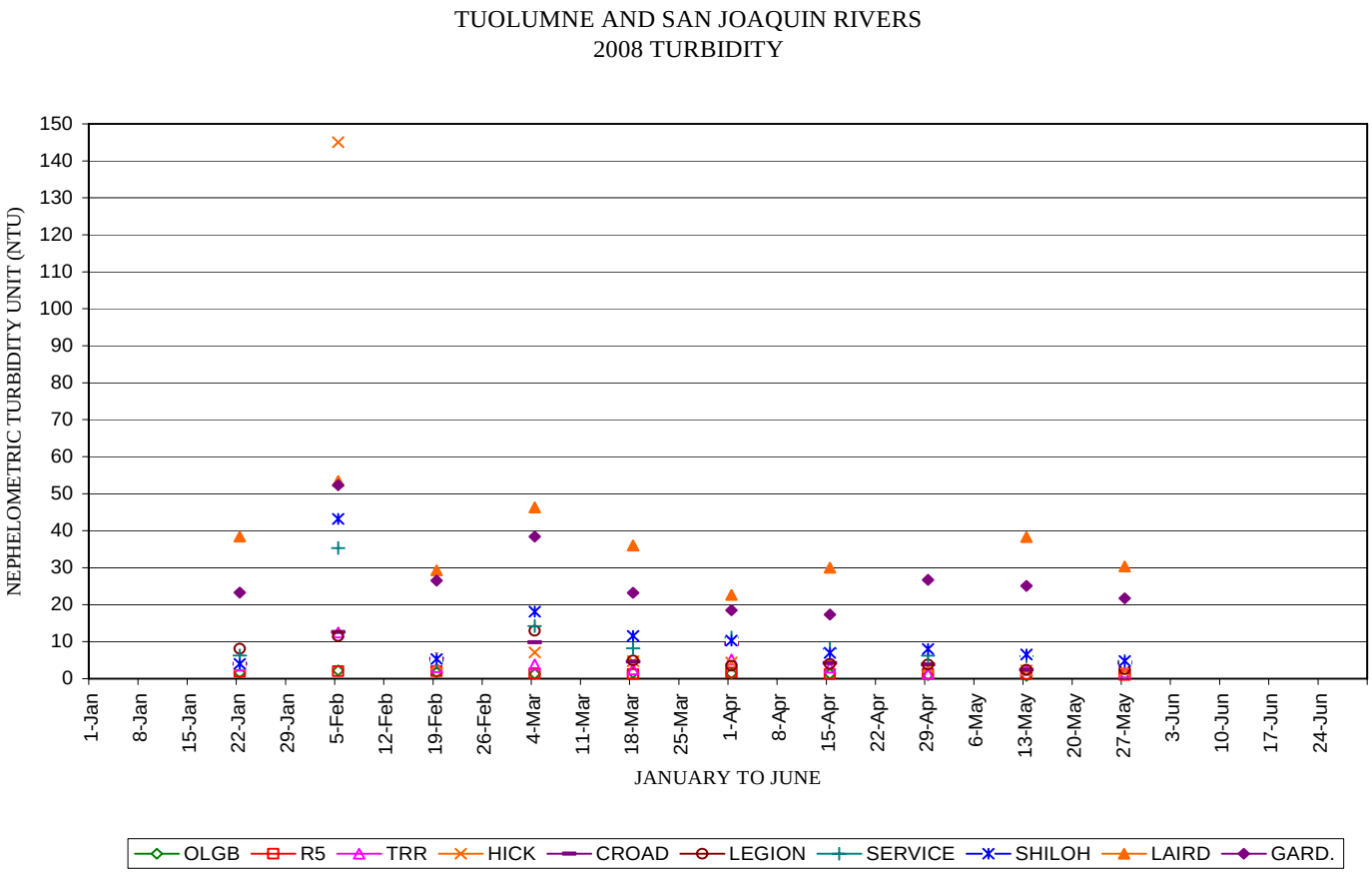
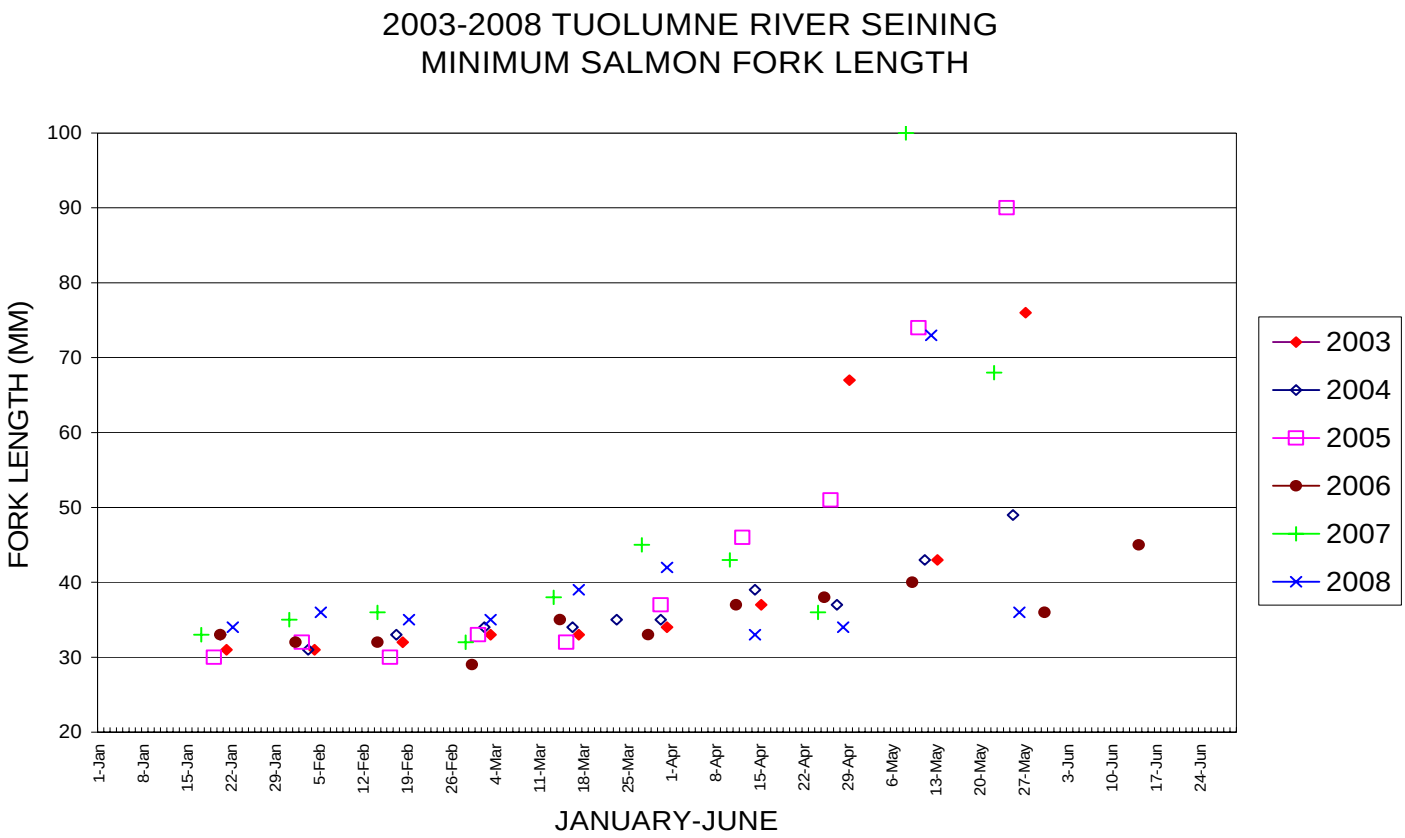
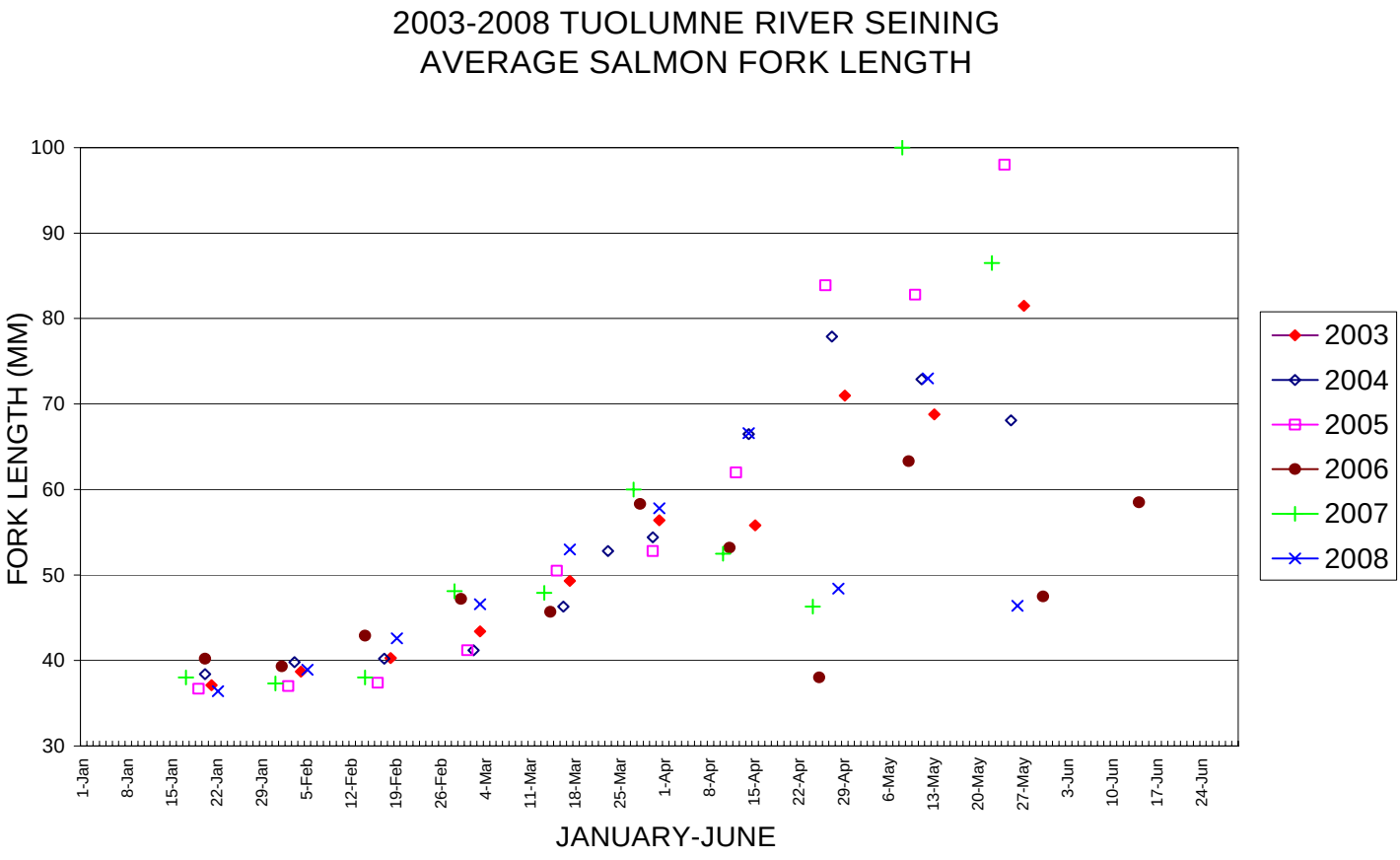
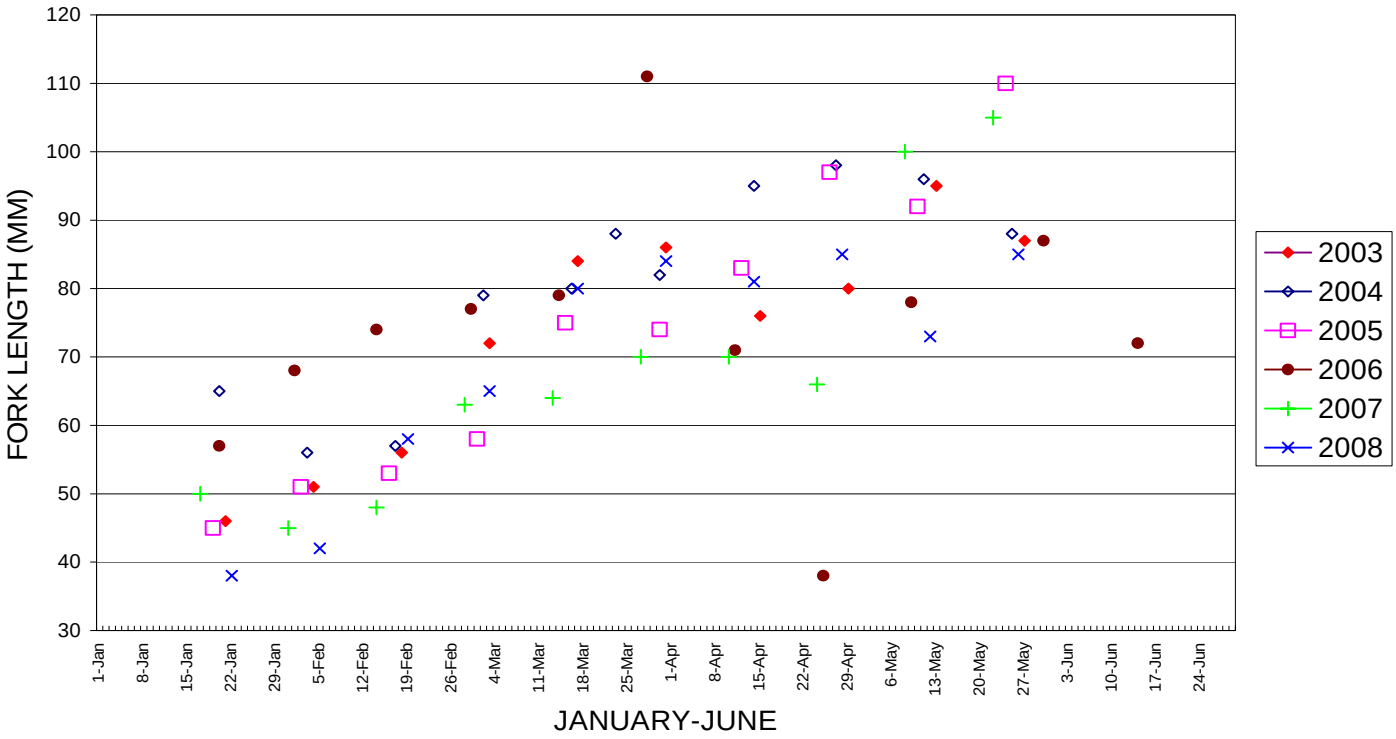


