UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

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

2007 LOWER TUOLUMNE RIVER ANNUAL REPORT

Report 2007-3

2007 Seine/Snorkel Report and Summary Update

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and

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EXECUTIVE SUMMARY

The 2007 seining survey was conducted at two-week intervals from 17 January to 23 May for a total of 10 sample periods. This was the 22nd consecutive annual seining study on the Tuolumne River conducted by the Turlock and Modesto Irrigation Districts.

A total of 204 natural Chinook salmon were caught in the Tuolumne River and 0 in the San Joaquin River. This was the 4th lowest number of salmon caught during the 1986-2007 period and no salmon were captured downstream of the Charles Rd. location (RM 24.9). Peak density of salmon caught in the Tuolumne was 5.9 salmon per 1,000 square feet on 28 February. Maximum fork length (FL) in the Tuolumne River increased from 48 mm FL to 105 mm FL from 14 February to 23 May and minimum FL was 32 mm.

Flows during the sampling period ranged from about 300 to 900 cubic feet per second (cfs) in the Tuolumne River at La Grange and from about 1,650 to 3,800 cfs in the San Joaquin River at Vernalis. Flows in 2007 were relatively low due to below average precipitation.

Water temperature in the Tuolumne ranged from 8.0°C to 22.5°C and in the San Joaquin from 7.3°C to 22.8°C. Conductivity in the Tuolumne River ranged from 29 to 169 μS and in the San Joaquin from 517 to 1,386 μS.

A comparative review of fork length and salmon density for the 2002-2007 period is included. Increase in average fork length in 2007 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.

Density of fry (≤ 50 mm) peaked on 28 February, generally later in timing than most years of the 2002-2007 period. The density of juveniles (> 50 mm) also peaked on 28 February, which was much earlier in timing to other years in the period. In 2007, the average density of salmon in the Tuolumne River was 1.5 salmon per 1,000 ft^2.

An early summer snorkel survey was conducted on 26-27 June and 03 July, within a 20-mile section below La Grange Dam. Preliminary USGS flow at La Grange was about 116 cfs and water temperature ranged from 12.2°C to 26.2°C. Sixty-seven Chinook salmon and 343 rainbow trout were observed. Other species observed were Sacramento sucker, Sacramento pikeminnow, hardhead, riffle sculpin, largemouth bass, smallmouth bass and white catfish. A late-summer survey was conducted on 18-20 September at a flow of about 87 cfs and water temperatures ranged from 12.8°C to 20.8°C. No Chinook salmon and 198 rainbow trout were observed.

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1 INTRODUCTION

Stillwater Sciences with assistance from FISHBIO conducted seine and snorkel fishery monitoring in the Tuolumne and San Joaquin Rivers in 2007 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 2007 were the progeny of the 2006 fall spawning run, estimated at about 625 fish. This was the 22nd consecutive annual TID/MID seining study and a summary of salmonid data since 1986 is contained in this report.

Tuolumne River snorkel surveys began in 1982 with the number, location, and area sampled by site having varied over the years. Summer surveys occurring within the June to September period have been conducted in most years since 1988, although very wet years with high summer flows, such as 1995 and 1998, were not sampled. Locations were selected to include a range of habitat types (i.e., riffles, runs, pools) at sites where salmonids may occur and are spaced at intervals down the river in general areas of suitable access. The overall river section examined is limited to the reach with suitable underwater visibility, this generally being in the 20-mile section from La Grange Dam downstream to near Waterford.

A June or July snorkel survey had been done since 1996 to evaluate the abundance, size, and distribution of salmonids and other fish species - 12 sites per survey have been done since 2001. High flow conditions in 2005 and 2006 precluded a comparable early summer snorkel survey, but the June survey was conducted in 2007. The September snorkel survey, done annually since 2001, was conducted on 18-20 September 2007. A comparison of the salmonids observed in the 2001-2007 period is included.

1.1 STUDY SITES

1.1.1 Seine

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	Riverdale Park	12.3
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.

1.1.2 Snorkel

The two snorkel surveys were conducted in a 20-mile reach from Riffle A7 (RM 50.7) downstream to Riffle 57 (RM 31.5) below Hickman Bridge near Waterford.

1.2 2007 TUOLUMNE AND SAN JOAQUIN RIVER SAMPLING CONDITIONS

1.2.1 Seine

Flows in the Tuolumne River below La Grange Dam were approximately 350 cfs in January when the surveys began. Flows began increasing on 20 April during the spring pulse flow period (Fig. 2). During the next month there two pulse flow of about 900 and 600 cfs. In late May flows began to decrease to about 125 cfs by early June.

Flows in the San Joaquin River at Vernalis (RM 72.5) ranged from 1,650-3,800 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 8.0 °C (46.4 °F) at RDP on 17 January, and the maximum temperature was 22.5 °C (72.5 °F) at Shiloh Road on 09 May (Fig. 3). The lowest San Joaquin River water temperature, 7.3 °C (45.1 °F) was at Gardner Cove on 17 January; the highest was 22.8 °C (73.0°F) at Laird Park on 09 May.

1.2.2 Snorkel

The flow at La Grange during the snorkel survey in June was about 116 cfs. Water temperature ranged from 12.2 °C (54.0 °F) at Riffle A7 on 26 June to 26.2 °C (79.2 °F) at Riffle 57 on 03 July. Flow at La Grange during the September surveys was about 87 cfs and water temperature ranged from 12.8°C at Riffle A7 to 20.8°C at Riffle 57.

2 METHODS

2.1 STUDY TIMING

The 2007 seining study began on 17 January and ended on 23 May. Sampling was done at about two-week intervals, with a total of 10 sampling dates. The snorkel survey was conducted 19-21 June.

2.2 SAMPLING METHODS AND DATA RECORDING

2.2.1 Seine

Seining was done using 6-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.

2.2.2 Snorkel

Underwater observations were conducted using an effort-based method where a snorkeler examined within a specified area for a given period of time and recorded the species, numbers, and size estimates of fish observed. A combination of different habitat types was observed, including riffles, runs, and pools. The overall river section examined is limited to the reach with suitable underwater visibility, this generally being a 20-mile section below La Grange Dam downstream to Waterford. The snorkeling method provided an index of species abundance.

Each habitat type sampled mostly involved one observer snorkeling a specified habitat area for a certain time period. Whenever feasible, the surveys were conducted moving upstream against the current - a side-to-side (zigzag) pattern was used as the width of the survey section required. Occasionally, two snorkelers moved upstream in tandem, with each person counting fish on their side of the center of the survey section. Whenever possible, the entire width of the habitat section selected was carefully surveyed. The only exceptions were the habitat areas that were too wide to effectively cover. If high water velocity precluded upstream movement, snorkelers

would float downstream with the current, remaining as motionless as possible through the study area, although stream margins at those sites would still be viewed in an upstream direction.

Usually the total length of an observed fish was estimated using a ruler outlined on the diving slate to the nearest 10 mm. For some larger fish, the lengths may be estimated by viewing the fish in reference to adjacent objects and then measuring that estimated length. In cases where larger numbers of fish are observed, the observer estimated the length range and number of fish in the group. Care was taken to observe and count each fish just once in the survey area.

Other data recorded for each location included water temperature, electrical conductivity, turbidity, and horizontal visibility. Site-specific data that was recorded included area sampled, average depth, sample time, general habitat type, and substrate type.

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 204 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 5.9 salmon per 1,000 ft^2 on 28 February.

3.1.1 Density of Fry and Juvenile Salmon

Salmon up to 50 mm fork length (FL) were caught in the Tuolumne River on 17 January in the first sampling period. The highest density of salmon fry in the Tuolumne was 3.7 fry/1,000 ft^2 found on 28 February (Table 2). The highest density of juvenile salmon in the Tuolumne was 2.2 juveniles/1,000 ft^2 also found on 28 February.

The density of salmon fry exhibited a peak for most sites from 17 January to 28 February. The density of juveniles generally peaked from 28 February to 11 April for most locations (Fig. 4).

The density of salmon fry in the Tuolumne River peaked in the upper section on 17 January and in the middle section on 28 February (Fig. 5). No salmon were captured in the lower section of the Tuolumne River. The density of juveniles peaked in the upper section on 11 April and in the middle section on 28 February. No salmon were caught in the San Joaquin River.

3.1.2 Size, Growth, and Smoltification

The fork length of salmon caught ranged from 32 mm to 105 mm. The average fork length (FL) of salmon generally increased from 14 February to 28 March (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 48 to 105 mm during the 14 February to 23 May period (Fig. 6), indicating a potential FL increase of approximately .58 mm per day (57 mm / 98 days).

Length frequency distributions by survey period are in Fig. 7 & 8. The change in FL by location generally shows an increase from late January to late May 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 late March. The first salmon exhibiting smolting characteristics was caught on 09 May. Fry were present through 25 April during the 2007 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 29 µS at Old La Grange Bridge to a high of 169 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 517 µS at Gardner Cove to a high of 1386 µS at Laird Park.

Turbidity in the Tuolumne River was less than 6.4 Nephelometric Turbidity Units (NTU) except for two readings at Riverdale Park and Shiloh Road on 28 February that were the result of storm runoff from Dry Creek. 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 8.0 at Gardner Cove to 47.7 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. Eleven species other than Chinook salmon were caught in the Tuolumne River and 5 other species in the San Joaquin River. Two of these species were common to both rivers and 14 species were caught overall. Twenty-two rainbow trout fry (21-50 mm FL) were caught in the Tuolumne River between 28 February to 23 May at R5 and TRR. The San Joaquin River had a much lower number of fish species than in recent years.

3.2 SNORKEL SURVEY

Survey conditions and fish observations from the snorkel survey conducted on 26-27 June and 03 July and 18-20 September are summarized in Table 5. The six native fish species observed were

characteristic of the lower elevation zone adjacent to the Sierra foothills; introduced species were largemouth bass, smallmouth bass, bluegill and white catfish.

During the early summer surveys, Chinook salmon were observed downstream to Riffle 5B (RM 47.9) and rainbow trout to Riffle 41A (RM 35.3). Other species seen were Sacramento sucker, Sacramento pikeminnow, hardhead, riffle sculpin, largemouth bass, smallmouth bass and white catfish. In September, no Chinook salmon were observed and rainbow trout were seen downstream to Riffle 31 (RM 38.1). The same other species observed in the early summer surveys were recorded except for no white catfish and the addition of bluegill.

4 COMPARATIVE REVIEW

4.1 SEINE: 1986-2007

Annual TID/MID Tuolumne River seining surveys began in 1986, with the number, location, and sampling frequency of sites having varied over time (Tables 6 & 7). The number of salmon captured in the Tuolumne has ranged from 120 (1991) to 14,825 (1987) - the total number of salmon captured in 2007 (204) is the fourth lowest for all years. In 2007, the average density of salmon in the river was 1.5 salmon per 1,000 ft^2 and was similar to densities found in 1992.

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 6). No salmon were captured in the San Joaquin River in five other years.

The comparative review of fork length and density is primarily for the 2002-2007 period in this report.

4.1.1 Size and Growth

Minimum FL found in 2007 remained low through late April (Fig. 11). In 2007, the increase in average FL during the January to March period was similar in timing and magnitude to the pattern observed in the 2002-2007 period (Fig. 12). Beginning in April the average FL was highly variable due to low numbers of salmon caught. Maximum FL in 2007 was on the low end from January to late April (Fig. 13). The estimated 2007 growth rate of .58 mm per day was about average for 1986-2007 (Table 6).

4.1.2 Fry and Juvenile Salmon Density

In 2007, the density of salmon fry (≤ 50 mm) in the Tuolumne River peaked on 28 February at the lowest level for the 2002-2007 period (Fig. 14).

The density of salmon juveniles (>50 mm) in 2007 peaked on 28 February 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 2002-2007 (Fig. 16). The 2007 densities peaked on 28 February 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 2007, the density of fry peaked in mid-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 2007, juvenile salmon density was low throughout the entire survey period and peaked on 11 April.

Middle section density of fry generally peaks from early February to mid-March similar timing to the upper section. In 2007, the density of fry peaked in late February. Middle section density of juveniles often peak from late February to late March. In 2007 juvenile density peaked in late February the same as the peak in fry density.

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 2002-2007 period. In 2007, no salmon fry were caught in the lower section as was the case with most other years. Peak density of juveniles ranged from late March (2003, 2004, 2006) to late April (2002, 2005) with no juveniles captured in 2007.

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 general, the abundance indices decline from the upper to lower sections. In 2007 the standardized section abundance indices was highest in the middle section that was due to a relatively large number of salmon caught at Hickman Bridge on 28 February (N=70).

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 1986-2007 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 2007. 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 1986-2007 period, 509 of which were caught in 1999. No salmon were caught at Gardner Cove in 2007.

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 .70 for the 1986-2007 period (Fig. 20, Table 8). A similar result with R-squared of .75 was found using average fry density from 15JAN-15MAR (Figure 21).

4.1.4 Other Fish Species

The number of fish species, other than Chinook salmon, caught during 1986-2007 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 2007. Eleven other species were caught, including 5 native species, in the Tuolumne; 5 fish species, including 1 native, were caught on the San Joaquin River in 2007 (Table 4). The number of species caught in the San Joaquin River was extremely low.

Of native species, rainbow trout, hardhead, Sacramento pikeminnow, and riffle sculpin were caught only in the Tuolumne River and Sacramento sucker were caught in both rivers. Native species recorded in prior years, but not caught in either river in 2007, were Pacific lamprey, Sacramento blackfish, hitch, Sacramento splittail, prickly sculpin and tule perch.

4.2 SNORKEL: 2001-2007

Annual Tuolumne River snorkel surveys under the 1995 Don Pedro Project FERC monitoring program began in 1996. The precursor to these surveys was the Districts'1988-1994 summer flow studies. This comparative review of 2001-2007 considers the total number and density of salmonids observed during the September surveys.

The locations sampled during the recent late season observations conducted in September were the same each year (Table 9). The total number of rainbow trout observed in September was 198 in 2007. September observations of rainbow trout were the second highest since the surveys began in 2001, exceeded only in 2006. Density indices of rainbow trout have been significantly higher since 2005 (Figure 22). Rainbow trout were observed downstream to Riffle 31 (RM 38.1) similar to the previous 2 years. Table 10 summarizes the locations and months surveyed for all snorkel surveys conducted during 2001-2007.

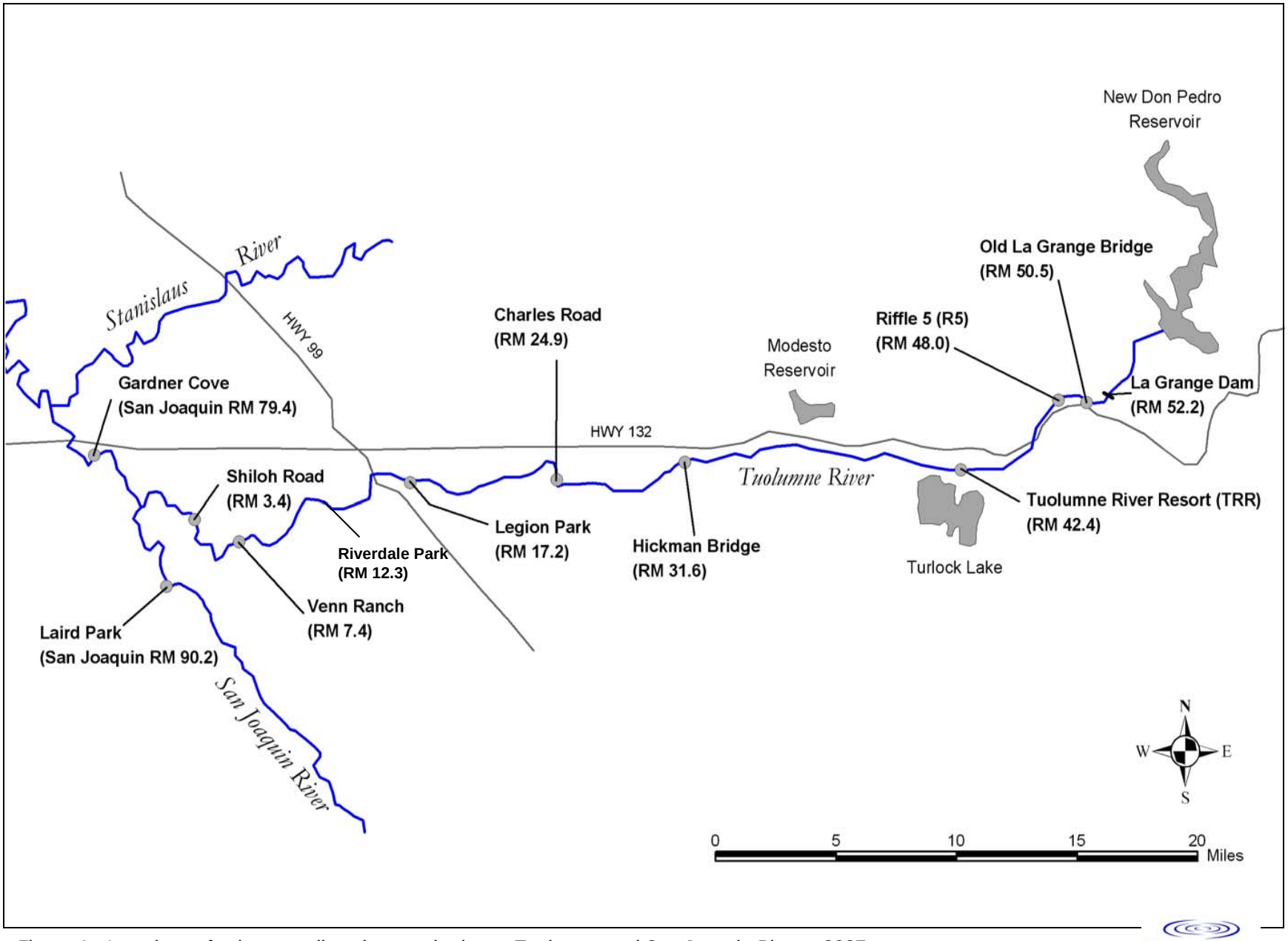

Figure 1. Locations of seine sampling sites on the lower Tuolumne and San Joaquin Rivers, 2007.

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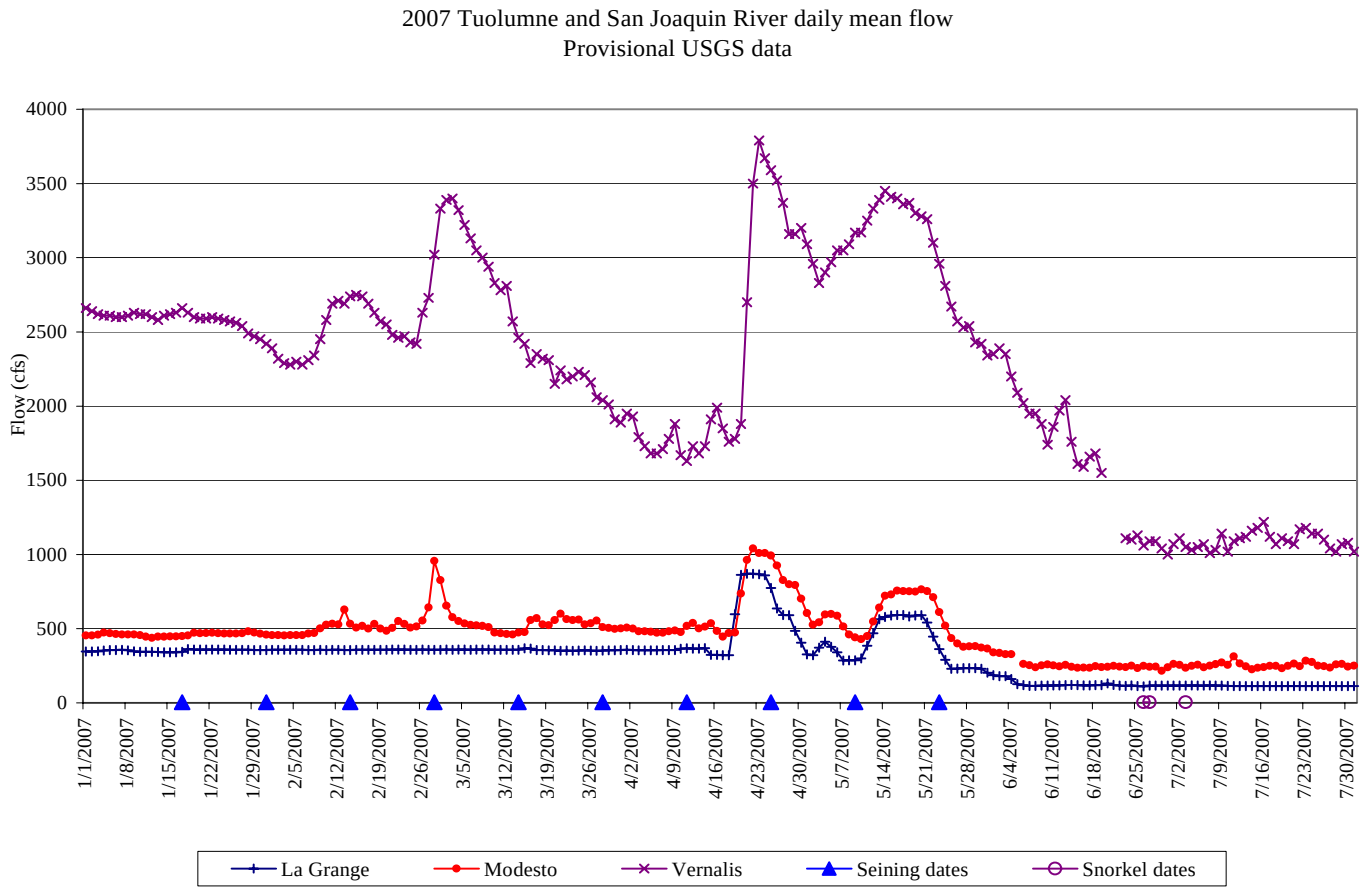


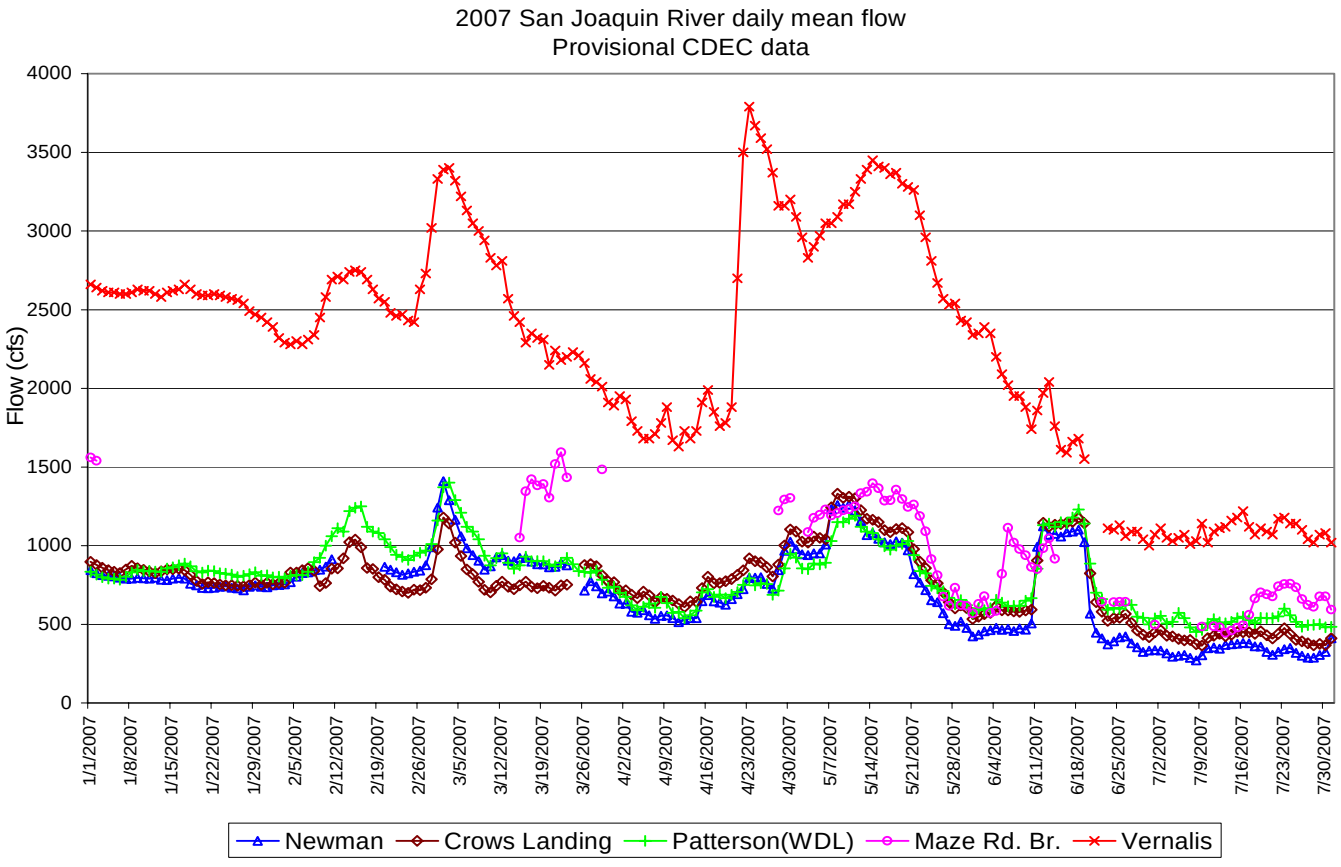


Figure 2. Tuolumne and San Joaquin River daily average flow.

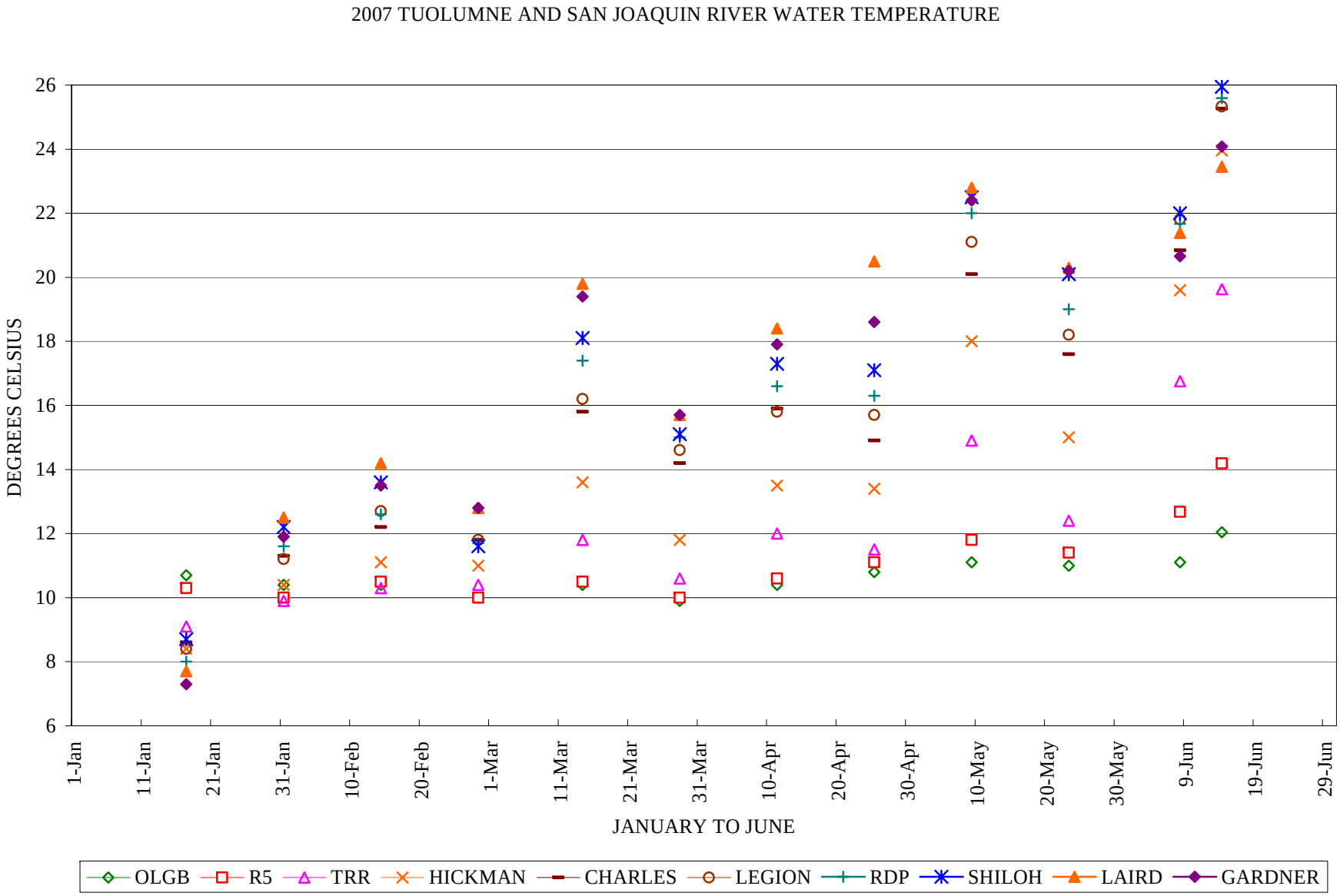


Figure 3. 2007 San Joaquin and Tuolumne River water temperature.

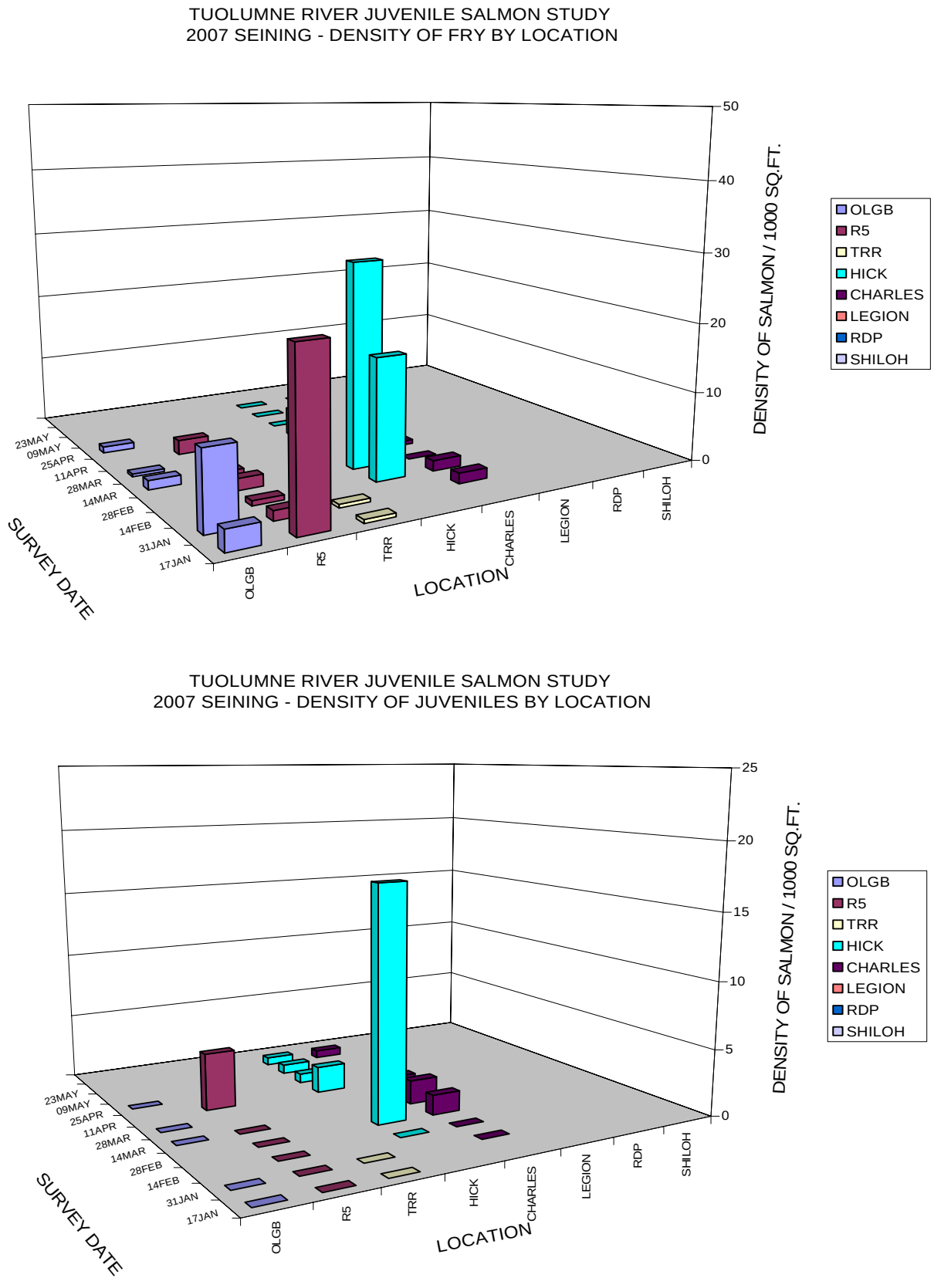


Figure 4. Tuolumne River density of fry and juvenile salmon by location.

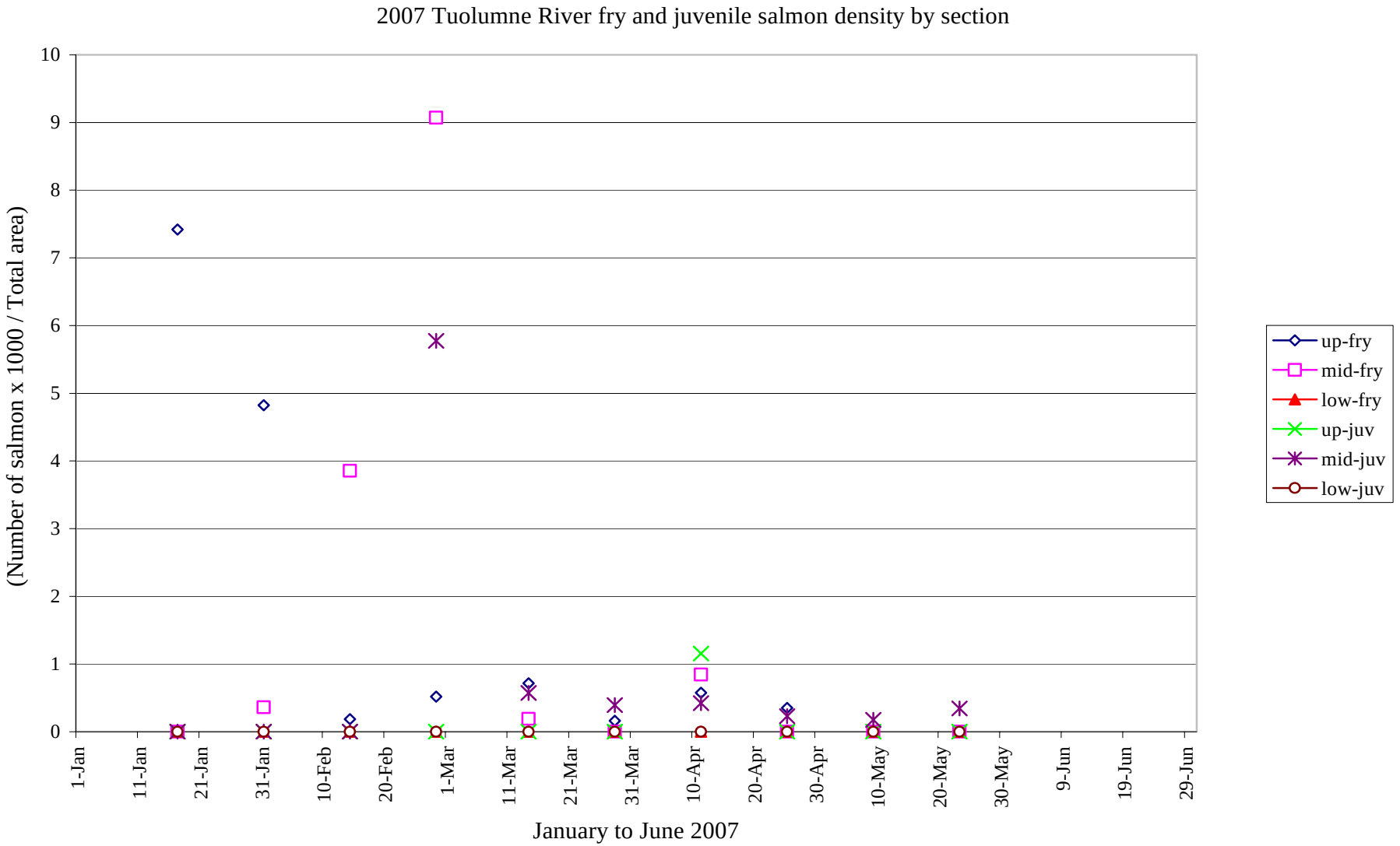


Figure 5. 2007 Tuolumne River fry and juvenile salmon density by section.

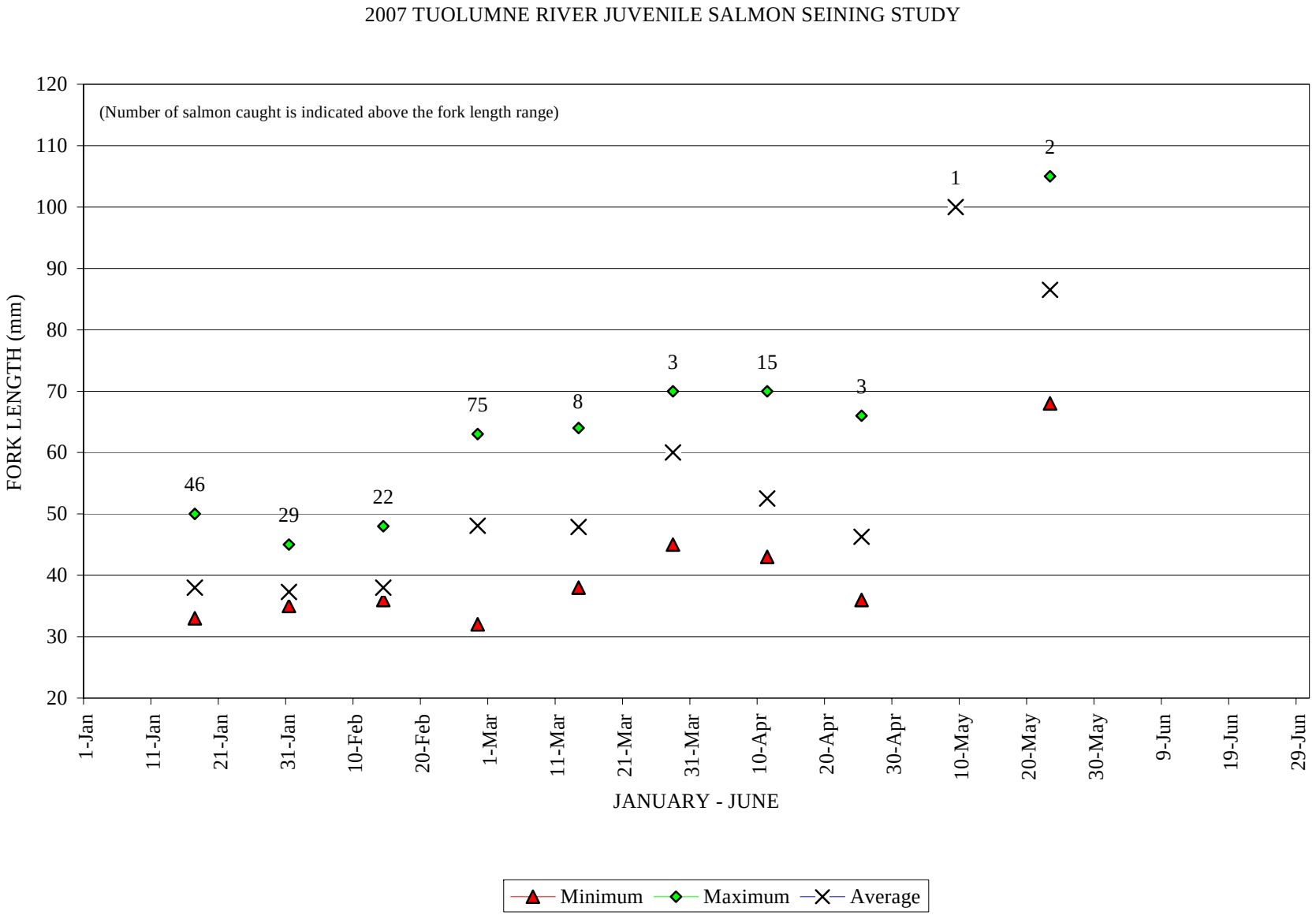


Figure 6. Fork length ranges of wild salmon in the Tuolumne River, 2007.