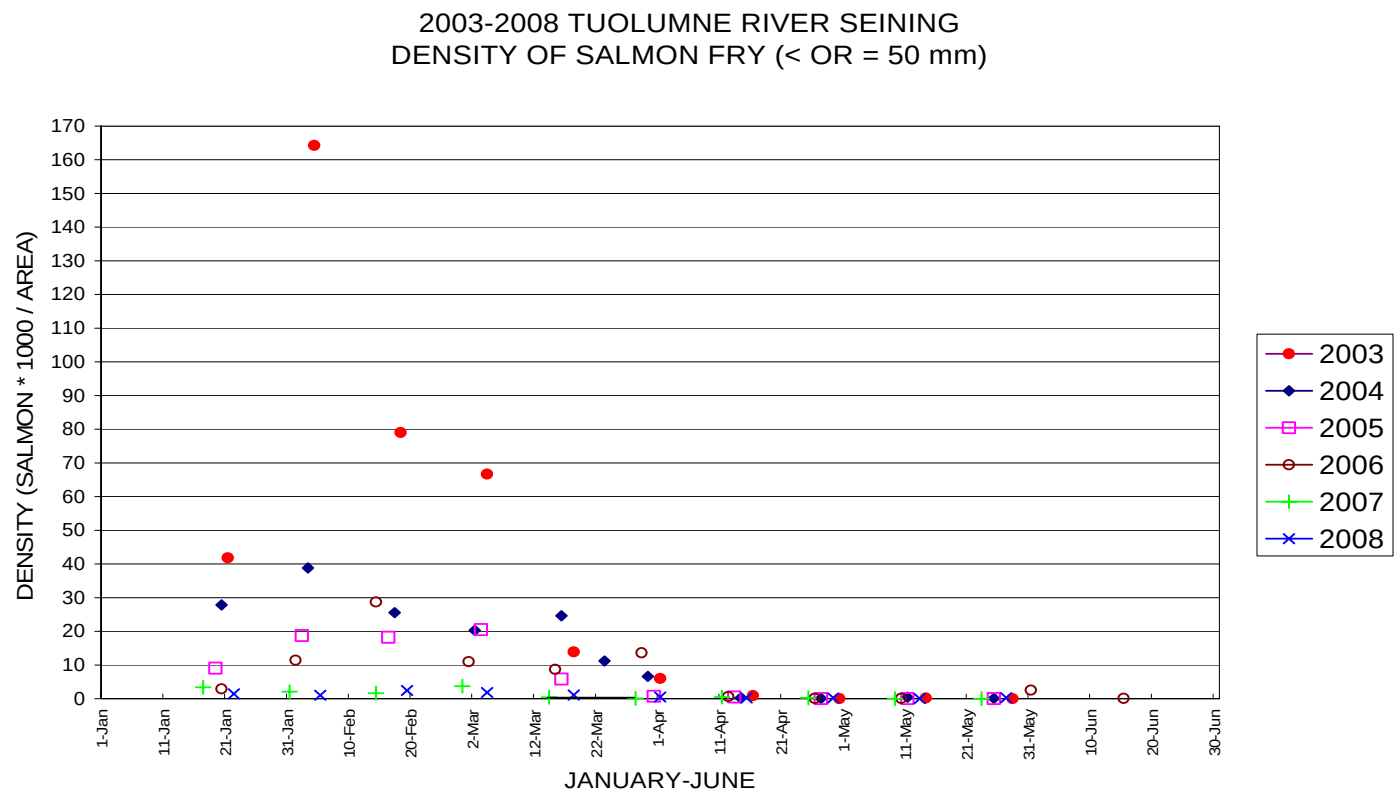
Figure 10. Conductivity and turbidity in the Tuolumne and San Joaquin Rivers, 2008



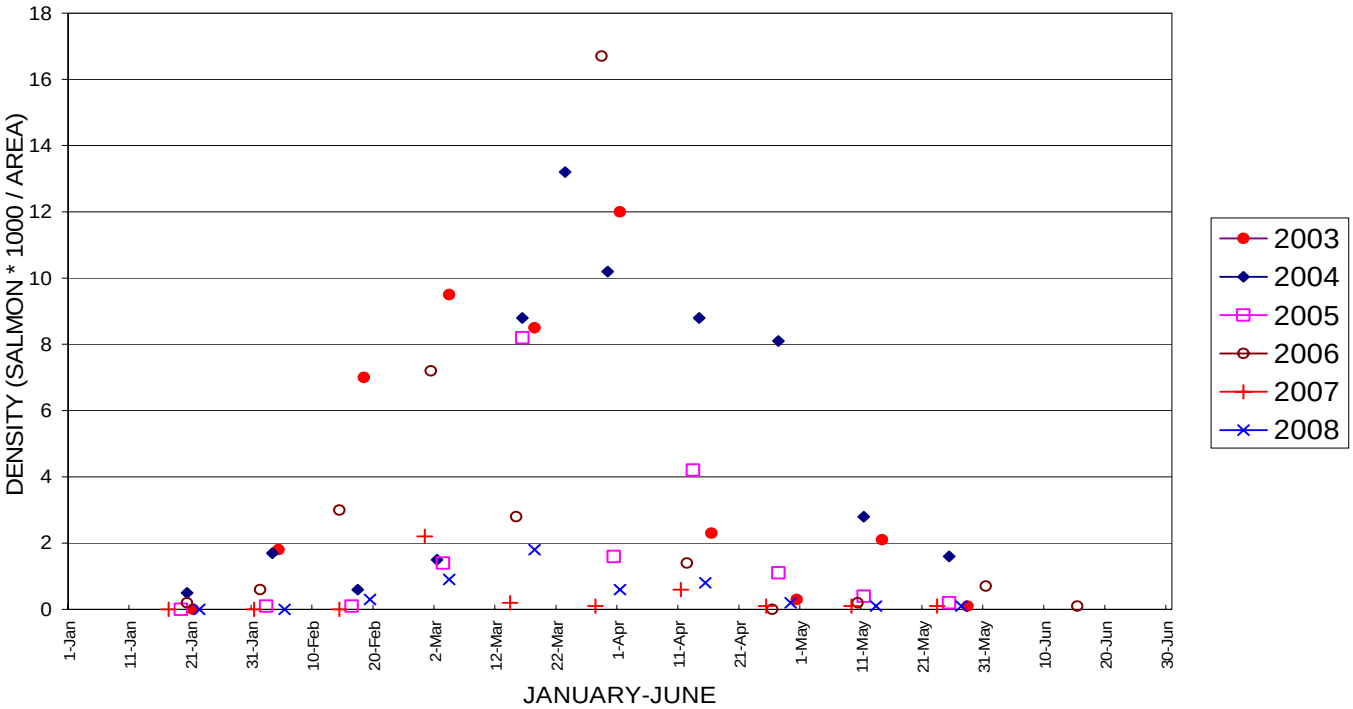


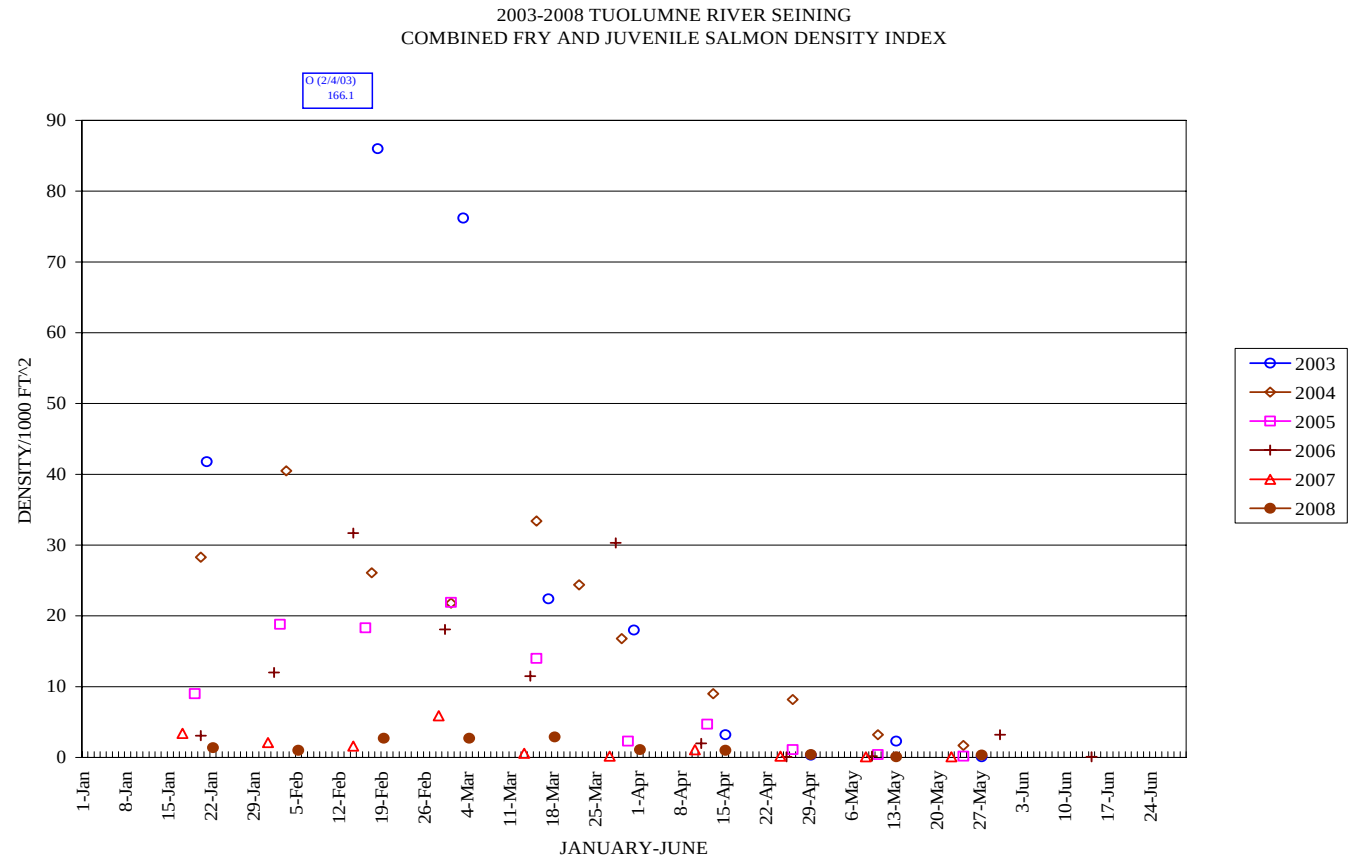
Figures 11 & 12. Minimum and average fork lengths of Tuolumne River salmon, 2003-2008.



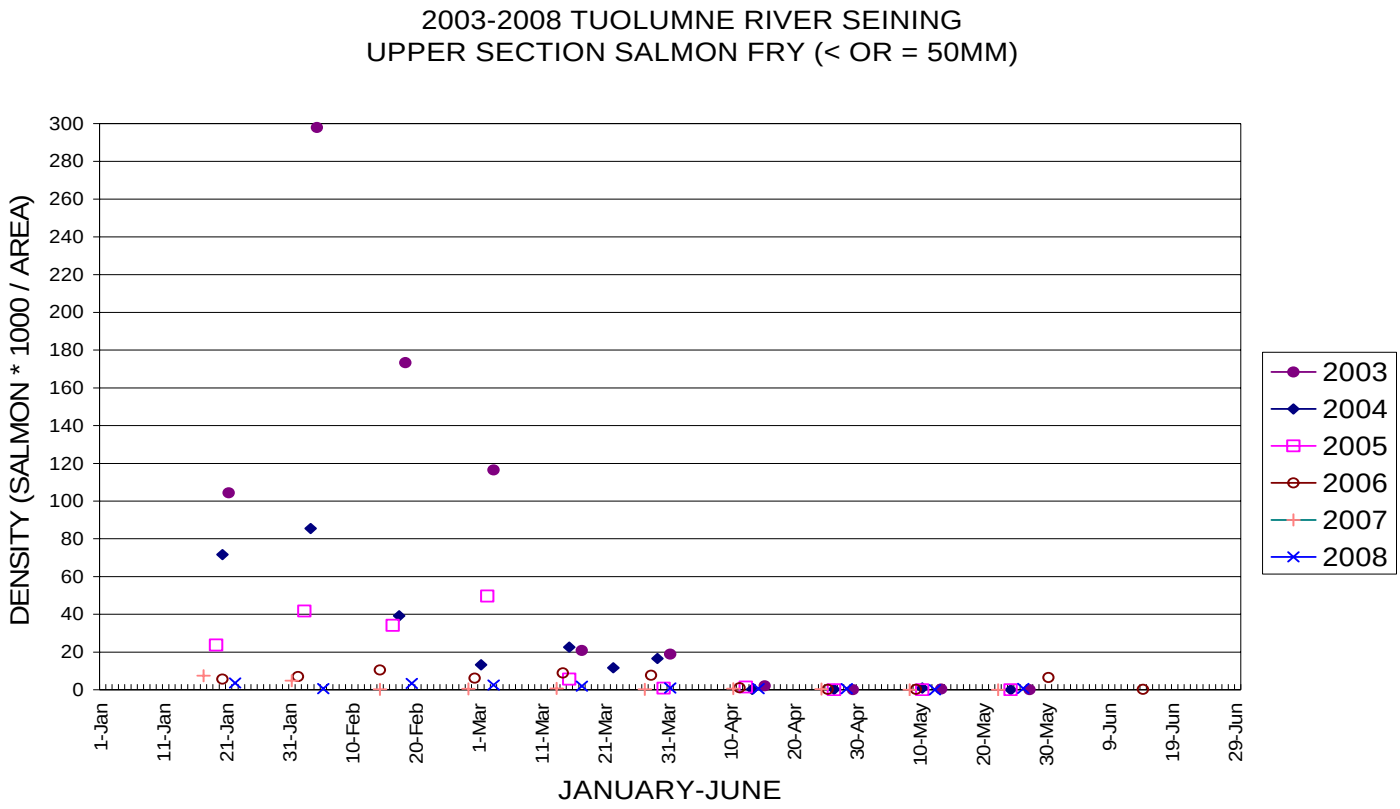


Figures 13 & 14. Maximum fork length and Density index of salmon fry, 2003-2008.





Figures 15 & 16. Density index of salmon juveniles and total river salmon catch, 2003-2008.



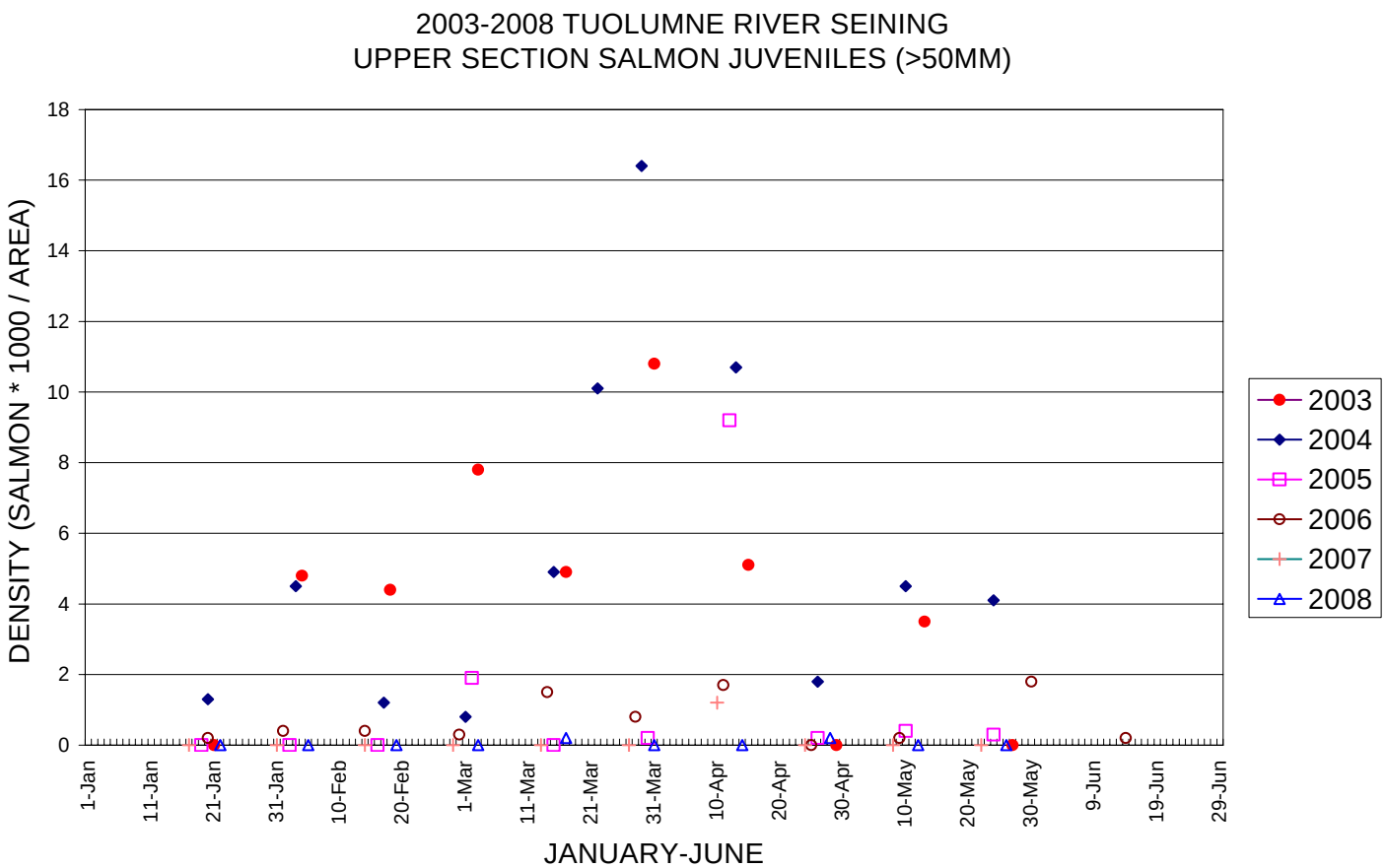


Figure 17. Upper section density indices for salmon fry and juveniles, 2003-2008

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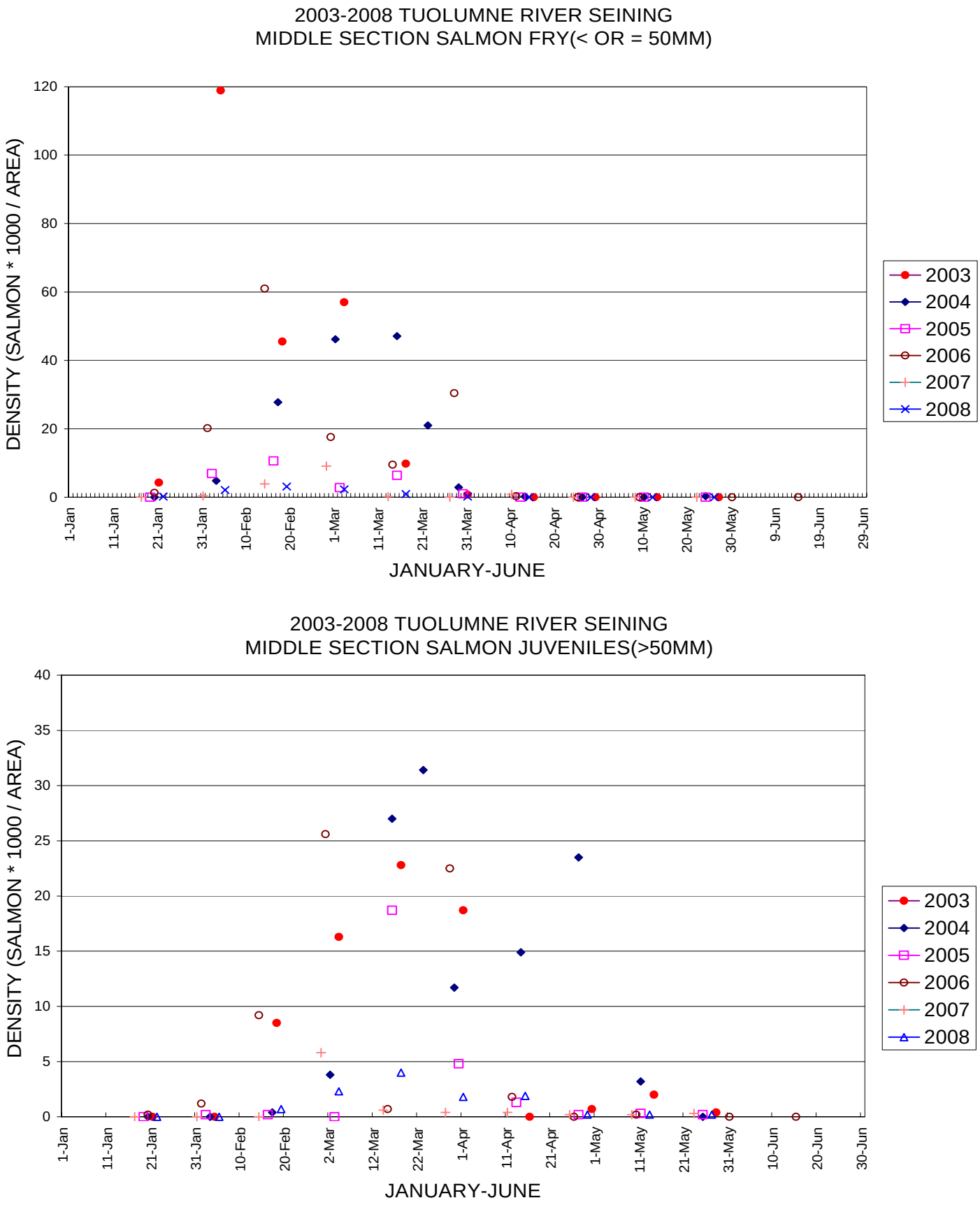
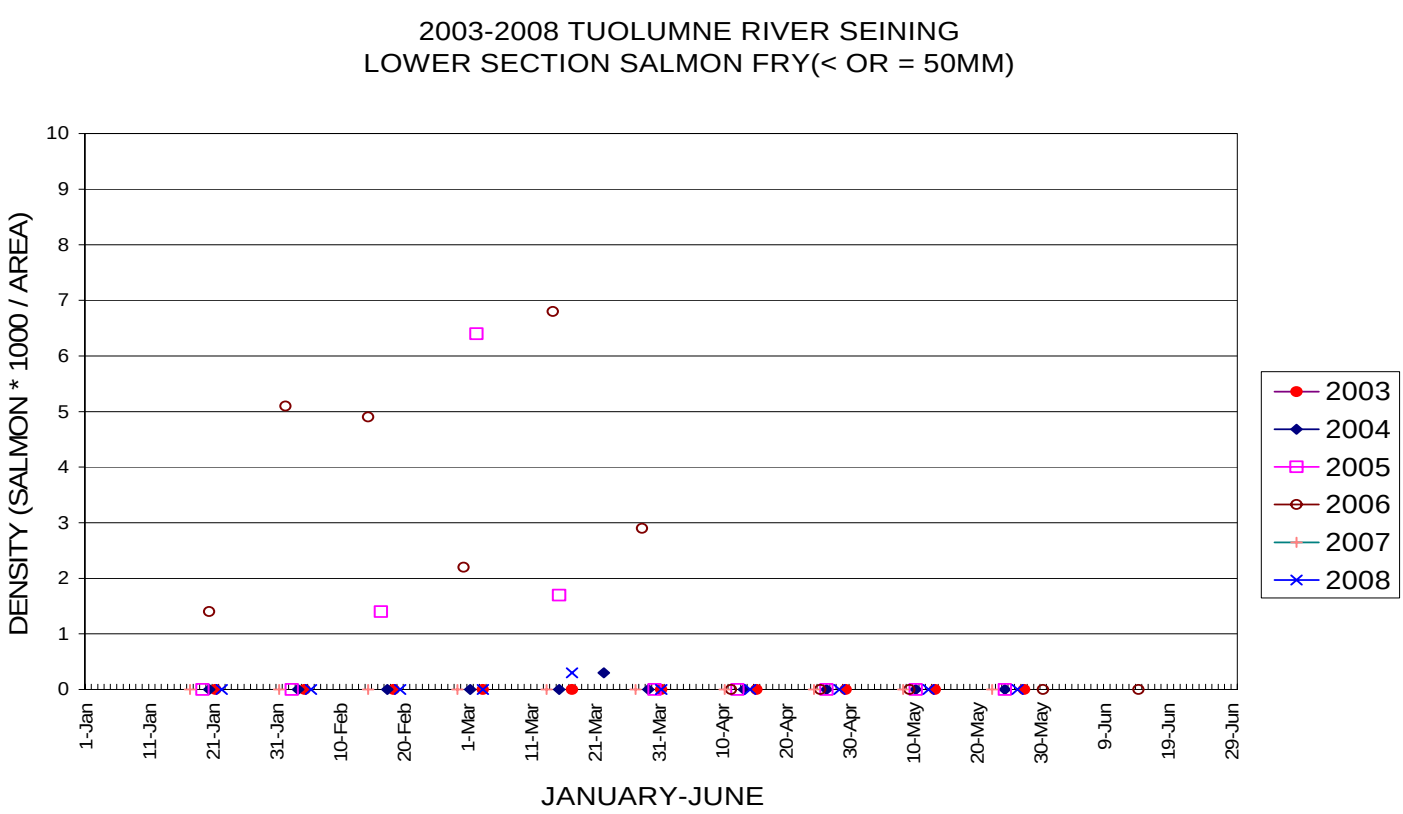


Figure 17. Middle section density indices for salmon fry and juveniles, 2003-2008.