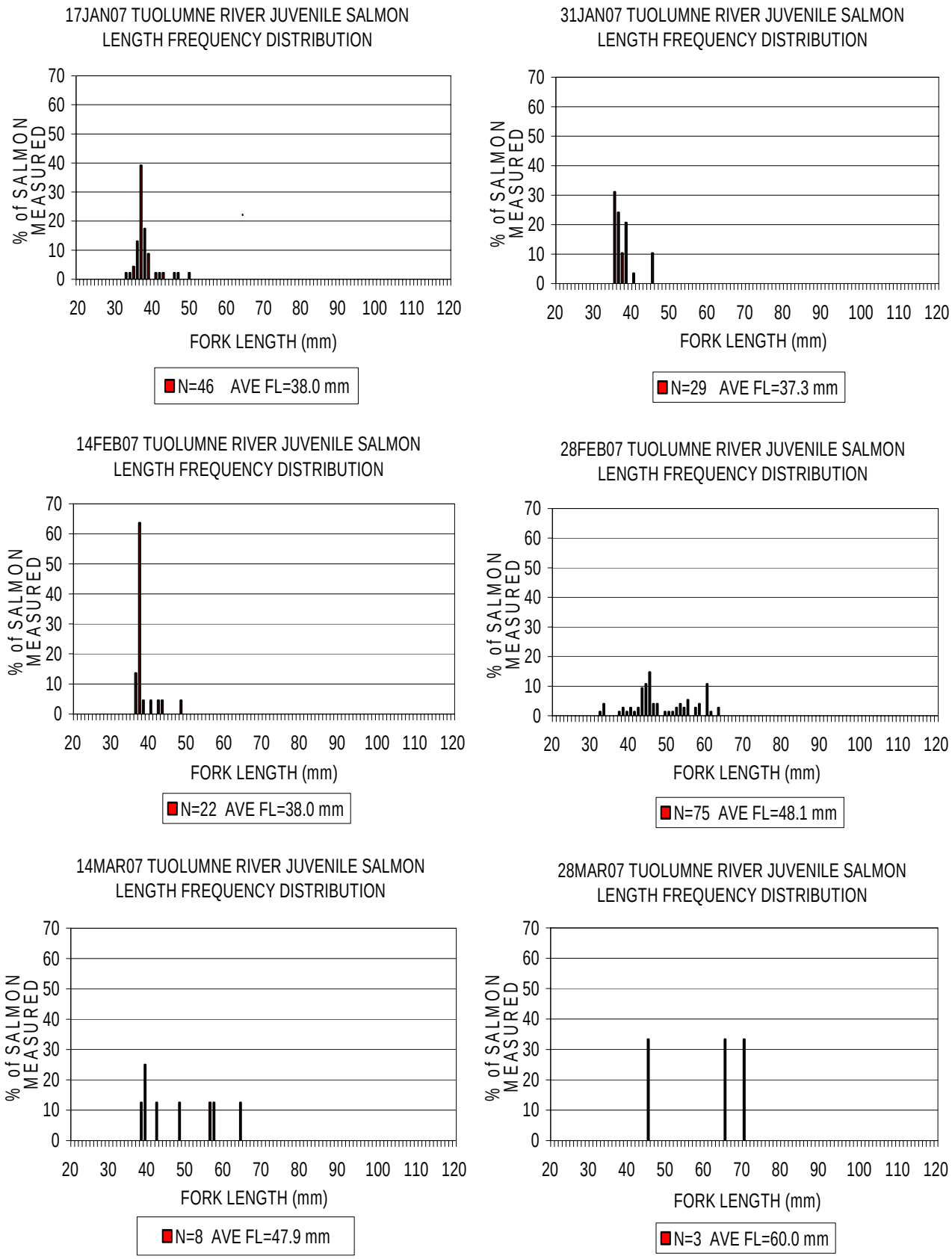


Figure 7. Length frequency distribution by date of salmon in the Tuolumne River, 2007.

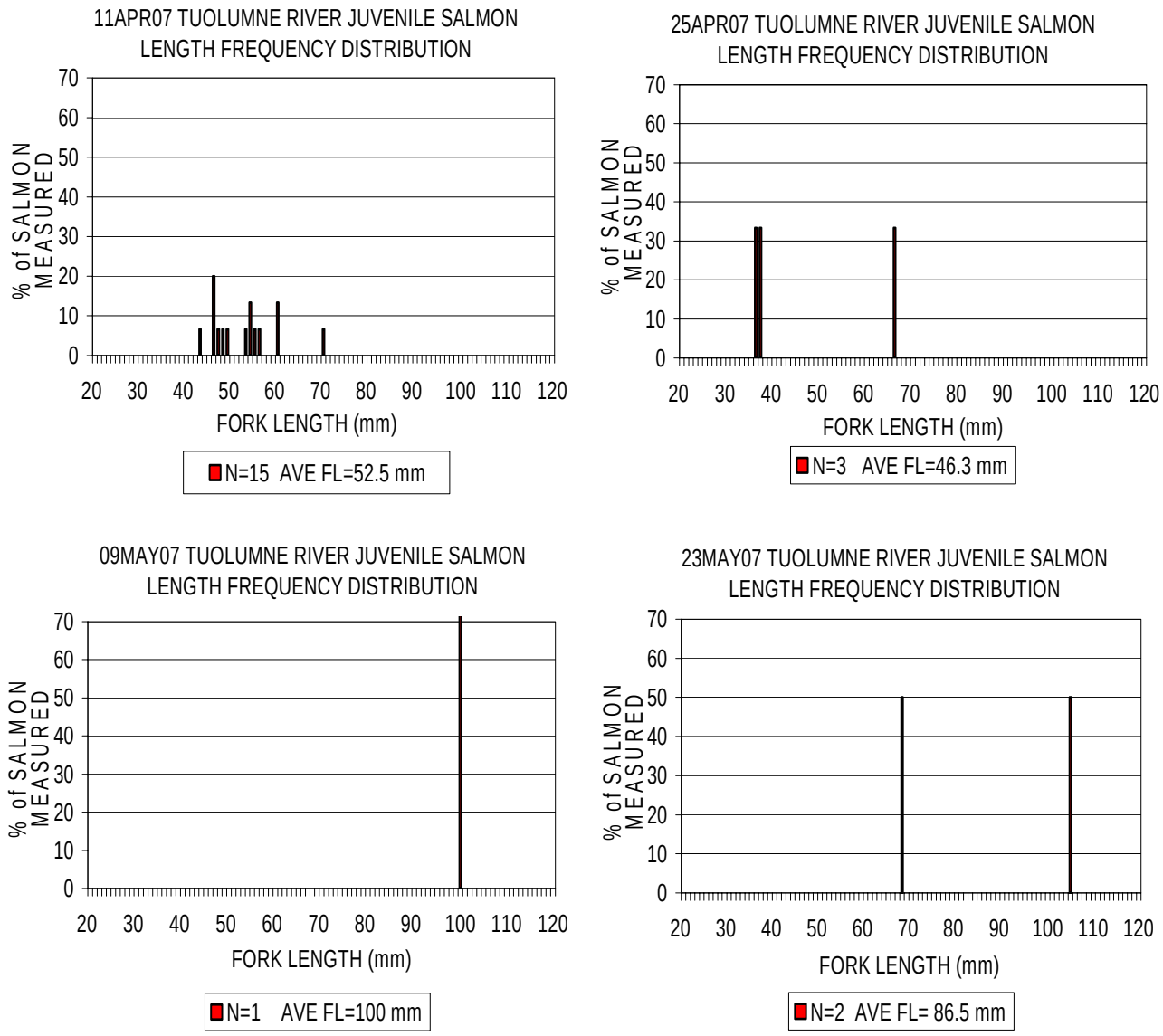


Figure 8. Length frequency distribution by date of salmon in the Tuolumne River, 2007.

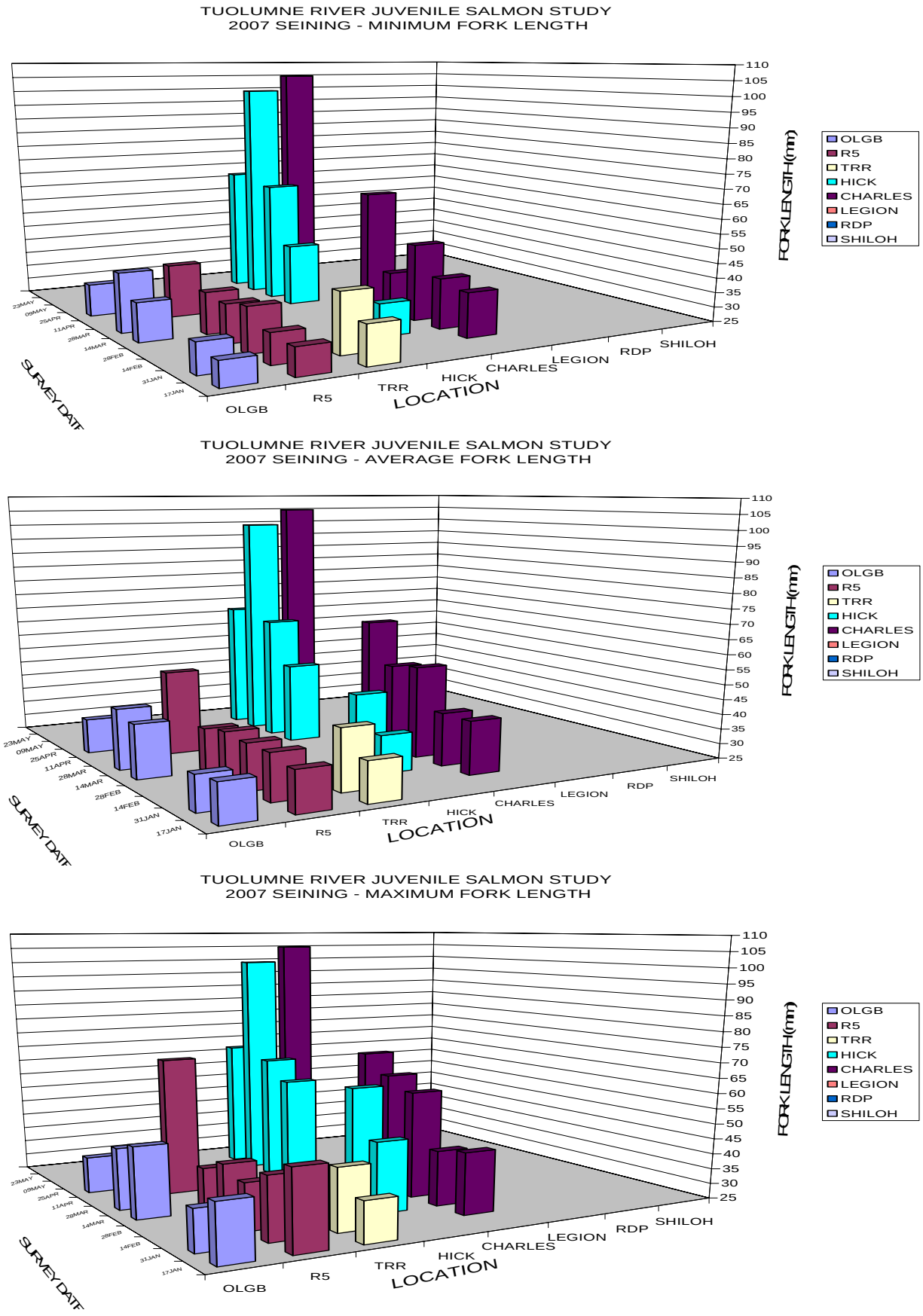
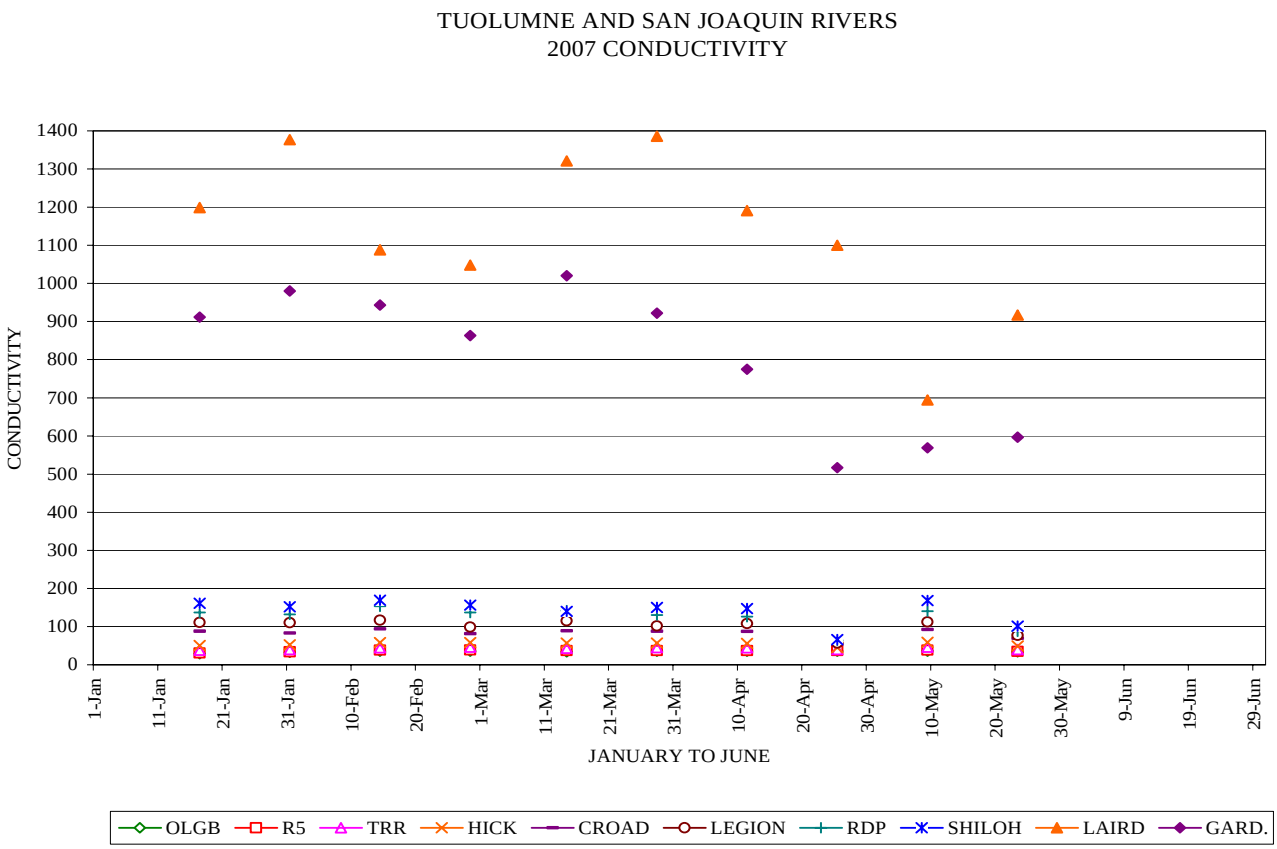


Figure 9. Minimum, average, and maximum fork length by location and survey period, 2007.