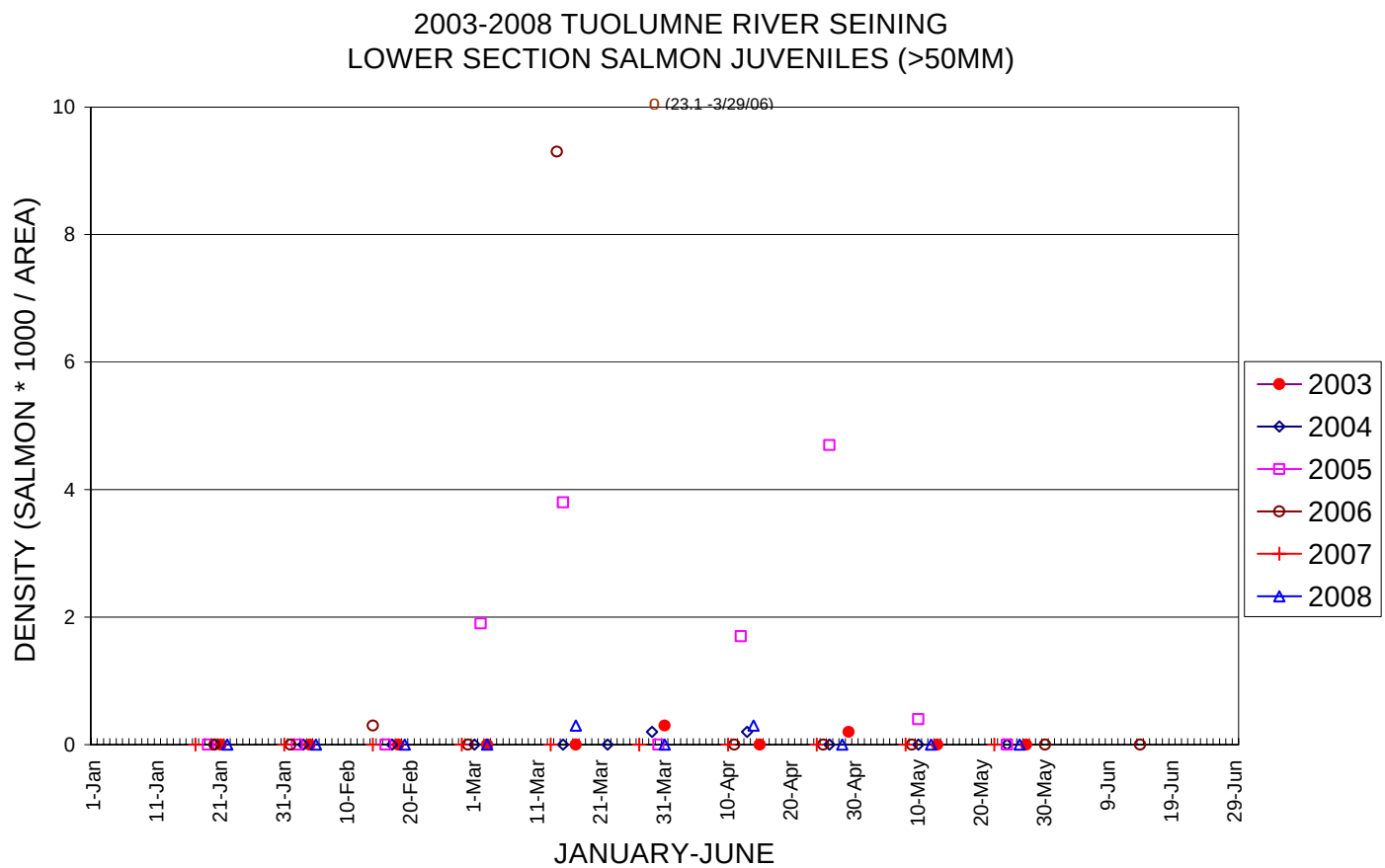


Figure 17. Lower section density indices for salmon fry and juveniles, 2003-2008.

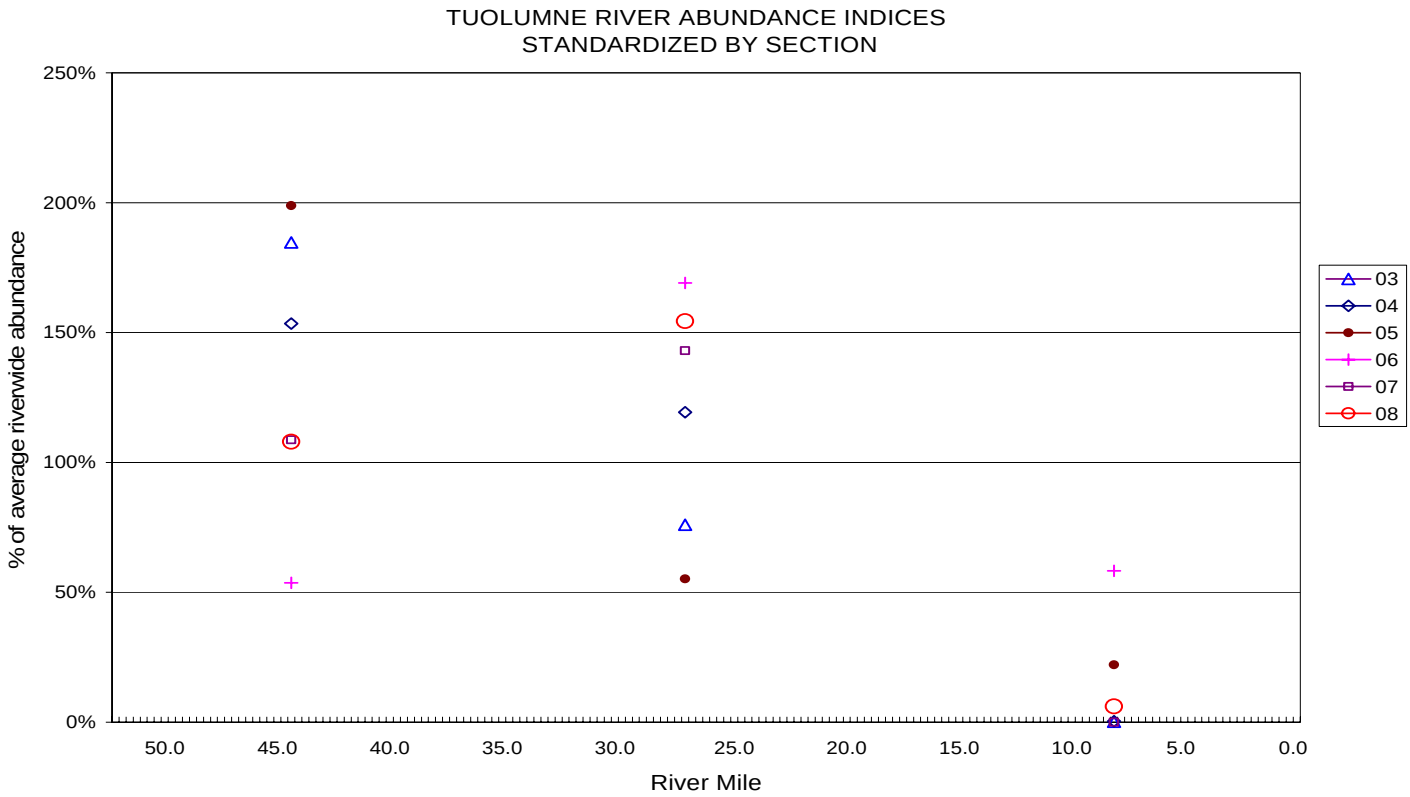


Figure 18. Tuolumne River abundance indices standardized by section, 2003-2008.

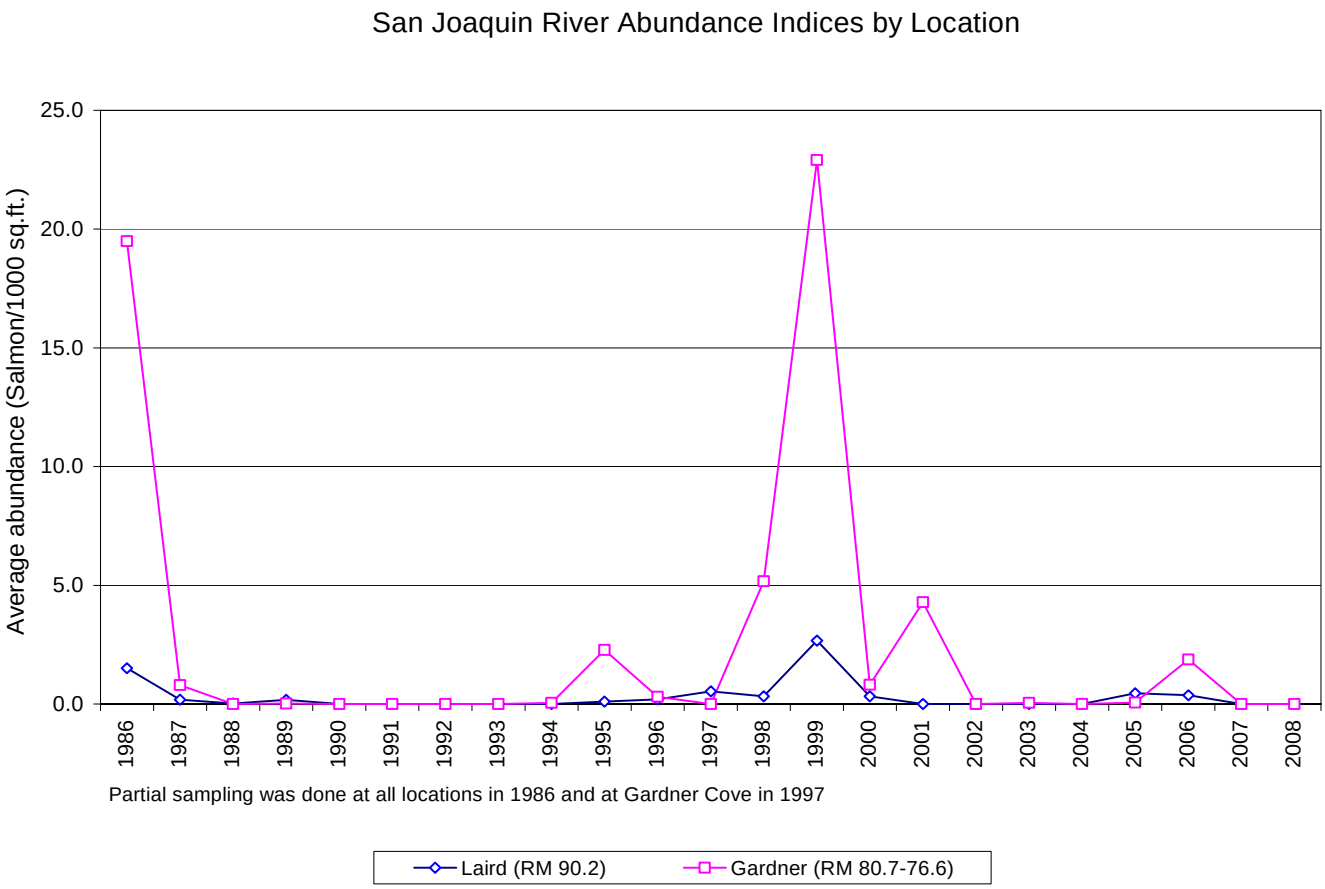


Figure 19. San Joaquin River abundance indices by location, 1986-2008.

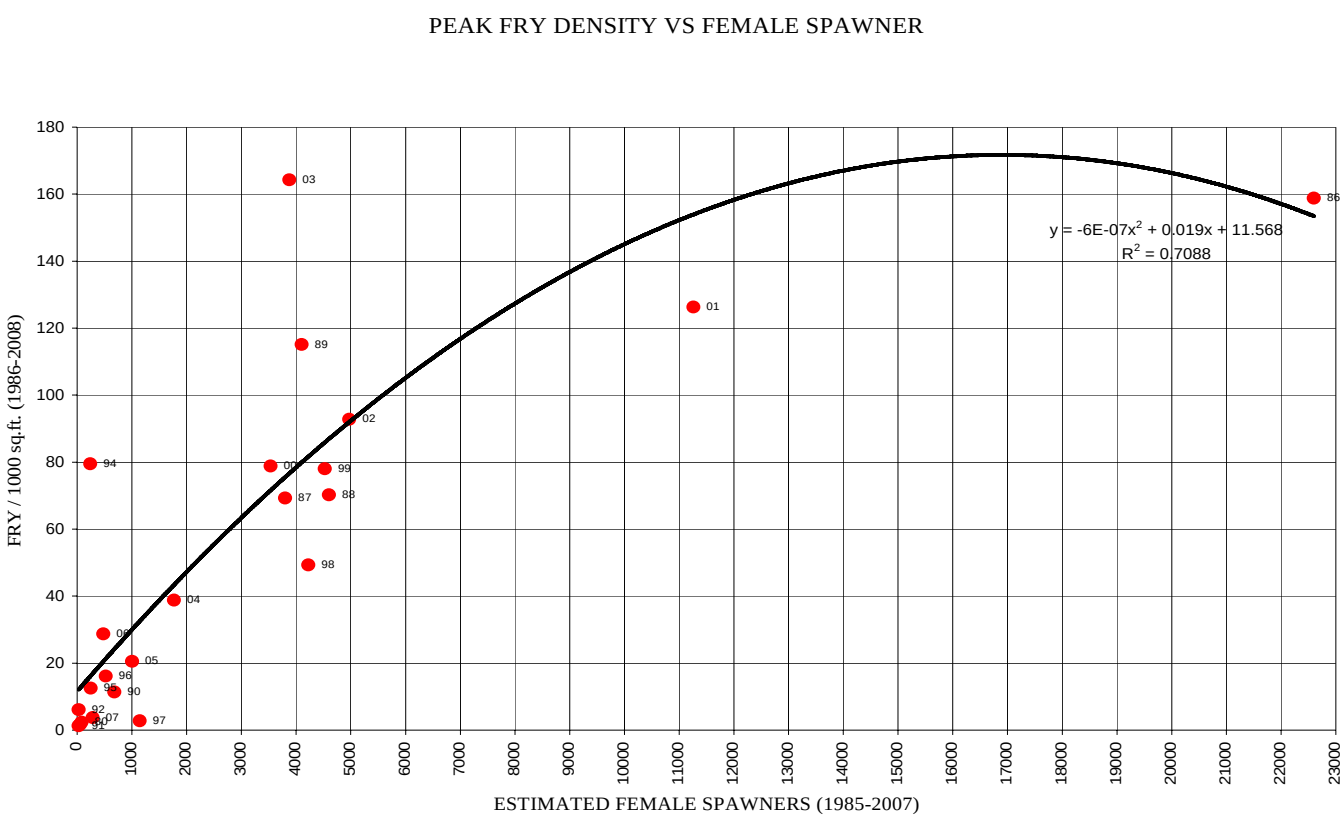


Figure 20. Tuolumne River peak fry density vs female spawners.

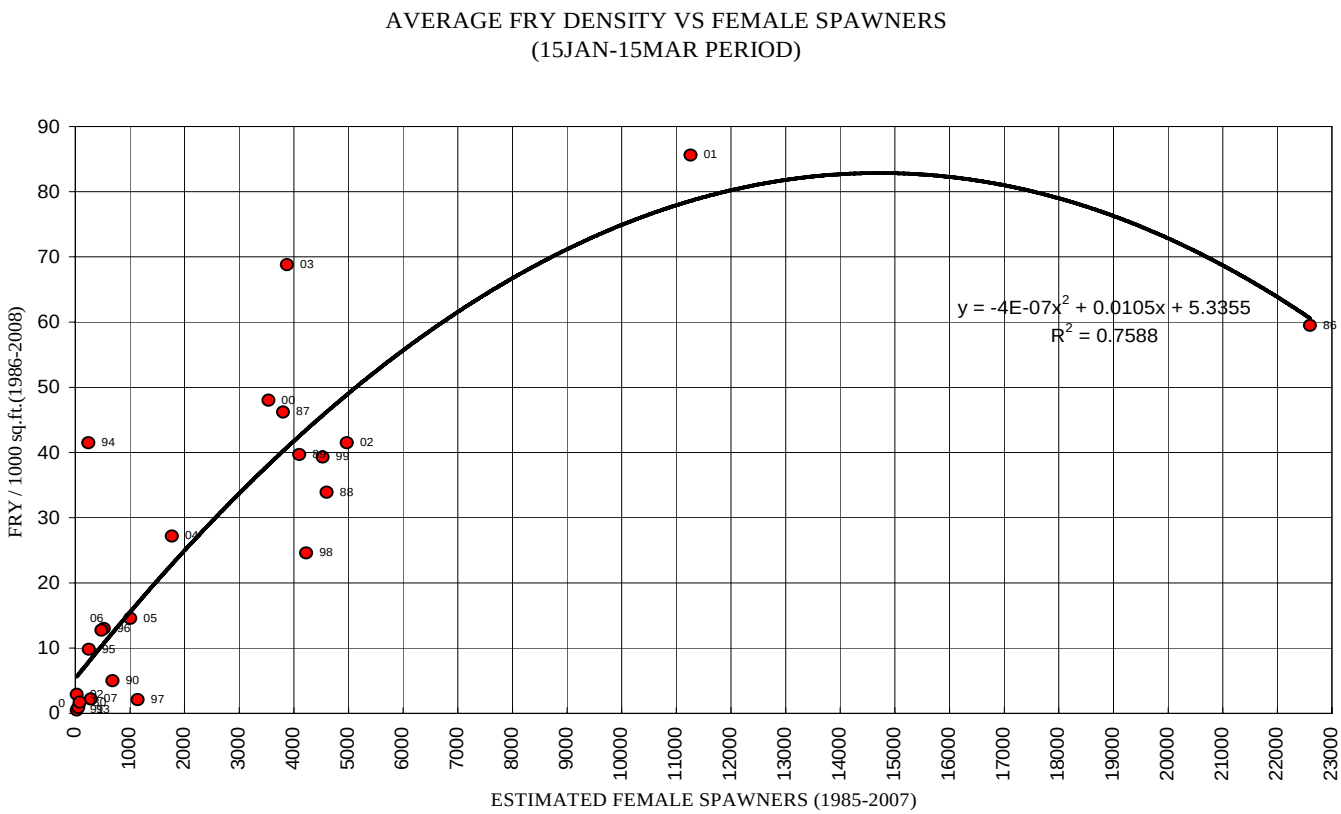


Figure 21. Tuolumne River average fry density vs female spawners.

Table 1. Summary table of weekly seine catch for the Tuolumne and San Joaquin rivers

2008 JUVENILE SALMON SEINING STUDY (TID/MID)

TUOLUMNE RIVER

DATE	SALMON CATCH	AREA (SQ. FT.)	DENSITY (/1000 ft^2)	MINIMUM FL	MAXIMUM FL	AVERAGE FL	NUMBER MEAS.	SACFRY	NUMBER KILLED
22JAN	19	13,300	1.4	34	38	36.4	19	0	2
05FEB	15	14,350	1.0	36	42	38.9	15	0	0
19FEB	40	14,750	2.7	35	58	42.6	40	0	2
04MAR	41	15,000	2.7	35	65	46.6	41	0	2
18MAR	41	14,150	2.9	39	80	53.0	41	0	0
01APR	16	14,500	1.1	42	84	57.8	16	0	0
15APR	15	14,700	1.0	33	81	66.6	15	0	0
29APR	5	12,600	0.4	34	85	48.4	5	0	0
13MAY	1	13,100	0.1	73	73	73.0	1	0	0
27MAY	5	14,400	0.3	36	85	46.4	5	0	0
TOTAL:	198	140,850	1.4				198	0	6

SAN JOAQUIN RIVER

DATE	SALMON CATCH	AREA (SQ. FT.)	DENSITY (/1000 ft^2)	MINIMUM FL	MAXIMUM FL	AVERAGE FL	NUMBER MEAS.	SACFRY	NUMBER KILLED
22JAN	0	2,600	0.0						
05FEB	0	2,300	0.0						
19FEB	0	3,000	0.0						
04MAR	0	3,000	0.0						
18MAR	0	2850	0.0						
01APR	0	3,300	0.0						
15APR	0	2,950	0.0						
29APR	0	1,800	0.0						
13MAY	0	3,000	0.0						
27MAY	0	3,300	0.0						
TOTAL:	0	28,100	0.0						

Table 2. Summary table of weekly seine catch by location for the Tuolumne and San Joaquin Rivers, 2008

2008 Weekly Summary of TID/MID Seining Study
Salmon Density is the Number of Salmon / 1000 sq. ft.

						Extrapolated				EXTRAPOLATED					
										UPPER SECTION	MIDDLE SECTION	LOWER SECTION	UPPER SECTION	MIDDLE SECTION	LOWER SECTION
		Total		Measured	Measured	Density	Density	Density	Average	Density	Density	Density	Density	Density	Density
Date	Location	Catch	Area	Fry	Juvenile	Fry	Juvenile	Total	FL	Fry	Fry	Fry	Juvenile	Juvenile	Juvenile
22JAN	OLGB	16	1,800	16	0	8.9	0.0	8.9	36.3	3.6	0.2	0.0	0.0	0.0	0.0
22JAN	R5	2	1,600	2	0	1.3	0.0	1.3	36.0						
22JAN	TRR	0	1,650					0.0							
22JAN	HICKMAN	0	1,350					0.0							
22JAN	CHARLES	1	1,650	1	0	0.6	0.0	0.6	38.0						
22JAN	LEGION	0	1,650					0.0							
22JAN	SERVICE	0	1,800					0.0							
22JAN	SHILOH	0	1,800					0.0							
22JAN	LAIRD	0	800					0.0							
22JAN	GARDNER	0	1,800					0.0							
TUOL.TOT.		19	13300	19	0	1.4	0.0	1.4	36.4						
SJR. TOT.		0	2600	0	0			0.0							

2008 Weekly Summary of TID/MID Seining Study
Salmon Density is the Number of Salmon / 1000 sq. ft.

						Extrapolated				EXTRAPOLATED					
										UPPER SECTION	MIDDLE SECTION	LOWER SECTION	UPPER SECTION	MIDDLE SECTION	LOWER SECTION
		Total		Measured	Measured	Density	Density	Density	Average	Density	Density	Density	Density	Density	Density
Date	Location	Catch	Area	Fry	Juvenile	Fry	Juvenile	Total	FL	Fry	Fry	Fry	Juvenile	Juvenile	Juvenile
05FEB	OLGB	0	1800					0.0		0.6	2.1	0.0	0.0	0.0	0.0
05FEB	R5	0	1500					0.0							
05FEB	TRR	3	1800	3	0	1.7	0.0	1.7	38.0						
05FEB	HICKMAN	3	1650	3	0	1.8	0.0	1.8	39.3						
05FEB	CHARLES	1	1800	1	0	0.6	0.0	0.6	42.0						
05FEB	LEGION	8	2400	8	0	3.3	0.0	3.3	38.6						
05FEB	SERVICE	0	1800					0.0							
05FEB	SHILOH	0	1600					0.0							
05FEB	LAIRD	0	700					0.0							
05FEB	GARDNER	0	1600					0.0							
TUOL.TOT.		15	14350	15	0	1.0	0.0	1.0	38.9						
SJR. TOT.		0	2300					0.0							

2008 Weekly Summary of TID/MID Seining Study
Salmon Density is the Number of Salmon / 1000 sq. ft.

						Extrapolated				EXTRAPOLATED					
										UPPER SECTION	MIDDLE SECTION	LOWER SECTION	UPPER SECTION	MIDDLE SECTION	LOWER SECTION
		Total		Measured	Measured	Density	Density	Density	Average	Density	Density	Density	Density	Density	Density
Date	Location	Catch	Area	Fry	Juvenile	Fry	Juvenile	Total	FL	Fry	Fry	Fry	Juvenile	Juvenile	Juvenile
19FEB	OLGB	2	2000	2	0	1.0	0.0	1.0	39.0	3.4	3.1	0.0	0.0	0.7	0.0
19FEB	R5	1	1500	1	0	0.7	0.0	0.7	38.0						
19FEB	TRR	15	1800	15	0	8.3	0.0	8.3	36.6						
19FEB	HICKMAN	22	1650	18	4	10.9	2.4	13.3	47.2						
19FEB	CHARLES	0	1800					0.0							
19FEB	LEGION	0	2400					0.0							
19FEB	SERVICE	0	1800					0.0							
19FEB	SHILOH	0	1800					0.0							
19FEB	LAIRD	0	1200					0.0							
19FEB	GARDNER	0	1800					0.0							
TUOL.TOT.		40	14750	36	4	2.4	0.3	2.7	42.6						
SJR. TOT.		0	3000	0	0			0.0							

2008 Weekly Summary of TID/MID Seining Study
Salmon Density is the Number of Salmon / 1000 sq. ft.

						Extrapolated				EXTRAPOLATED					
										UPPER SECTION	MIDDLE SECTION	LOWER SECTION	UPPER SECTION	MIDDLE SECTION	LOWER SECTION
		Total		Measured	Measured	Density	Density	Density	Average	Density	Density	Density	Density	Density	Density
Date	Location	Catch	Area	Fry	Juvenile	Fry	Juvenile	Total	FL	Fry	Fry	Fry	Juvenile	Juvenile	Juvenile
04MAR	OLGB	1	2000	1	0	0.5	0.0	0.5	40.0	2.5	2.3	0.0	0.0	2.3	0.0
04MAR	R5	0	1450					0.0							
04MAR	TRR	12	1800	12	0	6.7	0.0	6.7	38.7						
04MAR	HICKMAN	20	1950	10	10	5.1	5.1	10.3	50.1						
04MAR	CHARLES	3	1800	1	2	0.6	1.1	1.7	52.7						
04MAR	LEGION	5	2400	3	2	1.3	0.8	2.1	49.2						
04MAR	SERVICE	0	1800					0.0							
04MAR	SHILOH	0	1800					0.0							
04MAR	LAIRD	0	1200					0.0							
04MAR	GARDNER	0	1800					0.0							
TUOL.TOT.		41	15000	27	14	1.8	0.9	2.7	46.6						
SJR. TOT.		0	3000	0	0			0.0							

Table 2 (Continued)

2008 Weekly Summary of TID/MID Seining Study

Salmon Density is the Number of Salmon / 1000 sq. ft.