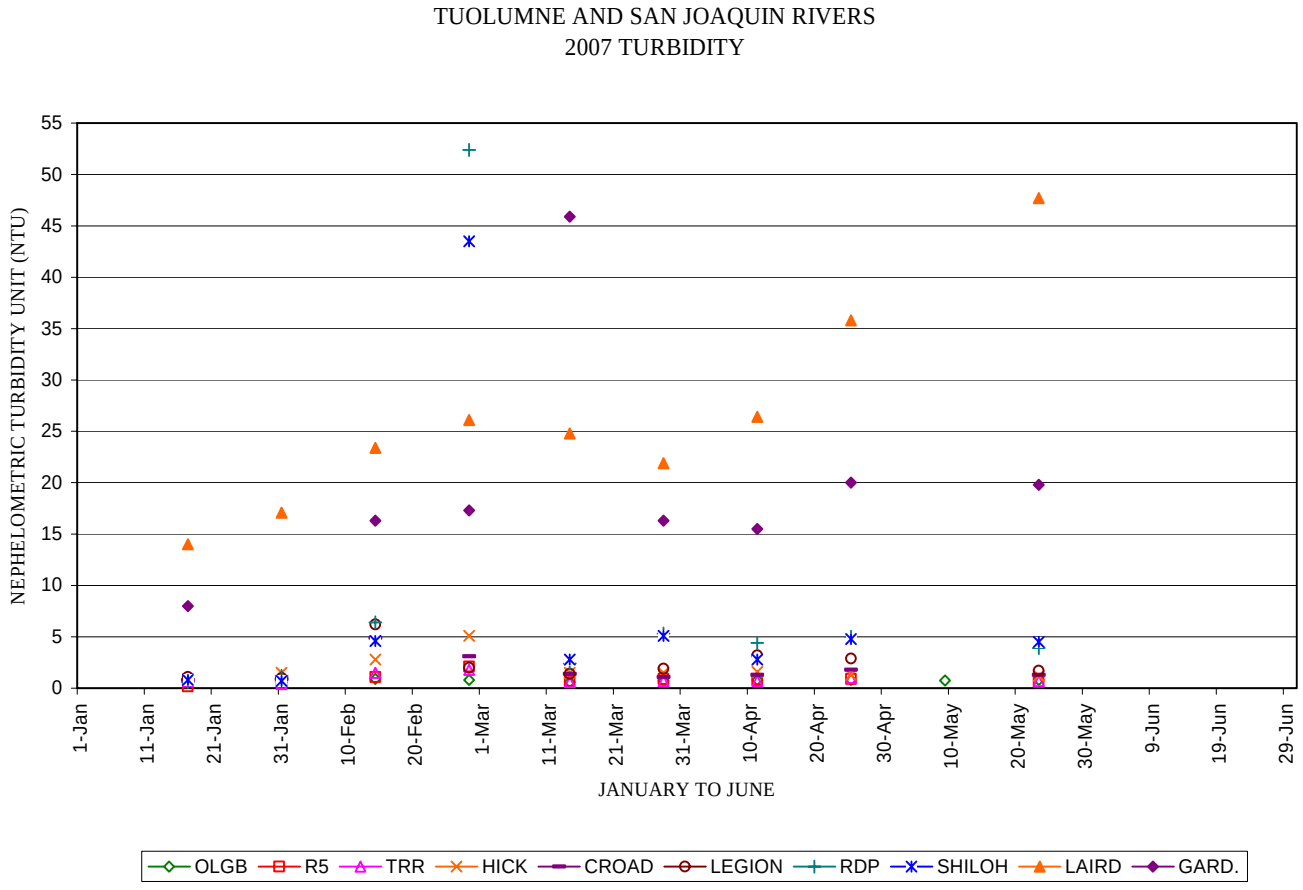
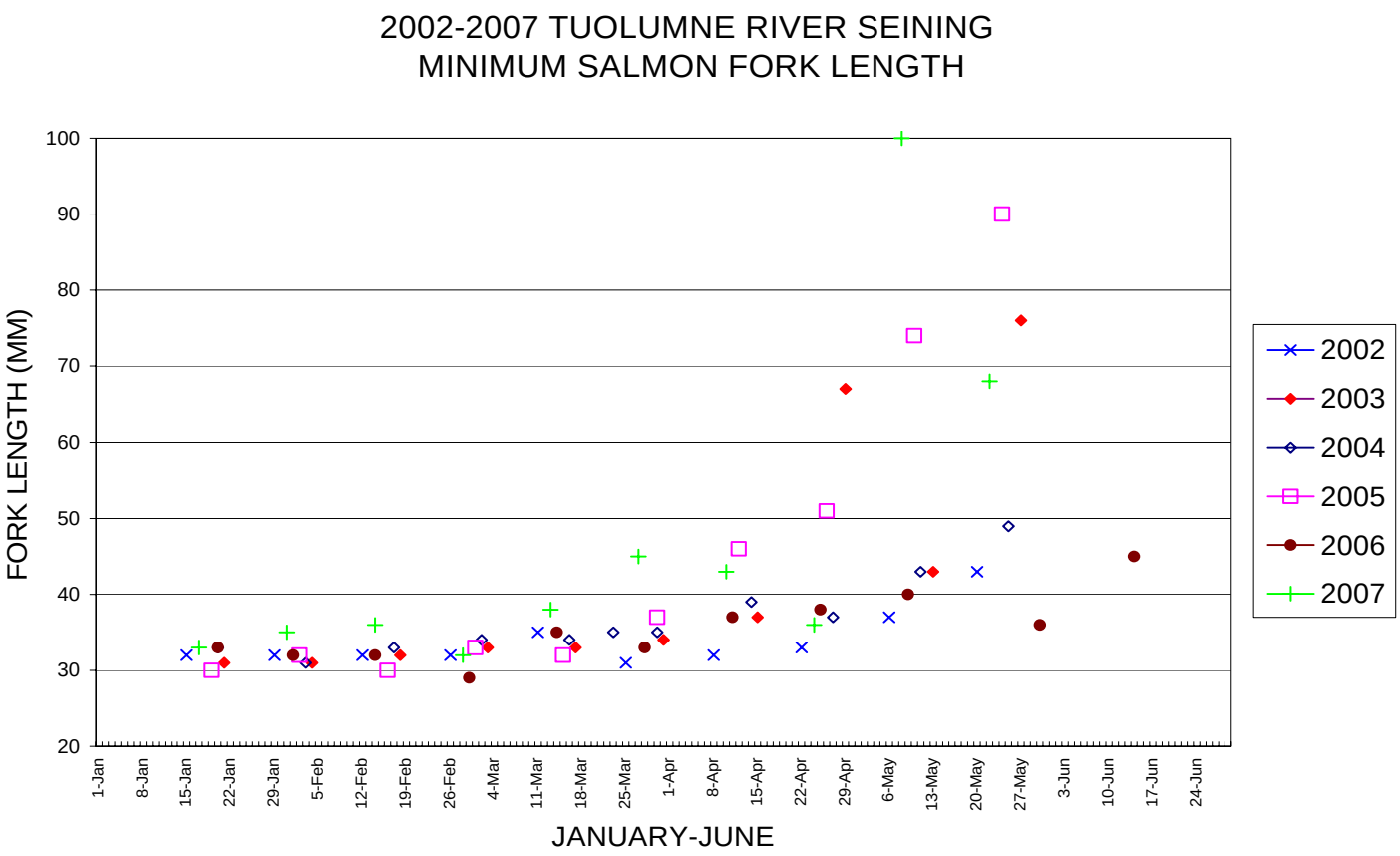
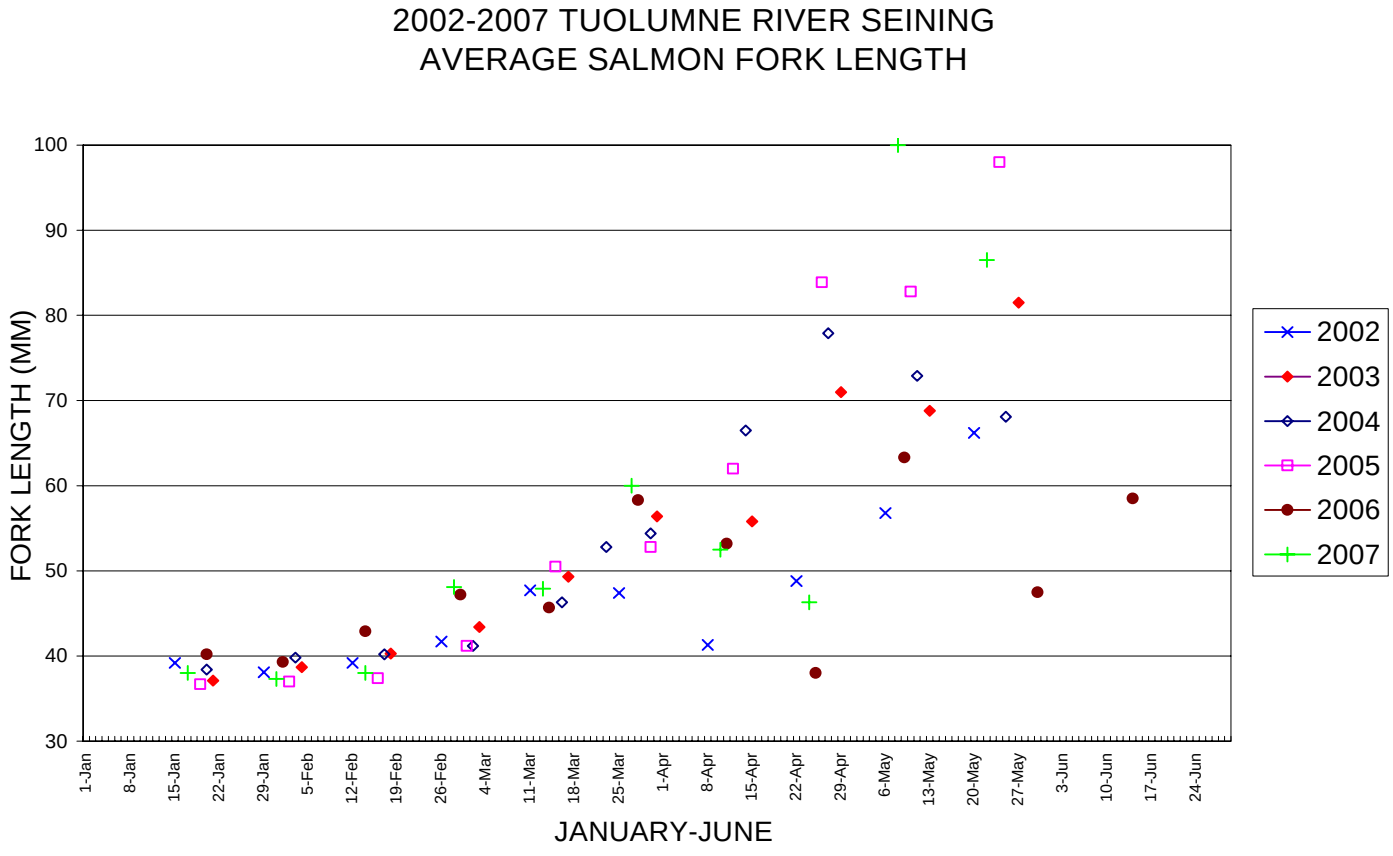
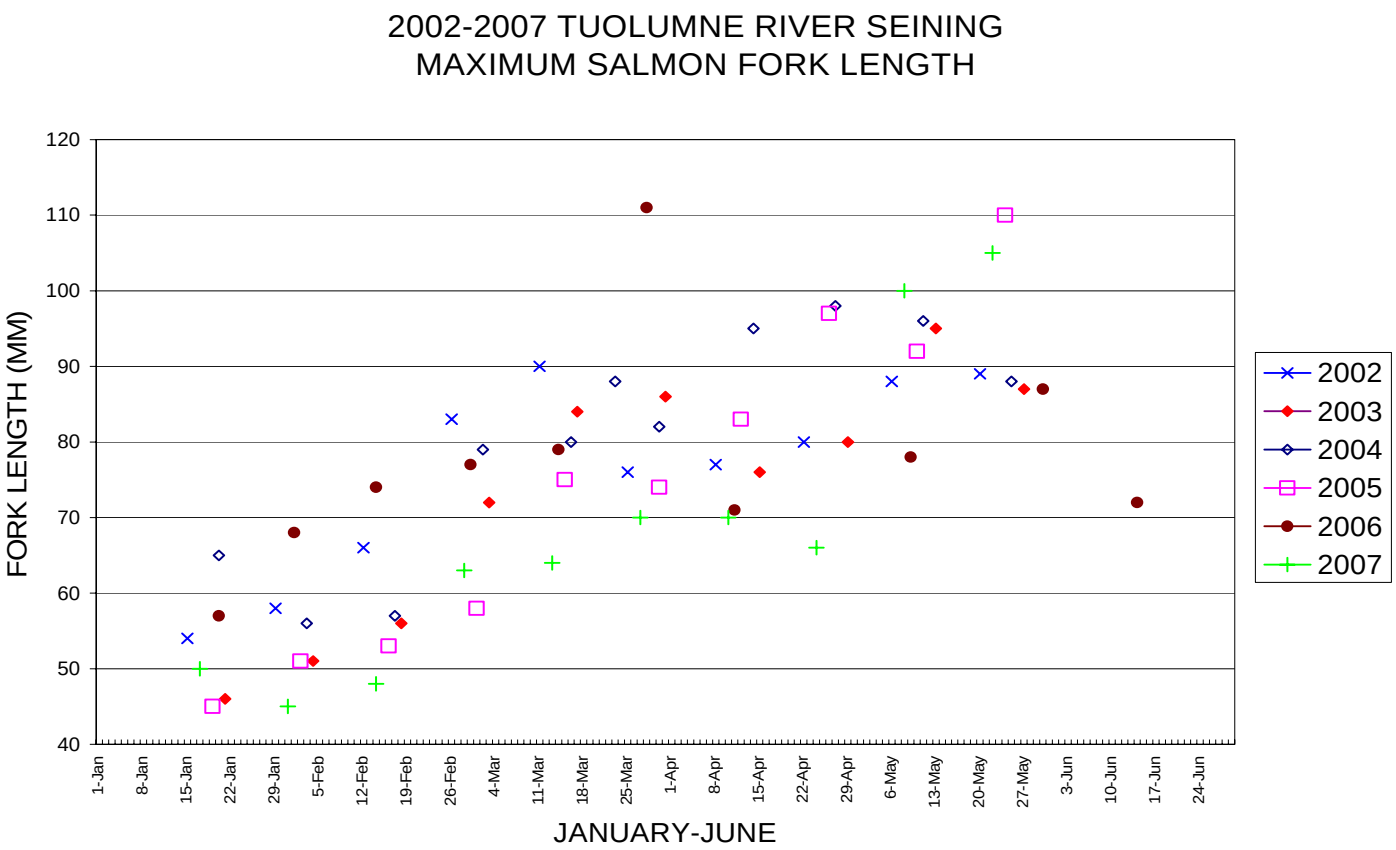


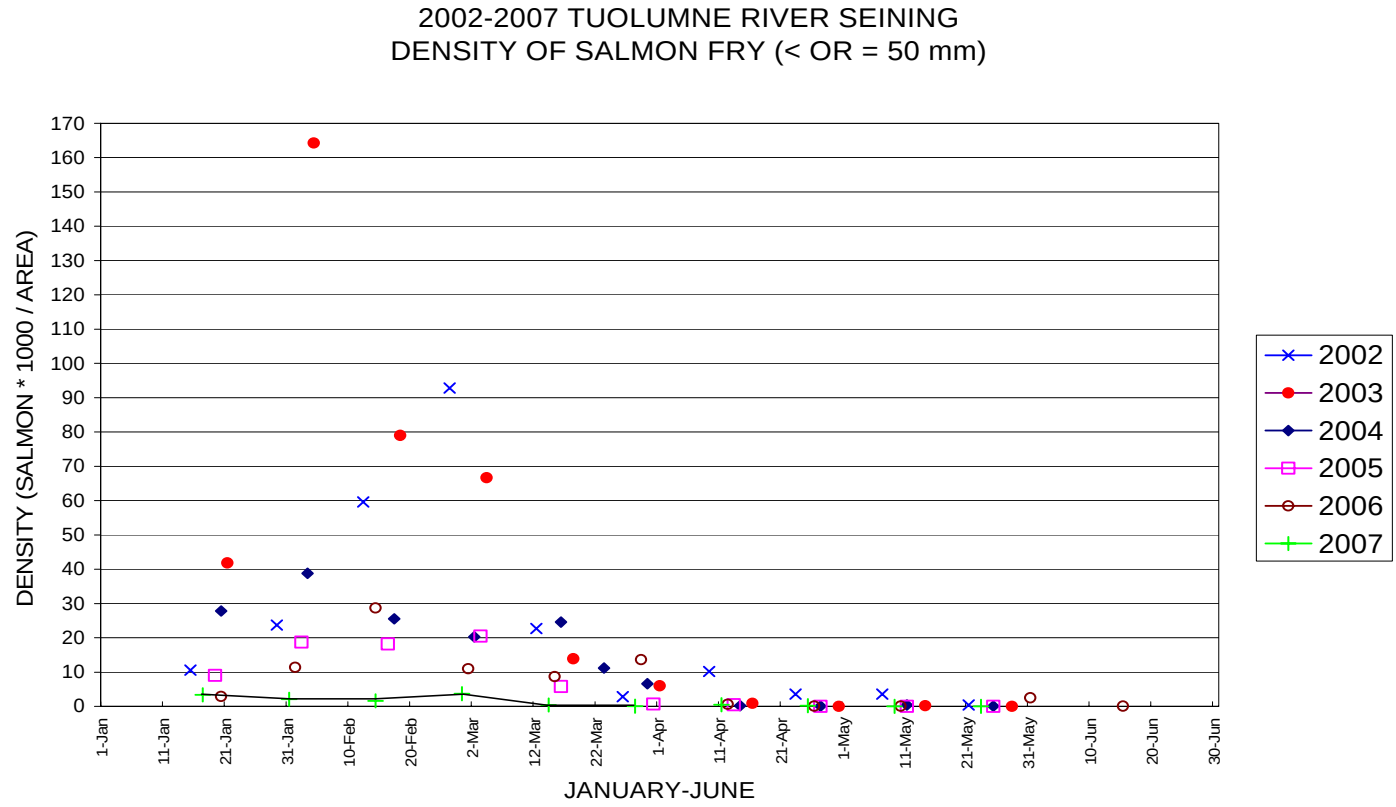
Figure 10. Conductivity and turbidity in the Tuolumne and San Joaquin Rivers, 2007



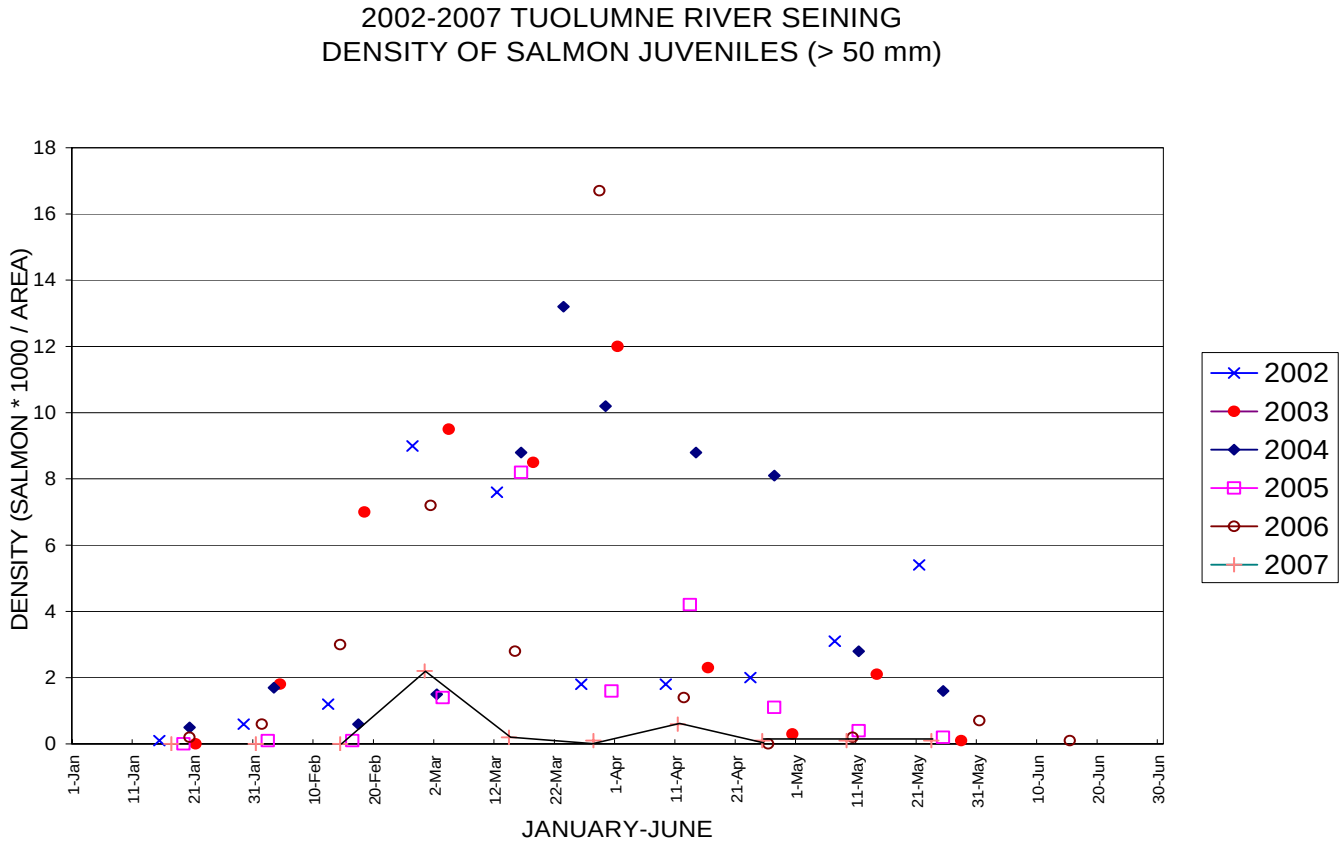


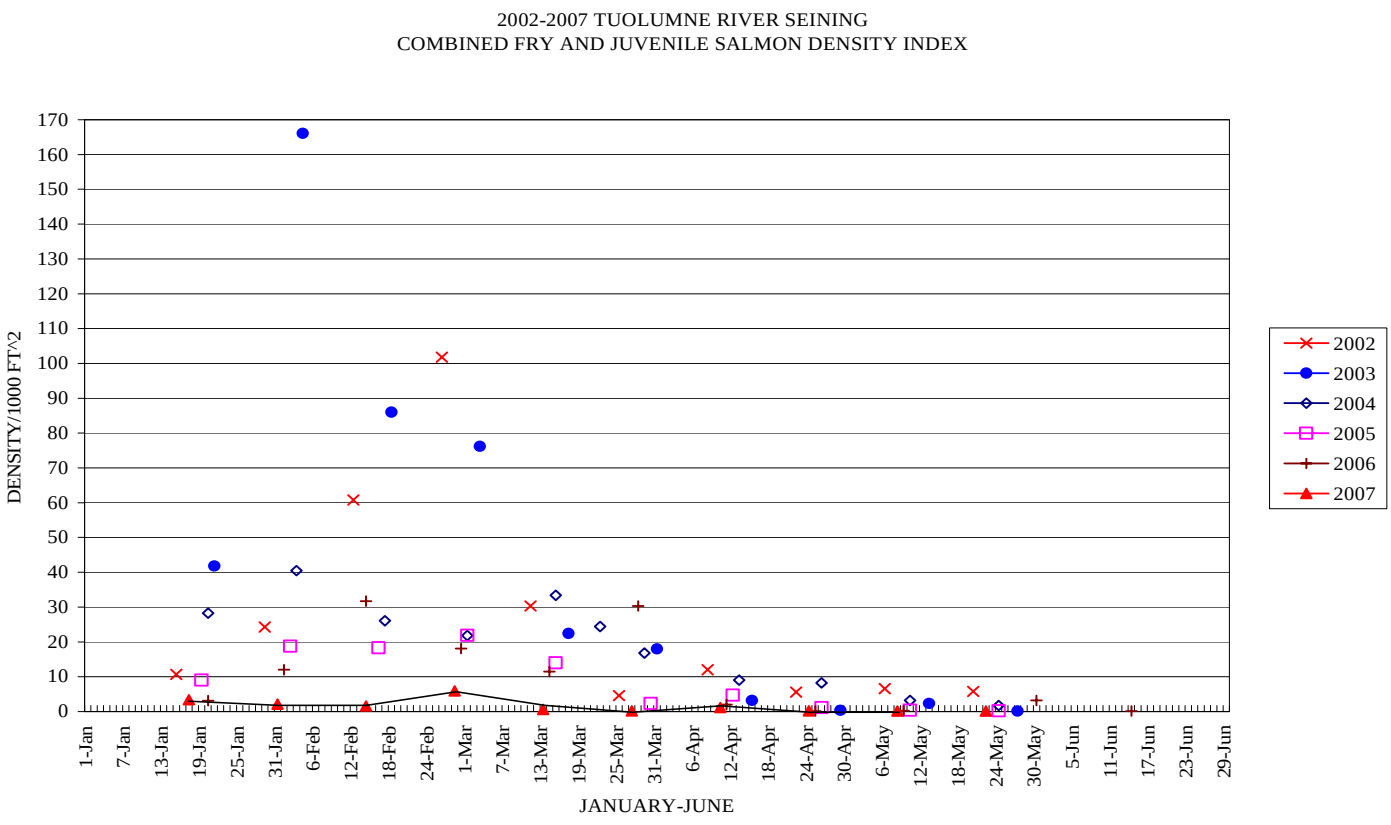
Figures 11 & 12. Minimum and average fork lengths of Tuolumne River salmon, 2002-2007.