Date	Location	Total Catch	Area	Measured Fry	Measured Juvenile	Extrapolated Density Fry	Extrapolated Density Juvenile	Density Total	Average FL	EXTRAPOLATED UPPER SECTION Density Fry	MIDDLE SECTION Density Fry	LOWER SECTION Density Fry	UPPER SECTION Density Juvenile	MIDDLE SECTION Density Juvenile	LOWER SECTION Density Juvenile
18MAR	OLGB	0	1800					0.0		1.9	0.9	0.3	0.2	4.0	0.3
18MAR	R5	0	1600					0.0							
18MAR	TRR	11	1800	10	1	5.6	0.6	6.1	48.1						
18MAR	HICKMAN	26	1650	5	21	3.0	12.7	15.8	55.0						
18MAR	CHARLES	0	1650					0.0							
18MAR	LEGION	2	2400	0	2	0.0	0.8	0.8	58.5						
18MAR	SERVICE	0	1800					0.0							
18MAR	SHILOH	2	1450	1	1	0.7	0.7	1.4	49.5						
18MAR	LAIRD	0	1350					0.0							
18MAR	GARDNER	0	1500					0.0							
TUOL.TOT.		41	14150	16	25	1.1	1.8	2.9	53.0						
SJR. TOT.		0	2850	0	0			0.0							

2008 Weekly Summary of TID/MID Seining Study

Salmon Density is the Number of Salmon / 1000 sq. ft.

Date	Location	Total Catch	Area	Measured Fry	Measured Juvenile	Extrapolated Density Fry	Extrapolated Density Juvenile	Density Total	Average FL	EXTRAPOLATED UPPER SECTION Density Fry	MIDDLE SECTION Density Fry	LOWER SECTION Density Fry	UPPER SECTION Density Juvenile	MIDDLE SECTION Density Juvenile	LOWER SECTION Density Juvenile
01APR	OLGB	0	2200					0.0		1.0	0.2	0.0	0.0	1.8	0.0
01APR	R5	0	1800					0.0							
01APR	TRR	6	1800	6	0	3.3	0.0	3.3	44.2						
01APR	HICKMAN	8	1800	1	7	0.6	3.9	4.4	64.6						
01APR	CHARLES	2	1500	0	2	0.0	1.3	1.3	71.5						
01APR	LEGION	0	1800					0.0							
01APR	SERVICE	0	1800					0.0							
01APR	SHILOH	0	1800					0.0							
01APR	LAIRD	0	1500					0.0							
01APR	GARDNER	0	1800					0.0							
TUOL.TOT.		16	14500	7	9	0.5	0.6	1.1	57.8						
SJR. TOT.		0	3300	0	0			0.0							

2008 Weekly Summary of TID/MID Seining Study

Salmon Density is the Number of Salmon / 1000 sq. ft.

Date	Location	Total Catch	Area	Measured Fry	Measured Juvenile	Extrapolated Density Fry	Extrapolated Density Juvenile	Density Total	Average FL	EXTRAPOLATED UPPER SECTION Density Fry	MIDDLE SECTION Density Fry	LOWER SECTION Density Fry	UPPER SECTION Density Juvenile	MIDDLE SECTION Density Juvenile	LOWER SECTION Density Juvenile
15APR	OLGB	0	1800					0.0		0.6	0.0	0.0	0.0	1.9	0.3
15APR	R5	1	1800	1	0	0.6	0.0	0.6	35.0						
15APR	TRR	2	1800	2	0	1.1	0.0	1.1	34.0						
15APR	HICKMAN	10	1800	0	10	0.0	5.6	5.6	75.2						
15APR	CHARLES	1	1500	0	1	0.0	0.7	0.7	63.0						
15APR	LEGION	0	2400					0.0							
15APR	SERVICE	1	1800	0	1	0.0	0.6	0.6	81.0						
15APR	SHILOH	0	1800					0.0							
15APR	LAIRD	0	1150					0.0							
15APR	GARDNER	0	1800					0.0							
TUOL.TOT.		15	14700	3	12	0.2	0.8	1.0	66.6						
SJR. TOT.		0	2950					0.0							

2008 Weekly Summary of TID/MID Seining Study

Salmon Density is the Number of Salmon / 1000 sq. ft.

Date	Location	Total Catch	Area	Measured Fry	Measured Juvenile	Extrapolated Density Fry	Extrapolated Density Juvenile	Density Total	Average FL	EXTRAPOLATED UPPER SECTION Density Fry	MIDDLE SECTION Density Fry	LOWER SECTION Density Fry	UPPER SECTION Density Juvenile	MIDDLE SECTION Density Juvenile	LOWER SECTION Density Juvenile
29APR	OLGB	3	1500	3	0	2.0	0.0	2.0	34.3	0.6	0.0	0.0	0.2	0.2	0.0
29APR	R5	1	1800	0	1	0.0	0.6	0.6	54.0						
29APR	TRR	0	1800					0.0							
29APR	HICKMAN	0	1200					0.0							
29APR	CHARLES	0	1050					0.0							
29APR	LEGION	1	1800	0	1	0.0	0.6	0.6	85.0						
29APR	SERVICE	0	1800					0.0							
29APR	SHILOH	0	1650					0.0							
29APR	LAIRD	Not sampled													
29APR	GARDNER	0	1800					0.0							
TUOL.TOT.		5	12600	3	2	0.2	0.2	0.4	48.4						
SJR. TOT.		0	1800					0.0							

Table 2 (Continued)

2008 Weekly Summary of TID/MID Seining Study

Salmon Density is the Number of Salmon / 1000 sq. ft.

Date	Location	Total Catch	Area	Measured Fry	Measured Juvenile	Extrapolated Density Fry	Extrapolated Density Juvenile	Density Total	Average FL	EXTRAPOLATED UPPER SECTION Density Fry	MIDDLE SECTION Density Fry	LOWER SECTION Density Fry	UPPER SECTION Density Juvenile	MIDDLE SECTION Density Juvenile	LOWER SECTION Density Juvenile
13MAY	OLGB	0	1500					0.0		0.0	0.0	0.0	0.0	0.2	0.0
13MAY	R5	0	1800					0.0							
13MAY	TRR	0	1800					0.0							
13MAY	HICKMAN	1	1300	0	1	0.0	0.8	0.8	73.0						
13MAY	CHARLES	0	1300					0.0							
13MAY	LEGION	0	1950					0.0							
13MAY	SERVICE	0	1650					0.0							
13MAY	SHILOH	0	1800					0.0							
13MAY	LAIRD	0	1200					0.0							
13MAY	GARDNER	0	1800					0.0							
TUOL.TOT.		1	13100	0	1	0.0	0.1	0.1	73.0						
SJR. TOT.		0	3000					0.0							

2008 Weekly Summary of TID/MID Seining Study

Salmon Density is the Number of Salmon / 1000 sq. ft.

Date	Location	Total Catch	Area	Measured Fry	Measured Juvenile	Extrapolated Density Fry	Extrapolated Density Juvenile	Density Total	Average FL	EXTRAPOLATED UPPER SECTION Density Fry	MIDDLE SECTION Density Fry	LOWER SECTION Density Fry	UPPER SECTION Density Juvenile	MIDDLE SECTION Density Juvenile	LOWER SECTION Density Juvenile
27MAY	OLGB	0	1800					0.0		0.7	0.0	0.0	0.0	0.2	0.0
27MAY	R5	4	1800	4	0	2.2	0.0	2.2	36.8						
27MAY	TRR	0	1800					0.0							
27MAY	HICKMAN	1	1800	0	1	0.0	0.6	0.6	85.0						
27MAY	CHARLES	0	1800					0.0							
27MAY	LEGION	0	1800					0.0							
27MAY	SERVICE	0	1800					0.0							
27MAY	SHILOH	0	1800					0.0							
27MAY	LAIRD	0	1500					0.0							
27MAY	GARDNER	0	1800					0.0							
TUOL.TOT.		5	14400	4	1	0.3	0.1	0.3	46.4						
SJR. TOT.		0	3300					0.0							

Table 3. Summary table of weekly seine catch by location for the Tuolumne and San Joaquin Rivers, 2008.

2008 TUOLUMNE RIVER SEINING STUDY (TID/MID)

DATE	LOCATION	RIVER MILE	CATCH	AREA	DENSITY (/1000ft^2)	FL MIN.	FL MAX.	FL AVG.	NO. MEAS.	SACFRY	NO. KILLED	WATER TEMP.	ELEC. COND.	SMOLT FL	SECTION DENSITY UPPER	MIDDLE	LOWER	TURB.	D.O. (ppm)
22JAN	OLGB	50.5	16	1,800	8.9	34	38	36.3	16	0	2	10.3	37		3.6	0.2	0.0	1.6	9.1
22JAN	R5	48.0	2	1,600	1.3	35	37	36.0	2	0	0	10.0	38					1.9	9.9
22JAN	TRR	42.3	0	1,650	0.0							10.0	51					3.5	10.8
22JAN	HICK	31.6	0	1,350	0.0							9.5	74					3.6	10.6
22JAN	CHARLES	24.9	1	1,650	0.6	38	38	38.0	1	0	0	9.3	122					4.0	9.8
22JAN	LEGION	17.2	0	1,650	0.0							9.6	154					8.1	10.0
22JAN	SERVICE	8.7	0	1,800	0.0							10.3	185					6.3	10.6
22JAN	SHILOH	3.4	0	1,800	0.0							10.9	221					4.0	9.9
22JAN	LAIRD	90.2	0	800	0.0							10.5	1333					38.4	10.3
22JAN	GARDNER	79.5	0	1,800	0.0							10.0	1098					23.3	9.8
TR TOT.			19	13300	1.4	34	38	36.4	19	0	2								
SJR TOT.			0	2600	0.0				0										

2008 TUOLUMNE RIVER SEINING STUDY (TID/MID)

DATE	LOCATION	RIVER MILE	CATCH	AREA	DENSITY (/1000ft^2)	FL MIN.	FL MAX.	FL AVG.	NO. MEAS.	SACFRY	NO. KILLED	WATER TEMP.	ELEC. COND.	SMOLT FL	SECTION DENSITY UPPER	MIDDLE	LOWER	TURB.	D.O. (ppm)
05FEB	OLGB	50.5	0	1800	0.0							9.5	37		0.6	2.1	0.0	2.2	10.1
05FEB	R5	48.0	0	1500	0.0							9.3	46					2.0	11.0
05FEB	TRR	42.3	3	1800	1.7	37	40	38.0	3	0	0	9.6	65					12.5	10.2
05FEB	HICK	31.6	3	1650	1.8	38	41	39.3	3	0	0	8.8	89					145.0	10.2
05FEB	CHARLES	24.9	1	1800	0.6	42	42	42.0	1	0	0	9.7	130					12.6	10.0
05FEB	LEGION	17.2	8	2400	3.3	36	41	38.6	8	0	0	10.1	162					11.5	10.3
05FEB	SERVICE	8.7	0	1800	0.0							9.3	142					35.3	10.3
05FEB	SHILOH	3.4	0	1600	0.0							9.4	140					43.2	10.1
05FEB	LAIRD	90.2	0	700	0.0							9.3	849					53.4	10.2
05FEB	GARDNER	79.5	0	1600	0.0							9.1	667					52.3	10.3
TR TOT.			15	14350	1.0	36	42	38.9	15	0	0								
SJR TOT.			0	2300	0.0				0	0	0								

2008 TUOLUMNE RIVER SEINING STUDY (TID/MID)

DATE	LOCATION	RIVER MILE	CATCH	AREA	DENSITY (/1000ft^2)	FL MIN.	FL MAX.	FL AVG.	NO. MEAS.	SACFRY	NO. KILLED	WATER TEMP.	ELEC. COND.	SMOLT FL	SECTION DENSITY UPPER	MIDDLE	LOWER	TURB.	D.O. (ppm)
19FEB	OLGB	50.5	2	2000	1.0	38	40	39.0	2	0	0	10.6	39		3.4	3.8	0.0	1.7	11.4
19FEB	R5	48.0	1	1500	0.7	38	38	38.0	1	0	0	10.3	47					2.0	12.3
19FEB	TRR	42.3	15	1800	8.3	35	40	36.6	15	0	1	11.4	58					3.1	12.2
19FEB	HICK	31.6	22	1650	13.3	39	58	47.2	22	0	1	11.8	78					3.9	12.3
19FEB	CHARLES	24.9	0	1800	0.0							12.2	126					5.4	12.6
19FEB	LEGION	17.2	0	2400	0.0							12.4	166					5.4	12.5
19FEB	SERVICE	8.7	0	1800	0.0							12.4	214					4.7	12.9
19FEB	SHILOH	3.4	0	1800	0.0							12.6	239					5.3	11.3
19FEB	LAIRD	90.2	0	1200	0.0							12.9	1396					29.3	10.0
19FEB	GARDNER	79.5	0	1800	0.0							12.8	1168					26.5	10.6
TR TOT.			40	14750	2.7	35	58	42.6	40	0	2								
SJR TOT.			0	3000	0.0														

2008 TUOLUMNE RIVER SEINING STUDY (TID/MID)

DATE	LOCATION	RIVER MILE	CATCH	AREA	DENSITY (/1000ft^2)	FL MIN.	FL MAX.	FL AVG.	NO. MEAS.	SACFRY	NO. KILLED	WATER TEMP.	ELEC. COND.	SMOLT FL	SECTION DENSITY UPPER	MIDDLE	LOWER	TURB.	D.O. (ppm)
04MAR	OLGB	50.5	1	2000	0.5	40	40	40.0	1	0	0	10.3	40		2.5	4.6	0.0	1.3	10.3
04MAR	R5	48.0	0	1450	0.0							10.6	45					1.4	11.5
04MAR	TRR	42.3	12	1800	6.7	35	44	38.7	12	0	0	12.8	58					3.8	11.6
04MAR	HICK	31.6	20	1950	10.3	37	65	50.1	20	0	2	13.3	80					7.1	11.0
04MAR	CHARLES	24.9	3	1800	1.7	50	55	52.7	3	0	0	14.3	127					9.8	10.8
04MAR	LEGION	17.2	5	2400	2.1	37	64	49.2	5	0	0	15.5	170					12.9	10.3
04MAR	SERVICE	8.7	0	1800	0.0							15.1	215					14.2	10.1
04MAR	SHILOH	3.4	0	1800	0.0							15.7	239					18.1	10.0
04MAR	LAIRD	90.2	0	1200								14.9	1143					46.3	9.8
04MAR	GARDNER	79.5	0	1800	0.0							14.6	983					38.4	10.5
TR TOT.			41	15000	2.7	35	65	46.6	41	0	2								
SJR TOT.			0	3000	0.0														

2008 TUOLUMNE RIVER SEINING STUDY (TID/MID)

DATE	LOCATION	RIVER MILE	CATCH	AREA	DENSITY (/1000ft^2)	FL MIN.	FL MAX.	FL AVG.	NO. MEAS.	SACFRY	NO. KILLED	WATER TEMP.	ELEC. COND.	SMOLT FL	SECTION DENSITY UPPER	MIDDLE	LOWER	TURB.	D.O. (ppm)
18MAR	OLGB	50.5	0	1800	0.0							10.0	39		2.1	4.9	0.6	1.6	10.1
18MAR	R5	48.0	0	1600	0.0							10.1	44					1.2	11.4
18MAR	TRR	42.3	11	1800	6.1	41	53	48.1	11	0	0	12.3	59					2.5	11.4
18MAR	HICK	31.6	26	1650	15.8	39	80	55.0	26	0	0	13.6	79					4.7	11.1
18MAR	CHARLES	24.9	0	1650	0.0							14.4	126					4.6	11.4
18MAR	LEGION	17.2	2	2400	0.8	58	59	58.5	2	0	0	15.7	168					4.9	10.6
18MAR	SERVICE	8.7	0	1800	0.0							15.8	217					8.2	10.8
18MAR	SHILOH	3.4	2	1450	1.4	48	51	49.5	2	0	0	16.9	222					11.6	10.6
18MAR	LAIRD	90.2	0	1350	0.0							15.5	1479					36.0	11.4
18MAR	GARDNER	79.5	0	1500	0.0							15.6	1163					23.2	11.5
TR TOT.			41	14150	2.9	39	80	53.0	41	0	0								
SJR TOT.			0	2850	0.0														

Table 3 (Continued)

2008 TUOLUMNE RIVER SEINING STUDY (TID/MID)

DATE	LOCATION	RIVER MILE	CATCH	AREA	DENSITY (/1000ft^2)	FL MIN.	FL MAX.	FL AVG.	NO. MEAS.	SACFRY	NO. KILLED	WATER TEMP.	ELEC. COND.	SMOLT FL	SECTION DENSITY UPPER	MIDDLE	LOWER	TURB.	D.O. (ppm)
01APR	OLGB	50.5	0	2200	0.0							10.1	40		1.0	2.0	0.0	1.4	10.0
01APR	R5	48.0	0	1800	0.0							10.5	43					1.6	11.4
01APR	TRR	42.3	6	1800	3.3	42	47	44.2	6	0	0	13.3	59					5.2	11.0
01APR	HICK	31.6	8	1800	4.4	43	78	64.6	8	0	0	15.0	77	71,72,78				4.4	10.6
01APR	CHARLES	24.9	2	1500	1.3	59	84	71.5	2	0	0	16.1	124	84				9.3	10.9
01APR	LEGION	17.2	0	1800	0.0							17.2	153					3.5	10.6
01APR	SERVICE	8.7	0	1800	0.0							17.1	195					11.1	10.1
01APR	SHILOH	3.4	0	1800	0.0							17.8	210					10.3	9.4
01APR	LAIRD	90.2	0	1500	0.0							17.8	1571					22.6	12.6
01APR	GARDNER	79.5	0	1800	0.0							17.4	1105					18.5	11.8
TR TOT.			16	14500	1.1	42	84	57.8	16	0	0								
SJR TOT.			0	3300	0.0														

2008 TUOLUMNE RIVER SEINING STUDY (TID/MID)

DATE	LOCATION	RIVER MILE	CATCH	AREA	DENSITY (/1000ft^2)	FL MIN.	FL MAX.	FL AVG.	NO. MEAS.	SACFRY	NO. KILLED	WATER TEMP.	ELEC. COND.	SMOLT FL	SECTION DENSITY UPPER	MIDDLE	LOWER	TURB.	D.O. (ppm)
15APR	OLGB	50.5	0	1800	0.0							10.3	40		0.6	1.9	0.3	1.3	9.9
15APR	R5	48.0	1	1800	0.6	35	35	35.0	1	0	0	10.6	42					1.2	11.1
15APR	TRR	42.3	2	1800	1.1	33	35	34.0	2	0	0	13.7	57					3.0	10.3
15APR	HICK	31.6	10	1800	5.6	67	80	75.2	10	0	0	16.2	71	10(67-80)				5.2	9.8
15APR	CHARLES	24.9	1	1500	0.7	63	63	63.0	1	0	0	19.2	114	63				4.2	9.9
15APR	LEGION	17.2	0	2400	0.0							18.5	134					4.0	9.4
15APR	SERVICE	8.7	1	1800	0.6	81	81	81.0	1	0	0	18.0	183	81				8.1	9.7
15APR	SHILOH	3.4	0	1800	0.0							18.5	204					7.0	9.7
15APR	LAIRD	90.2	0	1150	0.0							19.1	1468					30.0	13.5
15APR	GARDNER	79.5	0	1800	0.0							18.2	952					17.3	13.0
TR TOT.			15	14700	1.0	33	81	66.6	15	0	0								
SJR TOT.			0	2950	0.0														

2008 TUOLUMNE RIVER SEINING STUDY (TID/MID)

DATE	LOCATION	RIVER MILE	CATCH	AREA	DENSITY (/1000ft^2)	FL MIN.	FL MAX.	FL AVG.	NO. MEAS.	SACFRY	NO. KILLED	WATER TEMP.	ELEC. COND.	SMOLT FL	SECTION DENSITY UPPER	MIDDLE	LOWER	TURB.	D.O. (ppm)
29APR	OLGB	50.5	3	1500	2.0	34	35	34.3	3	0	0	10.6	39		0.8	0.2	0.0	1.0	11.3
29APR	R5	48.0	1	1800	0.6	54	54	54.0	1	0	0	10.8	39					1.3	11.6
29APR	TRR	42.3	0	1800	0.0							11.1	42					1.3	11.1
29APR	HICK	31.6	0	1200	0.0							12.9	46					3.1	11.1
29APR	CHARLES	24.9	0	1050	0.0							14.9	53					3.8	11.0
29APR	LEGION	17.2	1	1800	0.6	85	85	85.0	1	0	0	15.8	56	85				3.8	10.2
29APR	SERVICE	8.7	0	1800	0.0							16.5	70					6.2	9.7
29APR	SHILOH	3.4	0	1650	0.0							17.3	68					8.0	9.8
29APR	LAIRD	90.2	Not sampled		#VALUE!														
29APR	GARDNER	79.5	0	1800	0.0							18.4	341					26.7	10.3
TR TOT.			5	12600	0.4	34	85	48.4	5	0	0								
SJR TOT.			0	1800	0.0														

2008 TUOLUMNE RIVER SEINING STUDY (TID/MID)

DATE	LOCATION	RIVER MILE	CATCH	AREA	DENSITY (/1000ft^2)	FL MIN.	FL MAX.	FL AVG.	NO. MEAS.	SACFRY	NO. KILLED	WATER TEMP.	ELEC. COND.	SMOLT FL	SECTION DENSITY UPPER	MIDDLE	LOWER	TURB.	D.O. (ppm)
13MAY	OLGB	50.5	0	1500	0.0							10.9	37		0.0	0.2	0.0	0.8	11.9
13MAY	R5	48.0	0	1800	0.0							11.0	38					1.2	12.5
13MAY	TRR	42.3	0	1800	0.0							11.3	42					2.3	11.4
13MAY	HICK	31.6	1	1300	0.8	73	73	73.0	1	0	0	13.3	46	73				2.2	11.0
13MAY	CHARLES	24.9	0	1300	0.0							15.0	60					2.4	11.0
13MAY	LEGION	17.2	0	1950	0.0							15.9	63					2.4	10.6
13MAY	SERVICE	8.7	0	1650	0.0							16.5	83					6.1	9.8
13MAY	SHILOH	3.4	0	1800	0.0							17.4	79					6.5	9.5
13MAY	LAIRD	90.2	0	1200	0.0							18.9	559					38.3	10.6
13MAY	GARDNER	79.5	0	1800	0.0							18.4	367					25.1	10.8
TR TOT.			1	13100	0.1	73	73	73.0	1	0	0								
SJR TOT.			0	3000	0.0														

2008 TUOLUMNE RIVER SEINING STUDY (TID/MID)

DATE	LOCATION	RIVER MILE	CATCH	AREA	DENSITY (/1000ft^2)	FL MIN.	FL MAX.	FL AVG.	NO. MEAS.	SACFRY	NO. KILLED	WATER TEMP.	ELEC. COND.	SMOLT FL	SECTION DENSITY UPPER	MIDDLE	LOWER	TURB.	D.O. (ppm)
27MAY	OLGB	50.5	0	1800	0.0				0			11.0	37		0.7	0.2	0.0	1.2	10.3
27MAY	R5	48.0	4	1800	2.2	36	39	36.8	4	0	0	11.9	30					1.0	11.2
27MAY	TRR	42.3	0	1800	0.0				0			15.4	50					1.7	10.4
27MAY	HICK	31.6	1	1800	0.6	85	85	85.0	1	0	0	17.3	65	85				2.1	9.8
27MAY	CHARLES	24.9	0	1800	0.0				0			18.2	116					4.2	9.4
27MAY	LEGION	17.2	0	1800	0.0				0			18.8	146					2.5	9.5
27MAY	SERVICE	8.7	0	1800	0.0				0			18.6	190					4.8	8.5
27MAY	SHILOH	3.4	0	1800	0.0				0			19.4	199					4.8	8.2
27MAY	LAIRD	90.2	0	1500	0.0				0			19.4	1186					30.3	12.5
27MAY	GARDNER	79.5	0	1800	0.0				0			19.8	840					21.7	12.8
TR TOT.			5	14400	0.3	36	85	46.4	2	0	0								
SJR TOT.			0	3300	0.0														

Table 4. 2008 OTHER SPECIES SAMPLED DURING SEINING STUDIES ON JUVENILE SALMON

2008 OTHER SPECIES SAMPLED DURING SEINING STUDIES ON JUVENILE SALMON

OTHER SPECIES SAMPLED (ACTUAL COUNTS OR ESTIMATED ABUNDANCE)

DATE	SITE	LOCATION	MILE	LP	TFS	RT	CP	GF	GSH	SBF	HH	HCH	PM	ST	PRS	FHM	SKR	WCF	GAM	ISS	SB	WCR	GSF	BG	LMB	SMB	BLP	TP	RSCP	RSF	CCF	CENT
22JAN	1	OLGB	50.5														2															
22JAN	2	R5	48.0								2		18				10												2			
22JAN	3	TRR	42.3								40																					
22JAN	4	HICK	31.6																													
22JAN	5	CHARLES	24.9																													
22JAN	6	LEGION	17.2																													
22JAN	7	SERVICE	8.7												2																	
22JAN	8	SHILOH	3.4												30					1												
22JAN	9	LAIRD	90.2												6																	
22JAN	10	GARDNER	77.8												10					3												

DATE	SITE	LOCATION	MILE	LP	TFS	RT	CP	GF	GSH	SBF	HH	HCH	PM	ST	PRS	FHM	SKR	WCF	GAM	ISS	SB	WCR	GSF	BG	LMB	SMB	BLP	TP	RSCP	RSF	CCF	CENT
05FEB	1	OLGB	50.5																													
05FEB	2	R5	48.0								1						1															
05FEB	3	TRR	42.3								10		10																			
05FEB	4	HICK	31.6										1																1			
05FEB	5	CHARLES	24.9																5													
05FEB	6	LEGION	17.2																													
05FEB	7	SERVICE	8.7						1						4				1	10				1	1							
05FEB	8	SHILOH	3.4												10					4												
05FEB	9	LAIRD	90.2												200					30												
05FEB	10	GARDNER	77.8												5					2												

DATE	SITE	LOCATION	MILE	LP	TFS	RT	CP	GF	GSH	SBF	HH	HCH	PM	ST	PRS	FHM	SKR	WCF	GAM	ISS	SB	WCR	GSF	BG	LMB	SMB	BLP	TP	RSCP	RSF	CCF	CENT
19FEB	1	OLGB	50.5																													
19FEB	2	R5	48.0																													
19FEB	3	TRR	42.3								20		20																			
19FEB	4	HICK	31.6																													
19FEB	5	CHARLES	24.9																2					3								
19FEB	6	LEGION	17.2																1											1		
19FEB	7	SERVICE	8.7																													
19FEB	8	SHILOH	3.4												20																	
19FEB	9	LAIRD	90.2				1								200																	
19FEB	10	GARDNER	77.8												2					2				1								