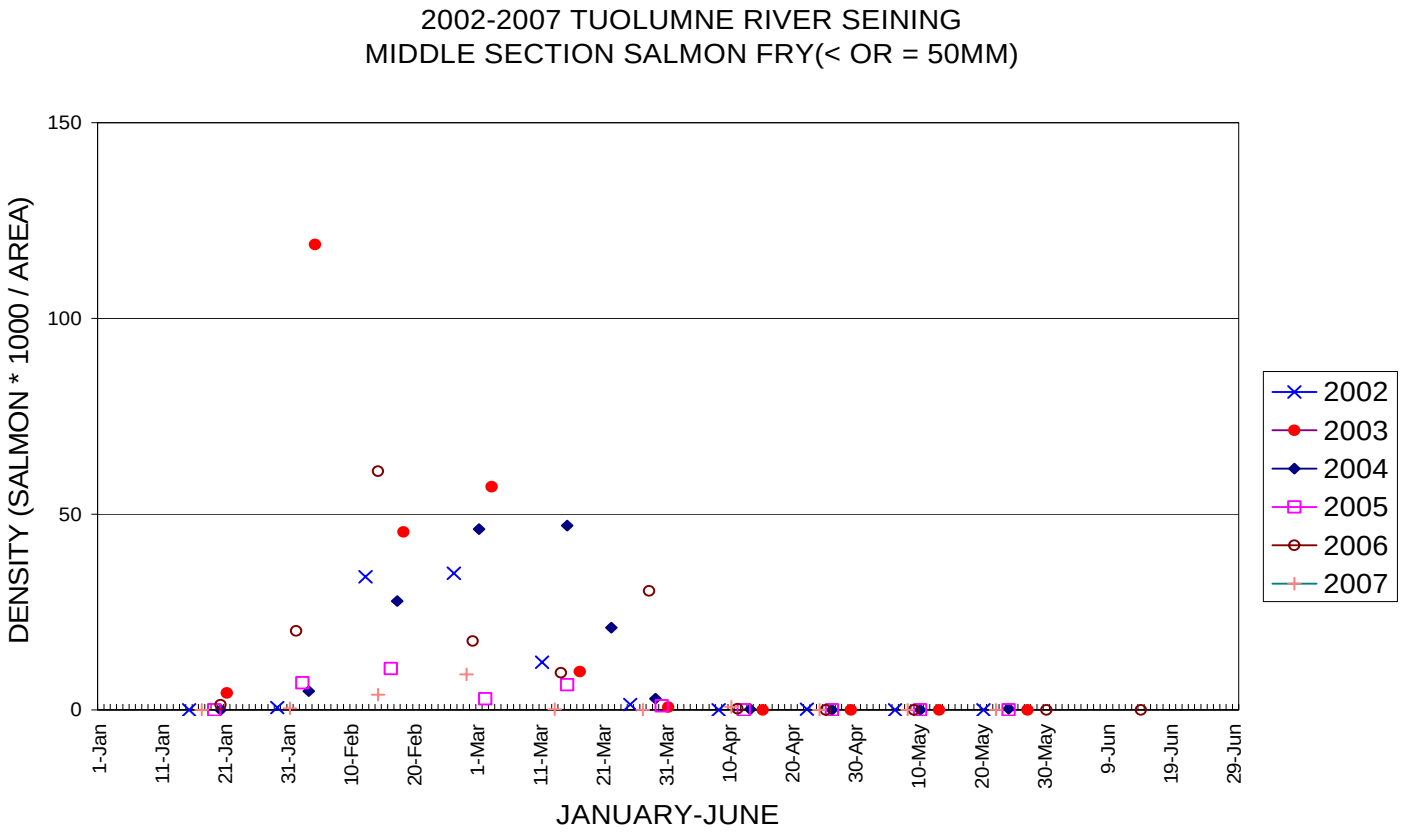


Figures 13 & 14. Maximum fork length and Density index of salmon fry, 2002-2007.





Figures 15 & 16. Density index of salmon juveniles and total river salmon catch, 2002-2007.



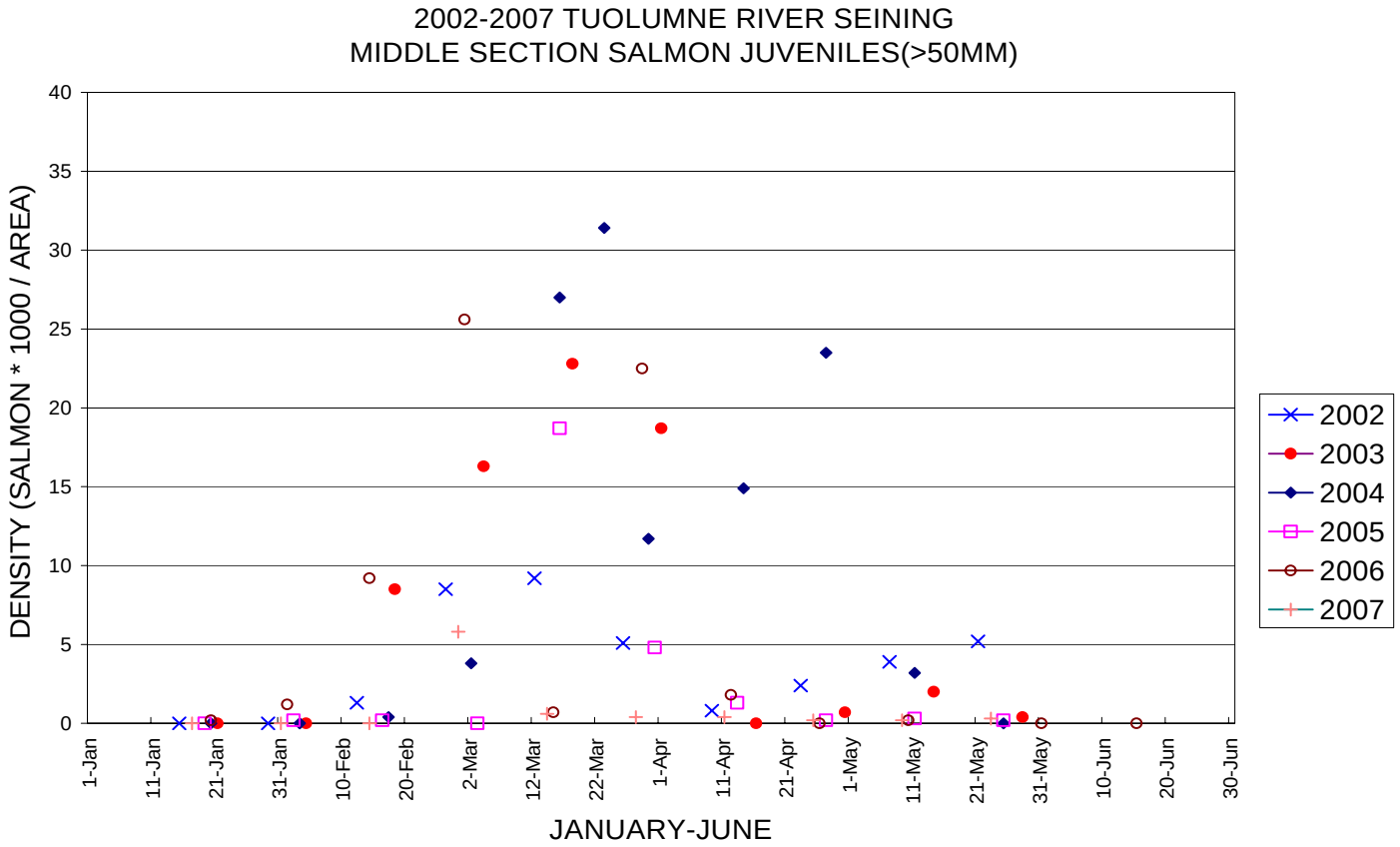


Figure 17. Middle section density indices for salmon fry and juveniles, 2002-2007.

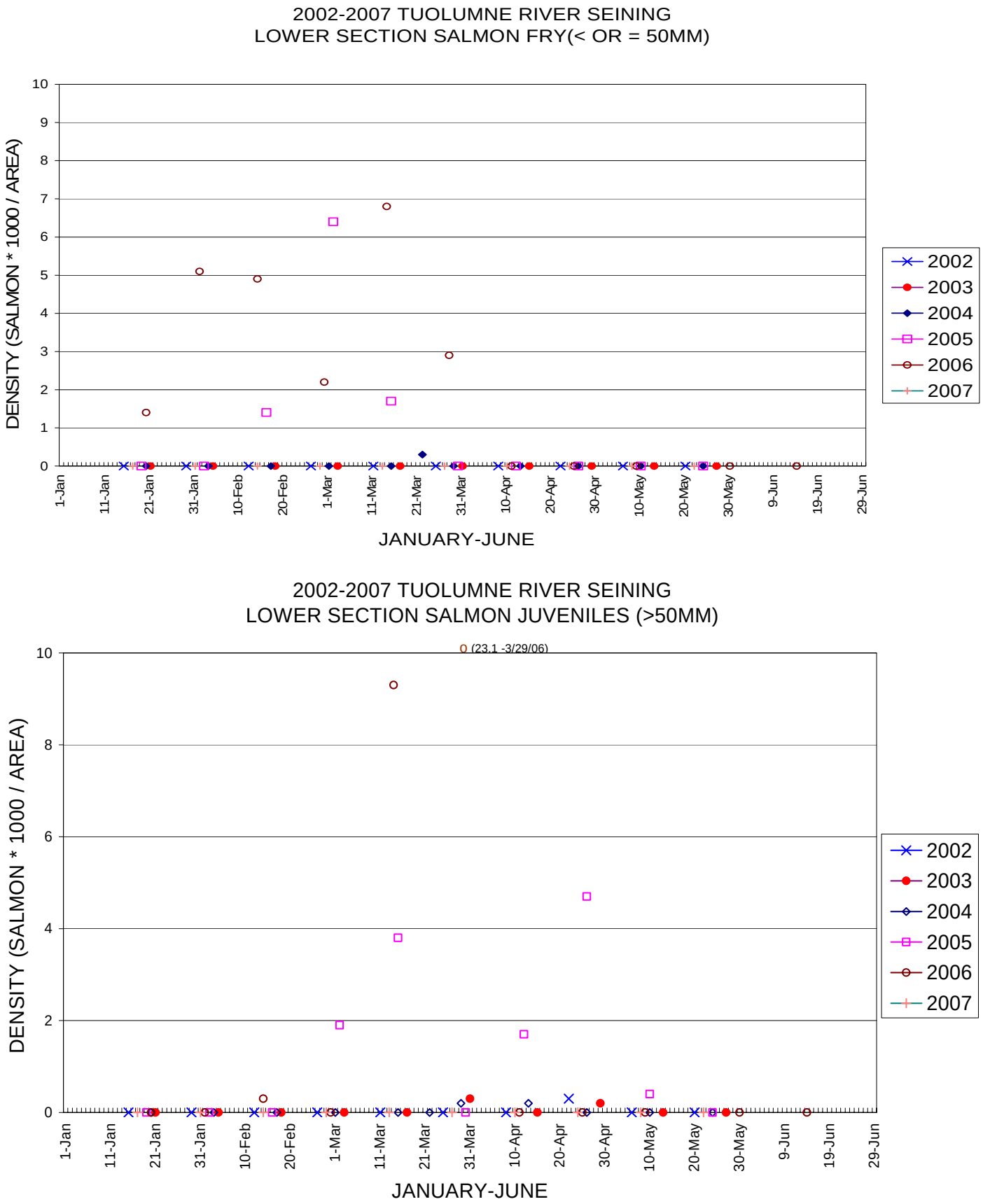
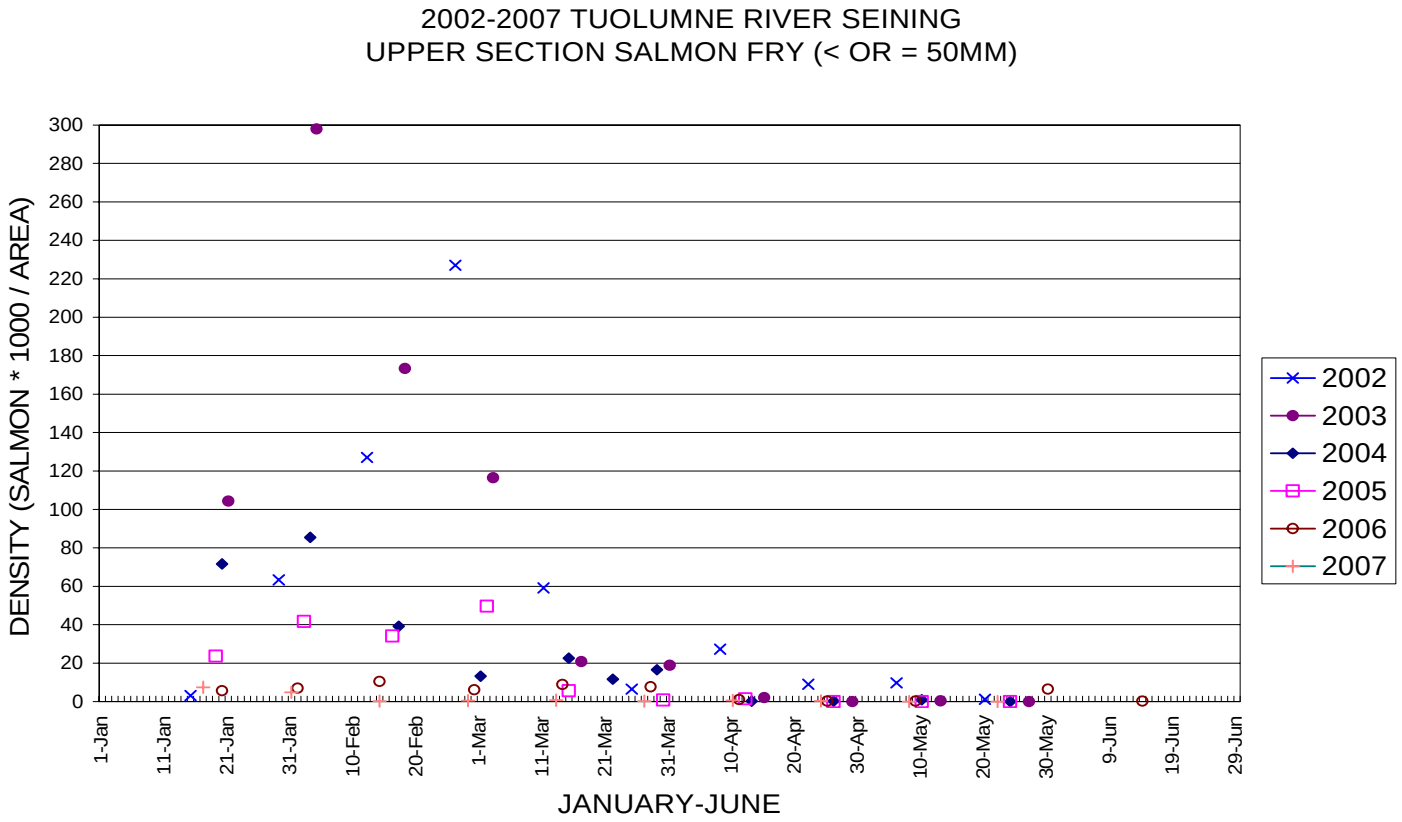


Figure 17. Lower section density indices for salmon fry and juveniles, 2002-2007.



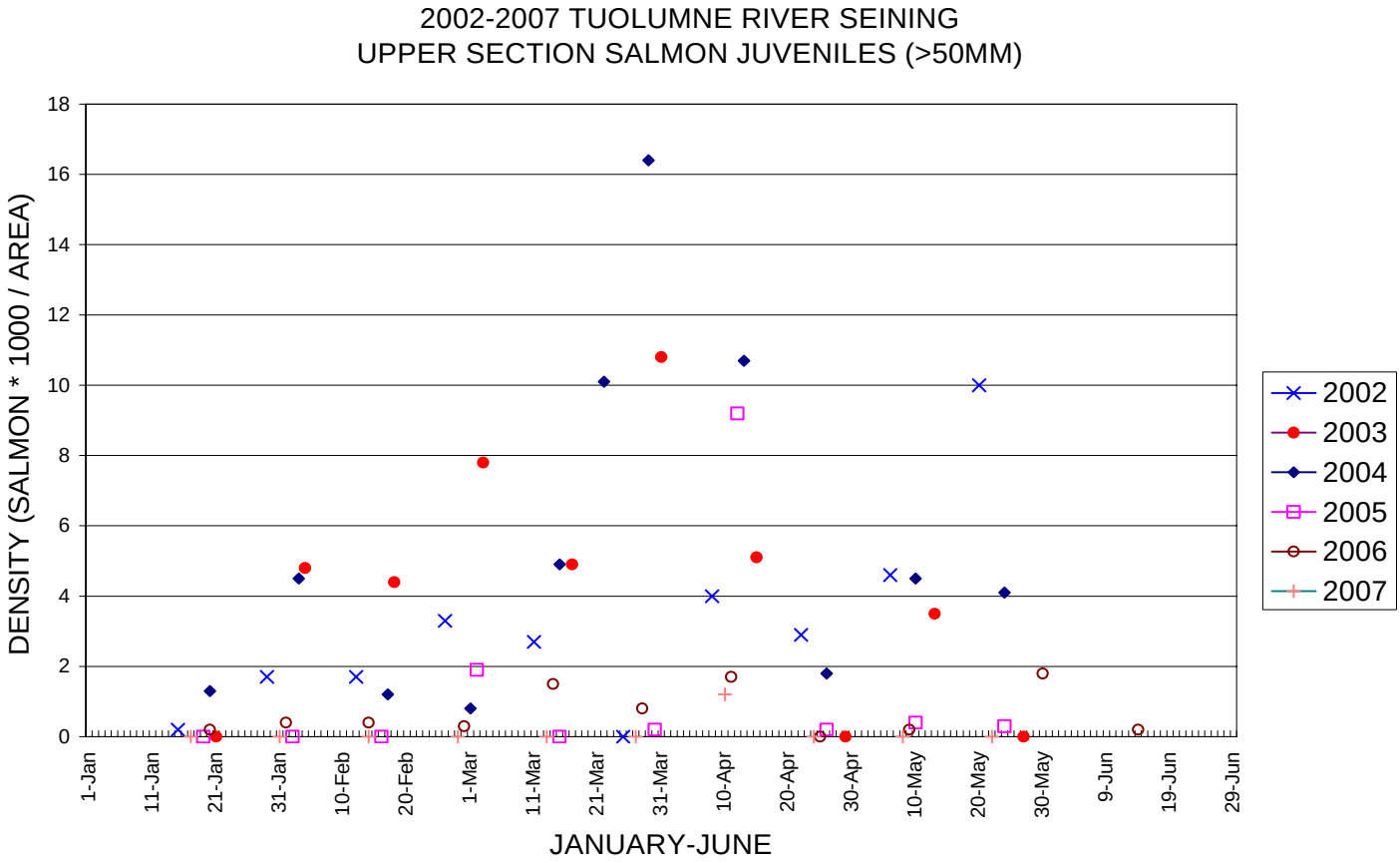


Figure 17. Upper section density indices for salmon fry and juveniles, 2002-2007

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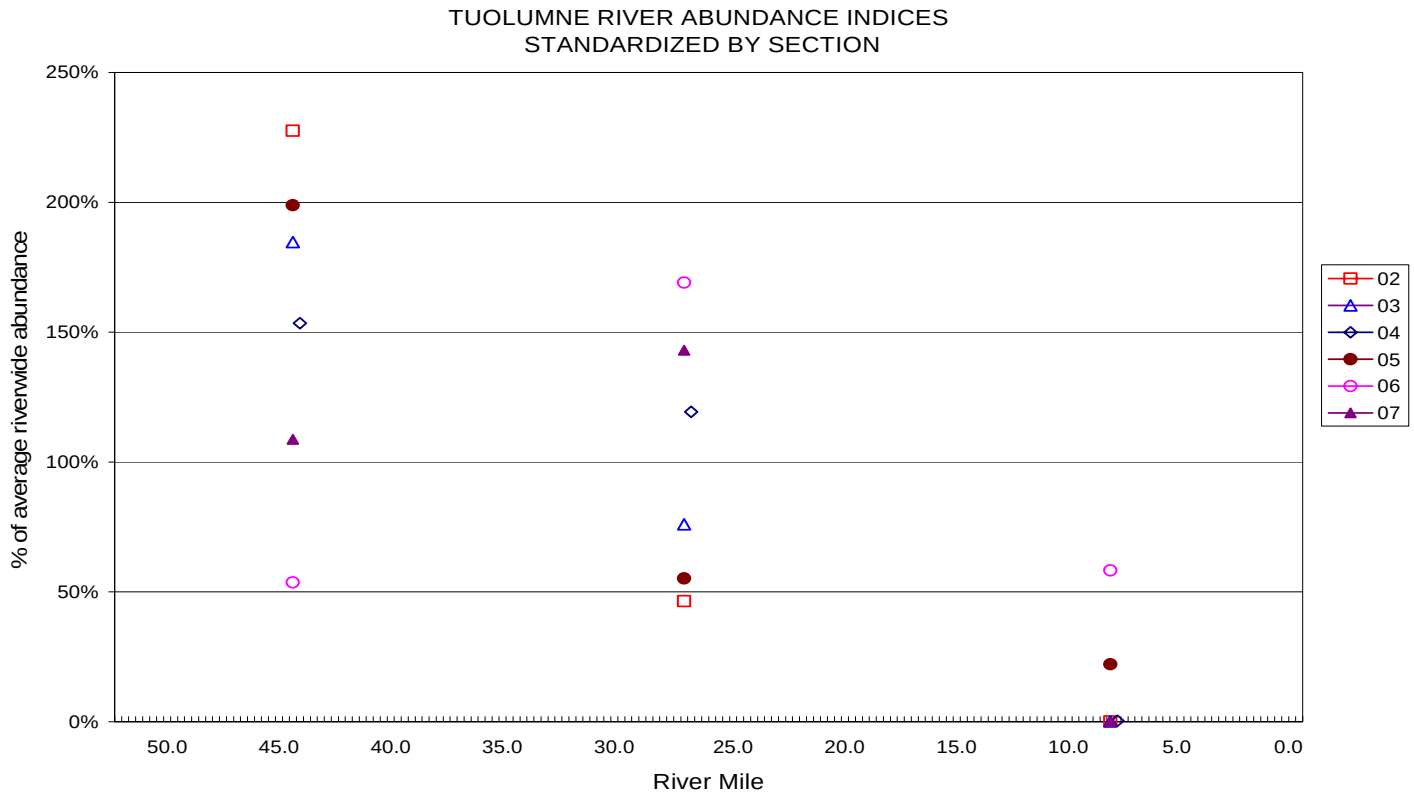

Figure 18. Tuolumne River abundance indices standardized by section, 2002-2007.

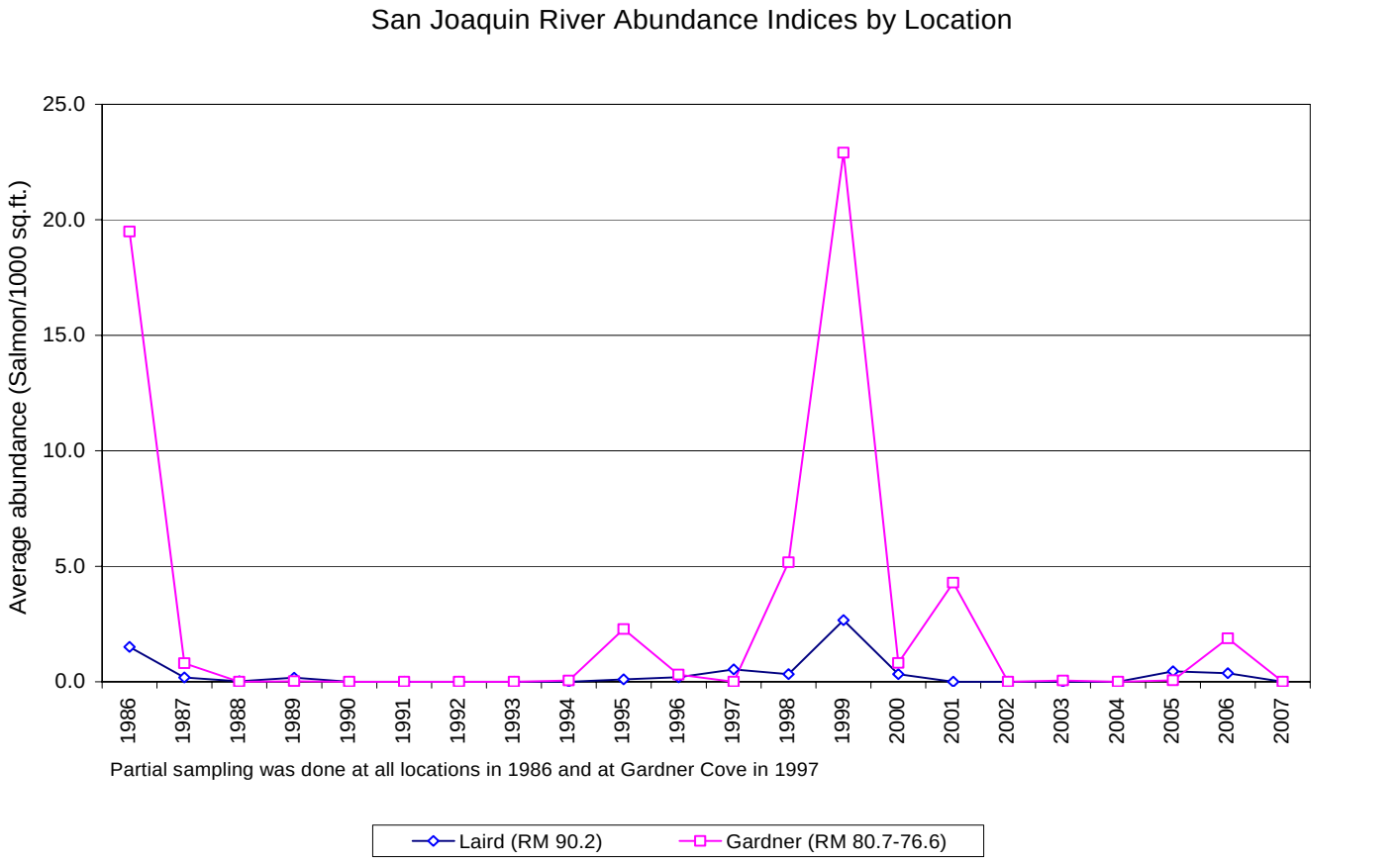

Figure 19. San Joaquin River abundance indices by location, 1986-2007.

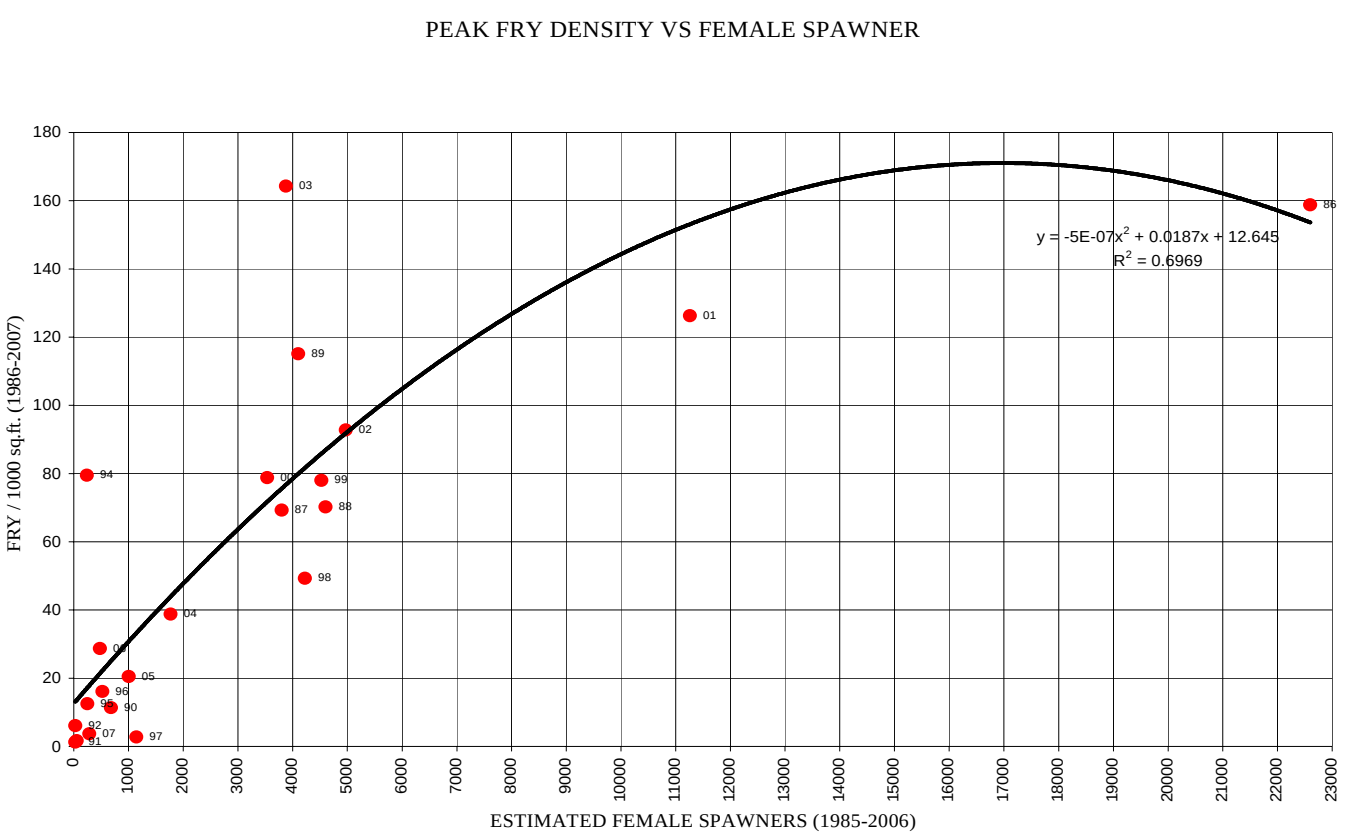

Figure 20. Tuolumne River peak fry density vs female spawners.

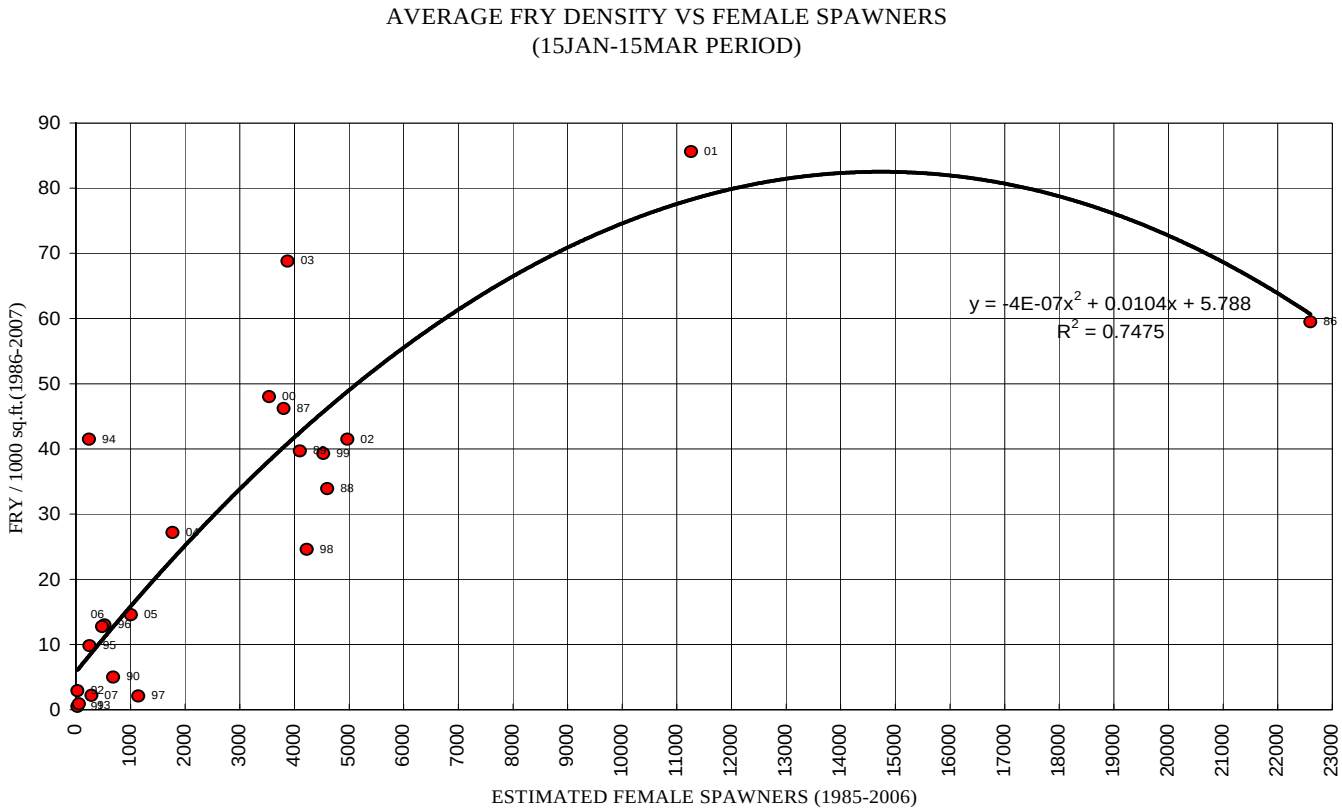

Figure 21. Tuolumne River average fry density vs female spawners.

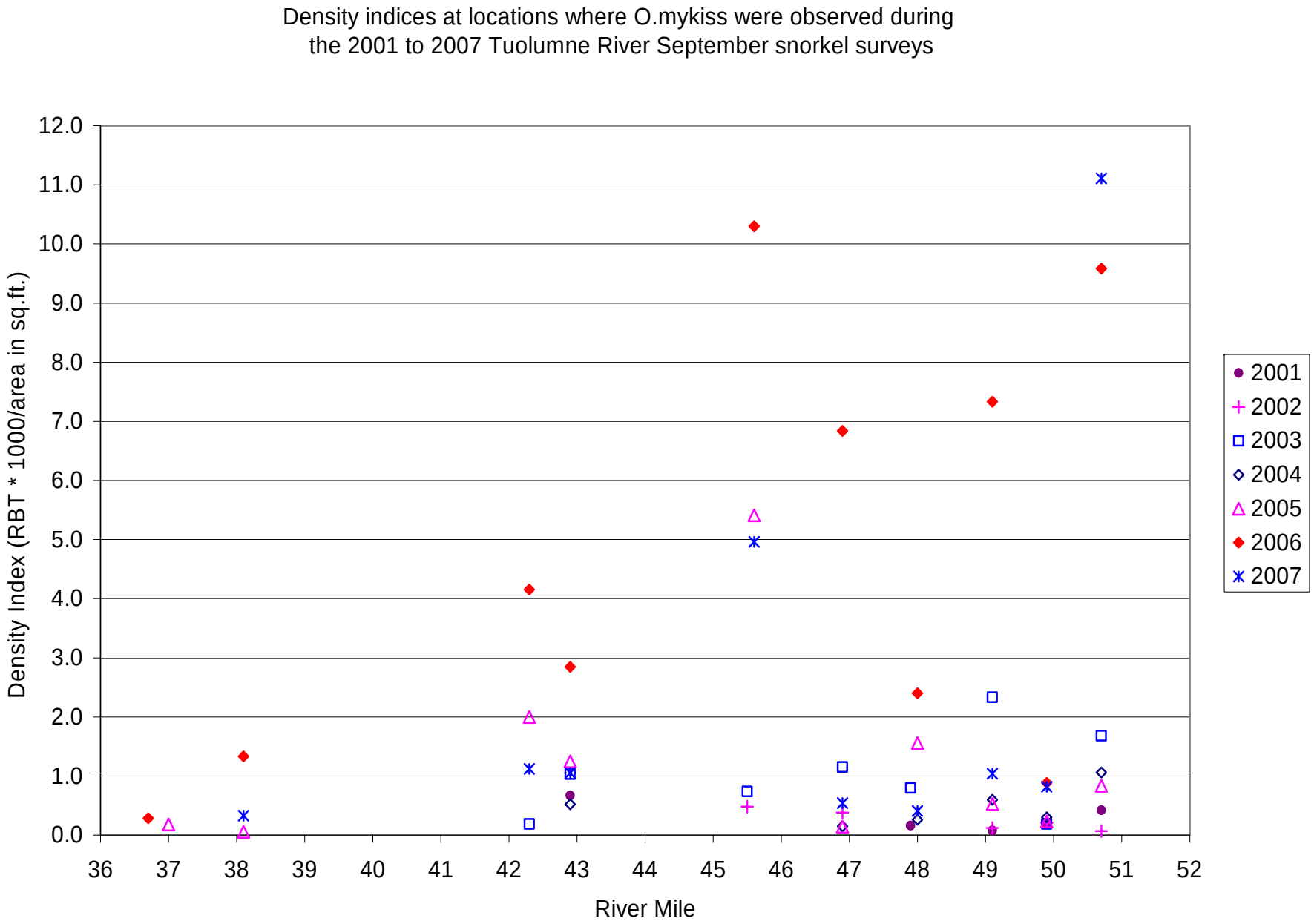

Figure 22. Density indices of O. mykiss observed during the September snorkel surveys

Table 1. Summary table of weekly seine catch for the Tuolumne and San Joaquin rivers, 2007
2007 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
17JAN	46	13,450	3.4	33	50	38.0	46	0	0
31JAN	29	13,700	2.1	35	45	37.3	29	0	0
14FEB	22	13,850	1.6	36	48	38.0	22	0	0
28FEB	75	12,800	5.9	32	63	48.1	75	0	0
14MAR	8	13,750	0.6	38	64	47.9	8	0	0
28MAR	3	14,150	0.2	45	70	60.0	3	0	0
11APR	15	13,250	1.1	43	70	52.5	15	0	0
25APR	3	12,350	0.2	36	66	46.3	3	0	0
09MAY	1	14,250	0.1	100	100	100.0	1	0	0
23MAY	2	13,950	0.1	68	105	86.5	2	0	0
TOTAL:	204	135,500	1.5				204	0	0

SAN JOAQUIN RIVER

DATE	SALMON CATCH	AREA (SQ. FT.)	DENSITY (/1000 ft^2)	MINIMUM FL	MAXIMUM FL	AVERAGE FL	NUMBER MEAS.	SACFRY	NUMBER KILLED
17JAN	0	2,300	0.0						
31JAN	0	3,100	0.0						
14FEB	0	3,150	0.0						
28FEB	0	3,150	0.0						
14MAR	0	3600	0.0						
28MAR	0	3,400	0.0						
11APR	0	3,600	0.0						
25APR	0	3,000	0.0						
09MAY	0	3,150	0.0						
23MAY	0	3,200	0.0						
TOTAL:	0	31,650	0.0						