DATE	SITE	LOCATION	MILE	LP	TFS	RT	CP	GF	GSH	SBF	HH	HCH	PM	ST	PRS	FHM	SKR	WCF	GAM	ISS	SB	WCR	GSF	BG	LMB	SMB	BLP	TP	RSCP	RSF	CCF	CENT
04MAR	1	OLGB	50.5														4															
04MAR	2	R5	48.0																													
04MAR	3	TRR	42.3								15						1															
04MAR	4	HICK	31.6																													
04MAR	5	CHARLES	24.9										1						2					5	1							
04MAR	6	LEGION	17.2																	1				1	1	1	1			1		
04MAR	7	SERVICE	8.7														3			5												
04MAR	8	SHILOH	3.4												1																	
04MAR	9	LAIRD	90.2												200					5					1							
04MAR	10	GARDNER	77.8												50					5												

DATE	SITE	LOCATION	MILE	LP	TFS	RT	CP	GF	GSH	SBF	HH	HCH	PM	ST	PRS	FHM	SKR	WCF	GAM	ISS	SB	WCR	GSF	BG	LMB	SMB	BLP	TP	RSCP	RSF	CCF	CENT
18MAR	1	OLGB	50.5																													
18MAR	2	R5	48.0														1															
18MAR	3	TRR	42.3																													
18MAR	4	HICK	31.6																													
18MAR	5	CHARLES	24.9																6													
18MAR	6	LEGION	17.2																1					2						3		
18MAR	7	SERVICE	8.7																	1												
18MAR	8	SHILOH	3.4												8																	
18MAR	9	LAIRD	90.2												80					2					1							
18MAR	10	GARDNER	77.8												15																	

Table 4. 2008 Other Species sampled (continued)

DATE	SITE	LOCATION	MILE	LP	TFS	RT	CP	GF	GSH	SBF	HH	HCH	PM	ST	PRS	FHM	SKR	WCF	GAM	ISS	SB	WCR	GSF	BG	LMB	SMB	BLP	TP	RSCP	RSF	CCF	CENT
01APR	1	OLGB	50.5														1															
01APR	2	R5	48.0																													
01APR	3	TRR	42.3								3								1										1			
01APR	4	HICK	31.6																													
01APR	5	CHARLES	24.9																5													
01APR	6	LEGION	17.2																					3	4					1		
01APR	7	SERVICE	8.7																													
01APR	8	SHILOH	3.4																					1								
01APR	9	LAIRD	90.2												100					20					1							
01APR	10	GARDNER	77.8										2		200					5												

DATE	SITE	LOCATION	MILE	LP	TFS	RT	CP	GF	GSH	SBF	HH	HCH	PM	ST	PRS	FHM	SKR	WCF	GAM	ISS	SB	WCR	GSF	BG	LMB	SMB	BLP	TP	RSCP	RSF	CCF	CENT
15APR	1	OLGB	50.5																													
15APR	2	R5	48.0																													
15APR	3	TRR	42.3								20		10																2			
15APR	4	HICK	31.6																													
15APR	5	CHARLES	24.9								1								3					2								
15APR	6	LEGION	17.2																					3						1		
15APR	7	SERVICE	8.7														YOY															
15APR	8	SHILOH	3.4												10					2					2		1					
15APR	9	LAIRD	90.2												100					1												
15APR	10	GARDNER	77.8												50					30												

DATE	SITE	LOCATION	MILE	LP	TFS	RT	CP	GF	GSH	SBF	HH	HCH	PM	ST	PRS	FHM	SKR	WCF	GAM	ISS	SB	WCR	GSF	BG	LMB	SMB	BLP	TP	RSCP	RSF	CCF	CENT
29APR	1	OLGB	50.5			3											2															
29APR	2	R5	48.0														8		1													
29APR	3	TRR	42.3																													
29APR	4	HICK	31.6														YOY															
29APR	5	CHARLES	24.9										1																			
29APR	6	LEGION	17.2														YOY															
29APR	7	SERVICE	8.7														YOY		3	1												
29APR	8	SHILOH	3.4												3		YOY								1					2		
29APR	9	LAIRD	90.2																													
29APR	10	GARDNER	77.8												100		YOY			6												

DATE	SITE	LOCATION	MILE	LP	TFS	RT	CP	GF	GSH	SBF	HH	HCH	PM	ST	PRS	FHM	SKR	WCF	GAM	ISS	SB	WCR	GSF	BG	LMB	SMB	BLP	TP	RSCP	RSF	CCF	CENT
13MAY	1	OLGB	50.5			1																										
13MAY	2	R5	48.0														2															
13MAY	3	TRR	42.3								7																					
13MAY	4	HICK	31.6														1															
13MAY	5	CHARLES	24.9																2					2								
13MAY	6	LEGION	17.2														YOY								1							
13MAY	7	SERVICE	8.7														YOY		5	2												
13MAY	8	SHILOH	3.4																2	10				1								
13MAY	9	LAIRD	90.2												200																	
13MAY	10	GARDNER	77.8												60					3					2			1				

DATE	SITE	LOCATION	MILE	LP	TFS	RT	CP	GF	GSH	SBF	HH	HCH	PM	ST	PRS	FHM	SKR	WCF	GAM	ISS	SB	WCR	GSF	BG	LMB	SMB	BLP	TP	RSCP	RSF	CCF	CENT
27MAY	1	OLGB	50.5																													
27MAY	2	R5	48.0														YOY															
27MAY	3	TRR	42.3																										1			
27MAY	4	HICK	31.6										5																			
27MAY	5	CHARLES	24.9																					2		1						
27MAY	6	LEGION	17.2																													
27MAY	7	SERVICE	8.7														YOY		6													
27MAY	8	SHILOH	3.4														YOY							2	1						4	
27MAY	9	LAIRD	90.2												60					1												
27MAY	10	GARDNER	77.8												50					4				3	1							

Table 4. KEY TO OTHER SPECIES SAMPLED AND DISTRIBUTION
(List includes all species caught during 1986-2008 seining studies)

FAMILY	COMMON NAME	NATIVE SPECIES	ABBREV.	SAN JOAQUIN	TUOL.
Petromyzontidae	Pacific lamprey	N	LP		
Clupeidae	threadfin shad		TFS		
Salmonidae	Chinook salmon	N	CS		X
Salmonidae	rainbow trout	N	RT		X
Cyprinidae	carp		CP	X	
Cyprinidae	goldfish		GF		
Cyprinidae	golden shiner		GSH		X
Cyprinidae	Sacramento blackfish	N	SBF		
Cyprinidae	hitch	N	HCH		
Cyprinidae	hardhead	N	HH		X
Cyprinidae	Sacramento pikeminnow	N	PM	X	X
Cyprinidae	Sacramento splittail	N	ST		
Cyprinidae	red shiner		PRS	X	X
Cyprinidae	fathead minnow		FHM		
Catostomidae	Sacramento sucker	N	SKR	X	X
Ictaluridae	channel catfish		CCF		
Ictaluridae	white catfish		WCF		
Ictaluridae	brown bullhead		BBH		
Poeciliidae	western mosquitofish		GAM		X
Atherinidae	inland silverside		ISS	X	X
Percichthyidae	striped bass		SB		
Centrarchidae	white/black crappie		WCR/BCR		
Centrarchidae	warmouth		WM		
Centrarchidae	green sunfish		GSF		
Centrarchidae	bluegill		BG	X	X
Centrarchidae	redear sunfish		RSF		X
Centrarchidae	largemouth bass		LMB	X	X
Centrarchidae	smallmouth bass		SMB		X
Percidae	bigscale logperch		BLP		X
Embiotocidae	tule perch	N	TP	X	
Cottidae	prickly sculpin	N	PSCP		
Cottidae	riffle sculpin	N	RSCP		X
TOTAL:	32			8	15

2008 species presence designated with 'X'

Table 5. Tuolumne River Seining Summary

Tuolumne River Seining Study Summary (Tuolumne, San Joaquin and Stanislaus Rivers)

	TUOLUMNE RIVER					SAN JOAQUIN			STANISLAUS				
Sampling Year	Sampling Periods	Salmon Captured	Sites Sampled	Average Density	Growth Rate Index (mm/day)	Salmon Captured	Sites Sampled	Average Density	Salmon Captured	Sites Sampled	Average Density	Start Date	End Date
1986	18	5514	8	20.7	0.45	854	3	14.2	---	---		22JAN	27JUN
1987	21	14825	11	22.4	0.45	734	6	1.9	---	---		05JAN	04JUN
1988	14	6134	11	14.3	0.58	295	4	2.1	84	1	2.9	05JAN	17MAY
1989	13	10043	11	27.0	0.64	83	3	0.6	1206	1	45.4	05JAN	12MAY
1990	14	2286	11	6.0	0.57	48	3	0.5	---	---		04JAN	11MAY
1991	8	120	11	0.5	No estimate	0	3	0	3	1	0.2	15JAN	24MAY
1992	5	144	7	1.2	No estimate	0	3	0	54	1	3.9	27JAN	13MAY
1993	7	124	8	0.8	0.68	0	3	0	6	1	0.3	26JAN	12MAY
1994	7	2068	5	21.6	0.65	2	2	0	---	---		25JAN	20MAY
1995	8	512	5	6.1	0.79	43	2	1.1	---	---		09FEB	12JUL
1996	8	785	6	7.6	0.66	7	2*	0.2	---	---		17JAN	13JUN
1997	10	379	7	2.7	0.48	11	2*	0.4	---	---		14JAN	28MAY
1998	10	1950	7	14.4	0.46	99	2	2.5	---	---		14JAN	21MAY
1999	10	3443	8	24.6	0.54	560	2	13.6	---	---		14JAN	19MAY
2000	10	3213	8	27.0	0.46	19	2	0.6	---	---		11JAN	17MAY
2001	11	5567	8	41.3	0.67	83	2	2.6	---	---		09JAN	30MAY
2002	10	3486	8	25.6	0.64	0	2	0	---	---		15JAN	21MAY
2003	10	5983	8	39.3	0.68	1	2	0	---	---		21JAN	28MAY
2004	11	3280	8	19.3	0.55	0	2	0	---	---		20JAN	25MAY
2005	10	1341	8	8.9	0.53	8	2*	0.2	---	---		19JAN	25MAY
2006	11	1558	8	10.2	0.79	39	2	1.2	---	---		20JAN	15JUN
2007	10	204	8	1.5	0.58	0	2	0	---	---		17JAN	23MAY
2008	10	198	8	1.4	0.66	0	2	0	---	---		22JAN	27MAY

--- Not Sampled

*All San Joaquin River locations were not always sampled

Table 6. Summary table of locations sampled, 1986-2008

1986 TO 2008 SEINING LOCATIONS

TUOLUMNE RIVER

Site	Location	River Mile	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	Old La Grange Bridge	50.5	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X
2	Riffle 4B	48.4	X	X	X	X	X	X				X	X	X	X								X		
3	Riffle 5	47.9		X	X	X	X	X	X	X	X					X	X	X	X	X	X	X		X	X
4	Tuolumne River Resort	42.4			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	Turlock Lake State Rec. Area	42.0	X	X																					
6	Reed Gravel	34.0	X	X	X	X	X	X																	
7	Hickman Bridge	31.6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	Charles Road	24.9		X	X	X	X	X	X	X				X	X	X	X	X	X	X	X	X	X	X	X
9	Legion Park	17.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	RDP / Service Rd. / Venn	12.3 - 7.4		X	X	X	X	X								X	X	X	X	X	X	X	X	X	X
11	McCleskey Ranch	6.0	X	X	X	X	X	X	X	X	X														
12	Shiloh Bridge	3.4	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X

SAN JOAQUIN RIVER

Site	Location	River Mile	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
13	Laird Park	90.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14	Gardner Cove	77.8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
15	Maze Road	76.6	X	X	X																				
16	Sturgeon Bend	74.3		X	X																				
17	Durham Ferry Park	71.3	X	X	X	X	X	X	X	X															
18	Old River	53.7		X																					

STANISLAUS RIVER

Site	Location	River Mile	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
19	Caswell State Park	8.5			X	X		X	X	X															

DRY CREEK

Site	Location	River Mile	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
20	Beard Brook Park	0.5							X	X															

In 1987 additional sites on the Tuolumne, San Joaquin, Merced and Stanislaus Rivers were sampled occasionally (1987 annual report).

Table 7. Tuolumne River analysis of female spawners to fry density.

TUOL.R. FALL-RUN	TOTAL FEMALE SPAWNERS		JUVENILE SEINING PEAK FRY DENSITY	AVERAGE FRY DENSITY 15JAN-15MAR
1985	22600	1986	158.8	59.5
1986	3800	1987	69.3	46.2
1987	4600	1988	70.2	33.9
1988	4100	1989	115.1	39.7
1989	680	1990	11.4	5.0
1990	28	1991	1.3	0.5
1991	28	1992	6.1	2.9
1992	55	1993	1.7	0.9
1993	237	1994	79.5	41.5
1994	249	1995	12.5	9.8
1995	522	1996	16.1	13.0
1996	1142	1997	2.8	2.1
1997	4224	1998	49.3	24.6
1998	4527	1999	78.0	39.3
1999	3535	2000	78.8	48.0
2000	11260	2001	126.3	85.6
2001	4970	2002	92.8	41.5
2002	3876	2003	164.3	68.8
2003	1768	2004	38.8	27.2
2004	1004	2005	20.5	14.6
2005	478	2006	28.7	12.7
2006	282	2007	3.7	2.2
2007	80	2008	2.4	1.7