Table 2. Summary table of weekly seine catch by location for the Tuolumne and San Joaquin Rivers, 2007

2007 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
17JAN	OLGB	7	2,400	7	0	2.9	0.0	2.9	37.4	7.4	0.0	0.0	0.0	0.0	0.0
17JAN	R5	38	1,600	38	0	23.8	0.0	23.8	38.1						
17JAN	TRR	1	2,200	1	0	0.5	0.0	0.5	38.0						
17JAN	HICKMAN	0	1,100					0.0							
17JAN	CHARLES	0	1,200					0.0							
17JAN	LEGION	0	2,400					0.0							
17JAN	RDP	0	1,050					0.0							
17JAN	SHILOH	0	1,500					0.0							
17JAN	LAIRD	0	900					0.0							
17JAN	GARDNER	0	1,400					0.0							
TUOL.TOT.		46	13450	46	0	3.4	0.0	3.4	38.0						
SJR. TOT.		0	2300	0	0			0.0							

2007 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
31JAN	OLGB	24	2200	24	0	10.9	0.0	10.9	36.3	4.8	0.4	0.0	0.0	0.0	0.0
31JAN	R5	2	1400	2	0	1.4	0.0	1.4	40.0						
31JAN	TRR	1	2000	1	0	0.5	0.0	0.5	45.0						
31JAN	HICKMAN	0	1800					0.0							
31JAN	CHARLES	2	1350	2	0	1.5	0.0	1.5	42.5						
31JAN	LEGION	0	2400					0.0							
31JAN	RDP	0	900					0.0							
31JAN	SHILOH	0	1650					0.0							
31JAN	LAIRD	0	1500					0.0							
31JAN	GARDNER	0	1600					0.0							
TUOL.TOT.		29	13700	29	0	2.1	0.0	2.1	37.3						
SJR. TOT.		0	3100					0.0							

2007 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
14FEB	OLGB	0	2200					0.0		0.2	3.9	0.0	0.0	0.0	0.0
14FEB	R5	1	1400	1	0	0.7	0.0	0.7	40.0						
14FEB	TRR	0	1800					0.0							
14FEB	HICKMAN	19	1100	19	0	17.3	0.0	17.3	37.5						
14FEB	CHARLES	2	1350	2	0	1.5	0.0	1.5	42.5						
14FEB	LEGION	0	3000					0.0							
14FEB	RDP	0	1200					0.0							
14FEB	SHILOH	0	1800					0.0							
14FEB	LAIRD	0	1350					0.0							
14FEB	GARDNER	0	1800					0.0							
TUOL.TOT.		22	13850	22	0	1.6	0.0	1.6	38.0						
SJR. TOT.		0	3150	0	0			0.0							

2007 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
28FEB	OLGB	0	2200					0.0		0.5	9.1	0.0	0.0	5.8	0.0
28FEB	R5	3	1800	3	0	1.7	0.0	1.7	40.7						
28FEB	TRR	0	1800					0.0							
28FEB	HICKMAN	70	1500	44	26	29.3	17.3	46.7	48.3						
28FEB	CHARLES	2	1350	0	2	0.0	1.5	1.5	55.5						
28FEB	LEGION	0	2000					0.0							
28FEB	RDP	0	350					0.0							
28FEB	SHILOH	0	1800					0.0							
28FEB	LAIRD	0	1350												
28FEB	GARDNER	0	1800					0.0							
TUOL.TOT.		75	12800	47	28	3.7	2.2	5.9	48.1						
SJR. TOT.		0	3150	0	0			0.0							

2007 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
14MAR	OLGB	3	2400	3	0	1.3	0.0	1.3	42.7	0.7	0.2	0.0	0.0	0.6	0.0
14MAR	R5	1	1400	1	0	0.7	0.0	0.7	39.0						
14MAR	TRR	0	1800					0.0							
14MAR	HICKMAN	0	1200					0.0							
14MAR	CHARLES	4	1650	1	3	0.6	1.8	2.4	54.0						
14MAR	LEGION	0	2400					0.0							
14MAR	RDP	0	1100					0.0							
14MAR	SHILOH	0	1800					0.0							
14MAR	LAIRD	0	1800					0.0							
14MAR	GARDNER	0	1800					0.0							
TUOL.TOT.		8	13750	5	3	0.4	0.2	0.6	47.9						
SJR. TOT.		0	3600	0	0			0.0							

Table 2 (Continued)

2007 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
28MAR	OLGB	1	2400	1	0	0.4	0.0	0.4	45.0	0.2	0.0	0.0	0.0	0.4	0.0
28MAR	R5	0	1400					0.0							
28MAR	TRR	0	2400					0.0							
28MAR	HICK	0	1200					0.0							
28MAR	CHARLES	2	1500	0	2	0.0	1.3	1.3	67.5						
28MAR	LEGION	0	2400					0.0							
28MAR	RDP	0	1050					0.0							
28MAR	SHILOH	0	1800					0.0							
28MAR	LAIRD	0	1600					0.0							
28MAR	GARDNER	0	1800					0.0							
TUOL.TOT.		3	14150	1	2	0.1	0.1	0.2	60.0						
SJR. TOT.		0	3400	0	3	0.0	0.0	0.0							

2007 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
11APR	OLGB	0	2000					0.0		0.6	0.8	0.0	1.2	0.4	0.0
11APR	R5	9	1400	3	6	2.1	4.3	6.4	53.0						
11APR	TRR	0	1800					0.0							
11APR	HICK	6	1000	4	2	4.0	2.0	6.0	51.7						
11APR	CHARLES	0	1350					0.0							
11APR	LEGION	0	2400					0.0							
11APR	RDP	0	1500					0.0							
11APR	SHILOH	0	1800					0.0							
11APR	LAIRD	0	1800												
11APR	GARDNER	0	1800					0.0							
TUOL.TOT.		15	13250	7	8	0.5	0.6	1.1	52.5						
SJR. TOT.		0	3600					0.0							

2007 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
25APR	OLGB	2	2250	2	0	0.9	0.0	0.9	36.5	0.4	0.0	0.0	0.0	0.2	0.0
25APR	R5	0	1800					0.0							
25APR	TRR	0	1650					0.0							
25APR	HICK	1	1350	0	1	0.0	0.7	0.7	66.0						
25APR	CHARLES	0	1200					0.0							
25APR	LEGION	0	1800					0.0							
25APR	RDP	0	500					0.0							
25APR	SHILOH	0	1800					0.0							
25APR	LAIRD	0	1200					0.0							
25APR	GARDNER	0	1800					0.0							
TUOL.TOT.		3	12350	2	1	0.2	0.1	0.2	46.3						
SJR. TOT.		0	3000					0.0							

2007 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
09MAY	OLGB	0	2400					0.0		0.0	0.0	0.0	0.0	0.2	0.0
09MAY	R5	0	1500					0.0							
09MAY	TRR	0	1800					0.0							
09MAY	HICK	1	1500	0	1	0.0	0.7	0.7	100.0						
09MAY	CHARLES	0	1800					0.0							
09MAY	LEGION	0	2400					0.0							
09MAY	RDP	0	1050					0.0							
09MAY	SHILOH	0	1800					0.0							
09MAY	LAIRD	0	1350					0.0							
09MAY	GARDNER	0	1800					0.0							
TUOL.TOT.		1	14250	0	1	0.0	0.1	0.1	100.0						
SJR. TOT.		0	3150					0.0							

2007 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
23MAY	OLGB	0	1800					0.0		0.0	0.0	0.0	0.0	0.3	0.0
23MAY	R5	0	1800					0.0							
23MAY	TRR	0	1800					0.0							
23MAY	HICK	1	1800	0	1	0.0	0.6	0.6	68.0						
23MAY	CHARLES	1	1650	0	1	0.0	0.6	0.6	105.0						
23MAY	LEGION	0	2400					0.0							
23MAY	RDP	0	900					0.0							
23MAY	SHILOH	0	1800					0.0							
23MAY	LAIRD	0	1400					0.0							
23MAY	GARDNER	0	1800					0.0							
TUOL.TOT.		2	13950	0	2	0.0	0.1	0.1	86.5						
SJR. TOT.		0	3200					0.0							

Table 3. Summary table of weekly seine catch by location for the Tuolumne and San Joaquin Rivers, 2007.

2007 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)
17JAN	OLGB	50.5	7	2,400	2.9	33	43	37.4	7	0	0	10.7	29		7.4	0.0	0.0	0.8	10.9
17JAN	R5	48.0	38	1,600	23.8	34	50	38.1	38	0	0	10.3	31					0.2	11.8
17JAN	TRR	42.3	1	2,200	0.5	38	38	38.0	1	0	0	9.1	38					0.7	12.1
17JAN	HICK	31.6	0	1,100	0.0							8.4	50					0.9	12.5
17JAN	CHARLES	24.9	0	1,200	0.0							8.6	88					0.8	13.1
17JAN	LEGION	17.2	0	2,400	0.0							8.4	111					1.1	12.4
17JAN	RDP	12.3	0	1,050	0.0							8.0	137					0.6	12.9
17JAN	SHILOH	3.4	0	1,500	0.0							8.7	161					0.8	12.3
17JAN	LAIRD	90.2	0	900	0.0							7.7	1199					14.0	12.0
17JAN	GARDNER	79.5	0	1,400	0.0							7.3	912					8.0	12.3
TR TOT.			46	13450	3.4	33	50	38.0	46	0	0								
SJR TOT.			0	2300	0.0				0										

2007 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)
31JAN	OLGB	50.5	24	2200	10.9	35	38	36.3	24	0	0	10.4	33		4.8	0.4	0.0	0.6	10.9
31JAN	R5	48.0	2	1400	1.4	35	45	40.0	2	0	0	10.0	34					0.5	10.9
31JAN	TRR	42.3	1	2000	0.5	45	45	45.0	1	0	0	9.9	40					0.4	10.8
31JAN	HICK	31.6	0	1800	0.0							10.4	52					1.5	10.6
31JAN	CHARLES	24.9	2	1350	1.5	40	45	42.5	2	0	0	11.3	83					0.9	11.0
31JAN	LEGION	17.2	0	2400	0.0							11.2	110					1.0	10.4
31JAN	RDP	12.3	0	900	0.0							11.6	132					1.2	10.8
31JAN	SHILOH	3.4	0	1650	0.0							12.2	152					0.7	10.3
31JAN	LAIRD	90.2	0	1500	0.0							12.5	1377					17.1	10.3
31JAN	GARDNER	79.5	0	1600	0.0							11.9	980					N.T.	10.4
TR TOT.			29	13700	2.1	35	45	37.3	29	0	0								
SJR TOT.			0	3100	0.0				0	0	0								

2007 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)
14FEB	OLGB	50.5	0	2200	0.0							10.4	36		0.2	3.9	0.0	0.9	13.9
14FEB	R5	48.0	1	1400	0.7	40	40	40.0	1	0	0	10.5	38					1.1	13.6
14FEB	TRR	42.3	0	1800	0.0							10.3	44					1.5	13.4
14FEB	HICK	31.6	19	1100	17.3	36	48	37.5	19	0	0	11.1	58					2.8	13.2
14FEB	CHARLES	24.9	2	1350	1.5	42	43	42.5	2	0	0	12.2	94					4.9	12.6
14FEB	LEGION	17.2	0	3000	0.0							12.7	117					6.2	12.0
14FEB	RDP	12.3	0	1200	0.0							12.6	153					6.4	12.0
14FEB	SHILOH	3.4	0	1800	0.0							13.6	169					4.6	10.6
14FEB	LAIRD	90.2	0	1350	0.0							14.2	1088					23.4	10.6
14FEB	GARDNER	79.5	0	1800	0.0							13.5	943					16.3	10.8
TR TOT.			22	13850	1.6	36	48	38.0	22	0	0								
SJR TOT.			0	3150	0.0														

2007 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)
28FEB	OLGB	50.5	0	2200	0.0							10.0	36		0.5	14.8	0.0	0.8	11.8
28FEB	R5	48.0	3	1800	1.7	38	43	40.7	3	0	0	10.0	39					2.1	12.0
28FEB	TRR	42.3	0	1800	0.0							10.4	46					1.8	12.2
28FEB	HICK	31.6	70	1500	46.7	32	63	48.3	70	0	0	11.0	58					5.1	12.0
28FEB	CHARLES	24.9	2	1350	1.5	51	60	55.5	2	0	0	11.8	81					3.1	12.2
28FEB	LEGION	17.2	0	2000	0.0							11.8	99					2.0	11.2
28FEB	RDP	12.3	0	350	0.0							11.7	137					52.4	10.0
28FEB	SHILOH	3.4	0	1800	0.0							11.6	156					43.5	10.3
28FEB	LAIRD	90.2	0	1350								12.8	1048					26.1	9.8
28FEB	GARDNER	79.5	0	1800	0.0							12.8	863					17.3	10.0
TR TOT.			75	12800	5.9	32	63	48.1	75	0	0								
SJR TOT.			0	3150	0.0														

2007 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)
14MAR	OLGB	50.5	3	2400	1.3	38	48	42.7	3	0	0	10.4	34		0.7	0.8	0.0	0.6	11.9
14MAR	R5	48.0	1	1400	0.7	39	39	39.0	1	0	0	10.5	37					0.7	12.1
14MAR	TRR	42.3	0	1800	0.0							11.8	43					0.6	11.5
14MAR	HICK	31.6	0	1200	0.0							13.6	57					1.5	10.7
14MAR	CHARLES	24.9	4	1650	2.4	39	64	54.0	4	0	0	15.8	89					1.4	11.0
14MAR	LEGION	17.2	0	2400	0.0							16.2	115					1.4	9.8
14MAR	RDP	12.3	0	1100	0.0							17.4	142					2.4	9.9
14MAR	SHILOH	3.4	0	1800	0.0							18.1	140					2.8	9.6
14MAR	LAIRD	90.2	0	1800	0.0							19.8	1321					24.8	9.4
14MAR	GARDNER	79.5	0	1800	0.0							19.4	1020					45.9	9.6
TR TOT.			8	13750	0.6	38	64	47.9	8	0	0								
SJR TOT.			0	3600	0.0														

2007 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)
28MAR	OLGB	50.5	1	2400	0.4	45	45	45.0	1	0	0	9.9	36		0.2	0.4	0.0	0.7	11.8
28MAR	R5	48.0	0	1400	0.0							10.0	37					0.9	12.4
28MAR	TRR	42.3	0	2400	0.0							10.6	45					0.7	12.1
28MAR	HICK	31.6	0	1200	0.0							11.8	57					1.5	11.3
28MAR	CHARLES	24.9	2	1500	1.3	65	70	67.5	2	0	0	14.2	88					1.1	10.7
28MAR	LEGION	17.2	0	2400	0.0							14.6	102					1.9	10.1
28MAR	RDP	12.3	0	1050	0.0							15.0	130					5.3	10.1
28MAR	SHILOH	3.4	0	1800	0.0							15.1	150					5.1	10.0
28MAR	LAIRD	90.2	0	1600	0.0							15.7	1386					21.9	11.0
28MAR	GARDNER	79.5	0	1800	0.0							15.7	922					16.3	10.7
TR TOT.			3	14150	0.2	45	70	60.0	3	0	0								
SJR TOT.			0	3400	0.0														

Table 3 (Continued)

2007 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)
11APR	OLGB	50.5	0	2000	0.0							10.4	36		1.7	1.3	0.0	0.8	10.9
11APR	R5	48.0	9	1400	6.4	43	70	53.0	9	0	0	10.6	37					0.8	11.4
11APR	TRR	42.3	0	1800	0.0							12.0	44					0.7	11.2
11APR	HICK	31.6	6	1000	6.0	46	60	51.7	6	0	0	13.5	56					1.6	10.3
11APR	CHARLES	24.9	0	1350	0.0							15.9	87					1.3	10.1
11APR	LEGION	17.2	0	2400	0.0							15.8	108					3.2	9.2
11APR	RDP	12.3	0	1500	0.0							16.6	126					4.4	9.1
11APR	SHILOH	3.4	0	1800	0.0							17.3	147					2.8	9.1
11APR	LAIRD	90.2	0	1800	0.0							18.4	1191					26.4	10.0
11APR	GARDNER	79.5	0	1800	0.0							17.9	775					15.5	9.9
TR TOT.			15	13250	1.1	43	70	52.5	15	0	0								
SJR TOT.			0	3600	0.0														

2007 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)
25APR	OLGB	50.5	2	2250	0.9	36	37	36.5	2	0	0	10.8	36		0.4	0.2	0.0	0.8	11.7
25APR	R5	48.0	0	1800	0.0							11.1	37					0.9	11.2
25APR	TRR	42.3	0	1650	0.0							11.5	40					1.0	11.1
25APR	HICK	31.6	1	1350	0.7	66	66	66.0	1	0	0	13.4	45					1.3	10.4
25APR	CHARLES	24.9	0	1200	0.0							14.9	53					1.8	9.6
25APR	LEGION	17.2	0	1800	0.0							15.7	57					2.9	9.8
25APR	RDP	12.3	0	500	0.0							16.3	64					5.0	8.2
25APR	SHILOH	3.4	0	1800	0.0							17.1	66					4.8	8.5
25APR	LAIRD	90.2	0	1200	0.0							20.5	1100					35.8	10.5
25APR	GARDNER	79.5	0	1800	0.0							18.6	517					20.0	9.5
TR TOT.			3	12350	0.2	36	66	46.3	3	0	0								
SJR TOT.			0	3000	0.0														

2007 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)
09MAY	OLGB	50.5	0	2400	0.0							11.1	36		0.0	0.2	0.0	0.8	10.8
09MAY	R5	48.0	0	1500	0.0							11.8	38					N.A.	11.0
09MAY	TRR	42.3	0	1800	0.0							14.9	46					N.A.	10.3
09MAY	HICK	31.6	1	1500	0.7	100	100	100.0	1	0	0	18.0	59	100				N.A.	9.2
09MAY	CHARLES	24.9	0	1800	0.0							20.1	92					N.A.	9.1
09MAY	LEGION	17.2	0	2400	0.0							21.1	112					N.A.	8.5
09MAY	RDP	12.3	0	1050	0.0							22.0	141					N.A.	8.5
09MAY	SHILOH	3.4	0	1800	0.0							22.5	169					N.A.	7.8
09MAY	LAIRD	90.2	0	1350	0.0							22.8	694					N.A.	9.0
09MAY	GARDNER	79.5	0	1800	0.0							22.4	569					N.A.	8.8
TR TOT.			1	14250	0.1	100	100	100.0	1	0	0								
SJR TOT.			0	3150	0.0														

2007 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)
23MAY	OLGB	50.5	0	1800	0.0							11.0	34		0.0	0.3	0.0	0.8	11.6
23MAY	R5	48.0	0	1800	0.0							11.4	35					0.6	11.9
23MAY	TRR	42.3	0	1800	0.0							12.4	40					0.7	10.8
23MAY	HICK	31.6	1	1800	0.6	68	68	68.0	1	0	0	15.0	49	68				1.2	10.8
23MAY	CHARLES	24.9	1	1650	0.6	105	105	105.0	1	0	0	17.6	69	105				1.3	N.A.
23MAY	LEGION	17.2	0	2400	0.0							18.2	77					1.7	N.A.
23MAY	RDP	12.3	0	900	0.0							19.0	88					3.9	N.A.
23MAY	SHILOH	3.4	0	1800	0.0							20.1	101					4.5	N.A.
23MAY	LAIRD	90.2	0	1400	0.0							20.3	917					47.7	N.A.
23MAY	GARDNER	79.5	0	1800	0.0							20.2	597					19.8	N.A.
TR TOT.			2	13950	0.1	68	105	86.5	2	0	0								
SJR TOT.			0	3200	0.0														

Table 4. Key to other species caught and their distribution

(List includes all species caught during 1986-2007 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		
Cyprinidae	goldfish		GF		
Cyprinidae	golden shiner		GSH		
Cyprinidae	Sacramento blackfish	N	SBF		
Cyprinidae	hitch	N	HCH		
Cyprinidae	hardhead	N	HH		X
Cyprinidae	Sacramento pikeminnow	N	PM		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	X	
Ictaluridae	white catfish		WCF		
Ictaluridae	brown bullhead		BBH		
Poeciliidae	western mosquitofish		GAM		X
Atherinidae	inland silverside		ISS	X	
Percichthyidae	striped bass		SB		
Centrarchidae	white/black crappie		WCR/BCR		
Centrarchidae	warmouth		WM		
Centrarchidae	green sunfish		GSF		
Centrarchidae	bluegill		BG		X
Centrarchidae	redear sunfish		RSF		X
Centrarchidae	largemouth bass		LMB		X
Centrarchidae	smallmouth bass		SMB	X	
Percidae	bigscale logperch		BLP		X
Embiotocidae	tule perch	N	TP		
Cottidae	prickly sculpin	N	PSCP		
Cottidae	riffle sculpin	N	RSCP		X
TOTAL:	32			5	12

2007 species presence designated with 'X'

Table 4. 2007 OTHER SPECIES SAMPLED DURING SEINING STUDIES ON JUVENILE SALMON

2007 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
17JAN	1	OLGB	50.5																													
17JAN	2	R5	48.0														1															
17JAN	3	TRR	42.3														2												1			
17JAN	4	HICK	31.6																													
17JAN	5	CHARLES	24.9										15				1															
17JAN	6	LEGION	17.2																													
17JAN	7	RDP	12.3																													
17JAN	8	SHILOH	3.4																													
17JAN	9	LAIRD	90.2												20																	
17JAN	10	GARDNER	77.8												4																	

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
31JAN	1	OLGB	50.5																													
31JAN	2	R5	48.0																													
31JAN	3	TRR	42.3										1				1												1			
31JAN	4	HICK	31.6																													
31JAN	5	CHARLES	24.9										4				1															
31JAN	6	LEGION	17.2																													
31JAN	7	RDP	12.3																													
31JAN	8	SHILOH	3.4																													
31JAN	9	LAIRD	90.2												20					20												
31JAN	10	GARDNER	77.8												1					12												

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
14FEB	1	OLGB	50.5																													
14FEB	2	R5	48.0														1															
14FEB	3	TRR	42.3														1															
14FEB	4	HICK	31.6								12																					
14FEB	5	CHARLES	24.9										3																			
14FEB	6	LEGION	17.2																													
14FEB	7	RDP	12.3																													
14FEB	8	SHILOH	3.4																													
14FEB	9	LAIRD	90.2												20					4												
14FEB	10	GARDNER	77.8												6					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
28FEB	1	OLGB	50.5																													
28FEB	2	R5	48.0																													
28FEB	3	TRR	42.3			1											2															
28FEB	4	HICK	31.6								10																					
28FEB	5	CHARLES	24.9										2				1															
28FEB	6	LEGION	17.2														YOY															
28FEB	7	RDP	12.3																													
28FEB	8	SHILOH	3.4																											1		
28FEB	9	LAIRD	90.2												30																	
28FEB	10	GARDNER	77.8												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
14MAR	1	OLGB	50.5																													
14MAR	2	R5	48.0																													
14MAR	3	TRR	42.3																													
14MAR	4	HICK	31.6								3		3																			
14MAR	5	CHARLES	24.9								2		3																			
14MAR	6	LEGION	17.2																1													
14MAR	7	RDP	12.3																													
14MAR	8	SHILOH	3.4												1																	
14MAR	9	LAIRD	90.2																													
14MAR	10	GARDNER	77.8																													

Table 4. 2007 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
28MAR	1	OLGB	50.5																										1			
28MAR	2	R5	48.0																													
28MAR	3	TRR	42.3																										1			
28MAR	4	HICK	31.6										1																			
28MAR	5	CHARLES	24.9																													
28MAR	6	LEGION	17.2														YOY															
28MAR	7	RDP	12.3																													
28MAR	8	SHILOH	3.4														YOY															
28MAR	9	LAIRD	90.2												25					3												
28MAR	10	GARDNER	77.8														YOY															

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
11APR	1	OLGB	50.5																													
11APR	2	R5	48.0			3																										
11APR	3	TRR	42.3			7																							3			
11APR	4	HICK	31.6																													
11APR	5	CHARLES	24.9										3				3															
11APR	6	LEGION	17.2														YOY															
11APR	7	RDP	12.3												50		YOY															
11APR	8	SHILOH	3.4												100		YOY															
11APR	9	LAIRD	90.2												150		YOY			1												
11APR	10	GARDNER	77.8												40		YOY															

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
25APR	1	OLGB	50.5																										3			
25APR	2	R5	48.0																										2			
25APR	3	TRR	42.3			5																							4			
25APR	4	HICK	31.6																										1			
25APR	5	CHARLES	24.9								5						YOY															
25APR	6	LEGION	17.2										2				YOY															
25APR	7	RDP	12.3														YOY															
25APR	8	SHILOH	3.4														YOY										1					
25APR	9	LAIRD	90.2												40					1											8	
25APR	10	GARDNER	77.8												20		YOY			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
09MAY	1	OLGB	50.5																													
09MAY	2	R5	48.0			3																										
09MAY	3	TRR	42.3			1																							10			
09MAY	4	HICK	31.6										10																			
09MAY	5	CHARLES	24.9								20		4				3															
09MAY	6	LEGION	17.2														YOY															
09MAY	7	RDP	12.3														3															
09MAY	8	SHILOH	3.4												6									1	1							
09MAY	9	LAIRD	90.2												20																	
09MAY	10	GARDNER	77.8												4		YOY			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
23MAY	1	OLGB	50.5																													
23MAY	2	R5	48.0			2											YOY															
23MAY	3	TRR	42.3																													
23MAY	4	HICK	31.6								75		25																			
23MAY	5	CHARLES	24.9								10		5				YOY															
23MAY	6	LEGION	17.2														YOY															
23MAY	7	RDP	12.3														YOY															
23MAY	8	SHILOH	3.4												4		YOY															
23MAY	9	LAIRD	90.2												10		5									1						
23MAY	10	GARDNER	77.8												6					2						2						

Table 5. Tuolumne River snorkel summary, 2007.

2007 TUOLUMNE RIVER SNORKEL SUMMARY (TID/MID)

															NUMBER COUNTED (ESTIMATED TOTAL LENGTH OR SIZE RANGE IN MM)										
DATE	START TIME	LOCATION	RIVER MILE	SITE	AREA (Sq. Ft.)	AVG. DEPTH (FEET)	TIME (Min.)	HABITAT	SUBSTRATE	WATER TEMP. (C)	DO (mg/l)	EC	TURB. (NTU)	HORIZ. VISIB. (FEET)	CHINOOK count/est.	CHINOOK size	RAINBOW count/est.	RAINBOW size	SACRAMENTO SUCKER	SACRAMENTO PIKEMINNOW	HARDHEAD	RIFFLE SCULPIN	LARGEMOUTH BASS	SMALLMOUTH BASS	WHITE CATFISH
26JUN	0955	Riffle A7	50.7	1	5,000	1.2	25.0	Riffle	cobble,gravel,bedrock	12.2	10.5	33	0.7	20.0	3	(55,60,600)									
	0954			2	4,000	4.0	30.0	Run	cobble,gravel,sand						10	(70-90)	101	(60-110)							
																	5	(240-480)		(520)					
26JUN	1131	Riffle 2	49.9	1	5,000	1.2	20.0	Riffle	cobble,gravel,sand	14.5	10.4	35	0.7	17.0								4(60-80)			
	1147			2	4,500	7.0	20.0	Pool	bedrock,boulder,cobble								26	(70-100)							
																	4	(250-360)	13(300-500)	(400)					
	1154			3	8,000	4.0	20.0	Run	cobble,sand,boulder						8	(75-100)	4	(230-420)							
															10	(110-125)									
26JUN	1327	Riffle 3B	49.1	1	4,400	1.5	22.0	Riffle	cobble,gravel,sand	17.0	10.3	35	0.7	17.0	10	(70-100)	36	(60-120)							
																	4	(260-440)							
	1333			2	12,000	3.0	25.0	Run-Riffle	cobble,boulder,bedrock						22	(70-120)	5	(275-400)	7(525-625)	5(375-450)					
26JUN	1444	Riffle 5B	47.9	1	2,400	2.0	16.0	Riffle	cobble,gravel,sand	19.2	10.3	37	0.8	16.0			13	(70-100)	16(500-650)	(520)		(50,60,80)			
																	4	(320-480)							
	1516			2	12,000	4.0	24.0	Run	cobble,bedrock,gravel						4	(60-80)	9	(110), 8(250-380)	8(350-700)						
	1446			3	12,250	4.0	25.0	Run-Pool	bedrock,cobble,sand								65	(50-150)							
																	1	(390)							
					69,550		227.0			**Subtotal**					**67**		**277**		**44**	**8**		**7**			
27JUN	0954	Riffle 7	46.9	1	4,375	1.3	14.0	Riffle	cobble,gravel,sand	16.0	10.5	36	0.7	17.0			16	(80-125)							
																	1	(320)							
	0950			2	8,000	4.0	24.0	Run	bedrock,cobble,sand								5	(280-380)	120(400-600)	8(220-480)					
27JUN	1135	Riffle 13B	45.5	1	7,500	1.7	15.0	Run-Riffle	gravel,cobble,sand	18.7	10.1	38	1.0	16.0			5	(75-125)							
	1132			2	4,800	1.5	17.0	Riffle	gravel,cobble,bedrock								10	(70-140)		(220)					
27JUN	1328	Riffle 21	42.9	1	4,375	1.2	17.0	Riffle	cobble,gravel,sand	21.2	9.7	43	1.1	14.0			7	(80-160)							
	1324			2	4,500	3.5	20.0	Run-Pool	cobble,sand,vegetation								3	(90,110,120)		5(160-220)					
27JUN	1444	Riffle 23C	42.3	1	12,250	2.0	16.0	Run	cobble,sand,gravel	22.9	9.8	45	1.3	13.0			2	(120,125)	12(40-60)						
	1439			2	3,750	1.5	18.0	Riffle	cobble,bedrock,gravel								3	(120,140,350)	8(50-60), (500)			(60)			
					49,550		141.0			**Subtotal**					**0**		**52**		**141**	**14**		**1**			
03JUL	0923	Riffle 31	38.0	1	5,400	1.5	19.0	Riffle	cobble,gravel,algae	21.4	9.1	62	1.3	12.0			1	(90)	5(60-90)						
	0930			2	10,000	3.0	15.0	Run-Pool	cobble,sand,algae								11	(105-160)	(45,50), 55(500-700)				(270)		
03JUL	1043	Riffle 35A	37.1	1	7,500	2.0	24.0	Riffle-Run	cobble,gravel,bedrock	23.0	9.0	65	1.0	14.0					45(60-90) (700,800)	50(90-220)	20(100-160)	(90)	(120,160)		
	1051			2	10,500	2.5	23.0	Run	cobble,gravel,sand										400(50-90)	250(50-90)				(110)	
03JUL	1315	Riffle 41A	35.3	1	3,750	1.8	23.0	Run-Riffle	cobble,gravel,sand	23.7	8.8	67	1.3	12.0			2	(160,180)	40(50-100) 6(600-750)	75(60-140) 20(150-180)					
	1304			2	2,000	4.0	6.0	Run-Pool	sand,gravel,cobble										40(40-60)	(200,260,300)					
	1310			3	7,500	1.5	15.0	Riffle	cobble,gravel,sand										3(500-700)	10(90-140)					
03JUL	1451	Riffle 57	31.5	1	6,750	1.3	17.0	Riffle	cobble,gravel,sand	26.2	8.2	73	1.2	14.0					100(60-200) 7(600-800)	60(110-200)				(70)	
	1447			2	7,500	2.0	16.0	Run-Riffle	cobble,bedrock,sand										16(60-90)	22(70-140)	12(70-90)	(70)	6(50-60)	(300)	(360)
					60,900		158.0			**Subtotal**					**0**		**14**		**721**	**490**	**32**	**2**	**9**	**3**	**1**
										TOTAL#					**67**		**343**		**906**	**512**	**32**	**10**	**9**	**3**	**1**

YOY Sacramento sucker were common or abundant at most locations.

2007 TUOLUMNE RIVER SNORKEL SUMMARY (TID/MID)

																NUMBER COUNTED (ESTIMATED TOTAL LENGTH OR SIZE RANGE IN MM)									
DATE	START TIME	LOCATION	RIVER MILE	SITE	AREA (Sq. Ft.)	AVG. DEPTH (FEET)	TIME (Min.)	HABITAT	SUBSTRATE	WATER TEMP. (C)	DO (mg/l)	EC	TURB. (NTU)	HORIZ. VISIB. (FEET)	CHINOOK count/est.	CHINOOK size	RAINBOW count/est.	RAINBOW size	SACRAMENTO SUCKER	SACRAMENTO PIKEMINNOW	HARDHEAD	RIFFLE SCULPIN	LARGEMOUTH BASS	SMALLMOUTH BASS	BLUEGILL
18SEP	0930	Riffle A7	50.7	1	3,750	1.3	21.0	Riffle	cobble,gravel,bedrock	12.8	10.2	32	0.9	16.0			35	(40-80)							
				2	3,000	3.0	23.0	Run	cobble,gravel,sand								35	(90-160)							
																	5	(250-380)							
18SEP	1100	Riffle 2	49.9	1	4,000	1.2	20.0	Riffle	cobble,gravel,sand	15.3	10.0	35	0.8	16.0								5(30-60)			
				2	6,000	6.0	21.0	Pool	bedrock,cobble,boulder								7	(100-140)	(800)						
																	4	(300-480)							
				3	9,600	4.0	17.0	Run	cobble,sand,boulder								5	(220-400)	75(50-80)						
18SEP	1310	Riffle 3B	49.1	1	4,000	1.5	18.0	Riffle	cobble,gravel,sand	16.4	11.0	35	0.8	15.0			4	(100-130)							
																	4	(360-500)							
				2	7,500	2.8	20.0	Run-Riffle	cobble,boulder,gravel								4	(290-380)							
18SEP	1430	Riffle 5B	47.9	1	3,000	2.0	12.0	Riffle	cobble,gravel,algae	18.4	11.6	48	0.8	17.0			3	(120-160)							
																	4	(320-450)							
				2	12,000	4.0	22.0	Run	cobble,bedrock,algae								1	(340)	52(40-90)	12(50-80)			(70,80)		
				3	9,600	3.0	14.0	Run-Pool	cobble,bedrock,algae								2	(300,440)	75(40-80)						
					62,450		188.0			**Subtotal**					**0**		**113**		**203**	**12**		**5**	**2**		
19SEP	0930	Riffle 7	46.9	1	5,000	1.2	19.0	Riffle	cobble,gravel,algae	15.0	9.0	36	1.0	17.0			2	(400,420)	(90)						
				2	8,000	4.0	22.0	Run	bedrock,cobble,sand								5	(280-360)	50(400-800)	5(360-520)	(380)				
19SEP	1100	Riffle 13B	45.5	1	7,500	1.6	17.0	Run-Riffle	sand,cobble,gravel	16.7	9.2	44	0.8	20.0			45	(110-170)	150(50-90)	70(50-90)					
				2	4,000	1.5	15.0	Riffle	gravel,sand,cobble								12	(100-160)	6(40-60)	8(40-70)		(70)			
19SEP	1230	Riffle 21	42.9	1	4,500	1.1	15.0	Riffle	cobble,gravel,sand	17.9	8.6	44	0.9	18.0			9	(110-170)	40(50-90)	110(40-110)					
				2	5,000	3.5	19.0	Run-Pool	cobble,sand,vegetation								1	(320)		23(220-460)	22(220-380)				
19SEP	1410	Riffle 23C	42.3	1	2,250	2.0	15.0	Run	sand,cobble,gravel	19.0	8.6	48	0.9	17.0			2	(140,150)	40(40-80)	50(40-80) (300)			(160,150,150)		
				2	4,000	1.5	15.0	Riffle	cobble,bedrock,gravel								5	(120-150)	20(50-90)	40(60-110)	40(60-110)			(100)	
					40,250		137.0			**Subtotal**					**0**		**81**		**307**	**307**	**63**	**1**	**3**	**1**	
20SEP	0915	Riffle 31	38.0	1	4,500	1.5	16.0	Riffle	cobble,gravel,algae	17.1	10.0	68	1.3	14.5					22(60-100)	60(80-130)	50(80-110)				
				2	7,500	2.5	14.0	Run-Pool	cobble,sand,algae								4	(280-360)					(170)		
20SEP	1030	Riffle 35A	37.1	1	5,000	2.0	17.0	Riffle-Run	bedrock,cobble,gravel,	17.7	9.8	70	1.1	17.0					16(80-140)	10(60-80), 25(100-220)	27(100-240)	(70)			
				2	10,000	2.0	22.0	Run	sand,gravel,cobble														(140)		
20SEP	1210	Riffle 41A	35.3	1	2,500	2.0	16.0	Run-Riffle	cobble,gravel,sand	18.7	8.7	71	0.8	18.0					250(50-150)	230(50-200), 5(220-260)	230(50-200)				
				2	2,000	4.0	6.0	Run-Pool	sand,gravel,cobble										(110)	20(80-110)	20(80-110)		(110)	(90,100,110)	
				3	6,000	1.5	11.0	Riffle	cobble,gravel,sand										60(400-700)	15(110-140)	15(110-140)				
20SEP	1400	Riffle 57	31.5	1	5,250	1.1	17.0	Riffle	cobble,gravel,algae	20.8	9.0	75	0.7	20.0					225(50-200),50(500-700)	205(100-300)	150(100-300)			(120,120)	
				2	7,500	2.5	17.0	Run-Riffle	cobble,bedrock,sand											20(80-110)	20(80-110)		6(90-110)	15(90-120)	8(60-80)
					50,250		136.0			**Subtotal**					**0**		**4**		**624**	**590**	**512**	**1**	**9**	**20**	**8**
										TOTAL#					**0**		**198**		**1134**	**909**	**575**	**7**	**14**	**21**	**8**

YOY Sacramento sucker were common or abundant at most locations.

Table 6. 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

--- Not Sampled

*All San Joaquin River locations were not always sampled

Table 7. Summary table of locations sampled, 1986-2007

1986 TO 2007 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
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
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
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
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
8	Charles Road	24.9		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
10	Riverdale Park / Venn	12.3 / 7.4		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

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
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
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
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
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
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 8. 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	86	158.8	59.5
1986	3800	87	69.3	46.2
1987	4600	88	70.2	33.9
1988	4100	89	115.1	39.7
1989	680	90	11.4	5.0
1990	28	91	1.3	0.5
1991	28	92	6.1	2.9
1992	55	93	1.7	0.9
1993	237	94	79.5	41.5
1994	249	95	12.5	9.8
1995	522	96	16.1	13.0
1996	1142	97	2.8	2.1
1997	4224	98	49.3	24.6
1998	4527	99	78.0	39.3
1999	3535	00	78.8	48.0
2000	11260	01	126.3	85.6
2001	4970	02	92.8	41.5
2002	3876	03	164.3	68.8
2003	1768	04	38.8	27.2
2004	1004	05	20.5	14.56
2005	478	06	28.7	12.74
2006	282	07	3.7	2.2

Table 9. Summary table of salmonids observed during the 2001-2007 (September) snorkel surveys.

Late summer snorkel survey comparisor

TUOLUMNE RIVER SNORKEL SUMMARY -- YEARLY COMPARISON OF SALMONIDS OBSERVED								TUOLUMNE RIVER SNORKEL SUMMARY -- YEARLY COMPARISON OF O. mykiss OBSERVED						
	CHINOOK 2001	**CHINOOK 2002**	**CHINOOK 2003**	**CHINOOK 2004**	**CHINOOK 2005**	**CHINOOK 2006**	**CHINOOK 2007**	**RAINBOW 2001**	**RAINBOW 2002**	**RAINBOW 2003**	**RAINBOW 2004**	**RAINBOW 2005**	**RAINBOW 2006**	**RAINBOW 2007**
DATES	Sept. 18-20	Sept. 24-26	Sept. 17-19	Sept. 15-17	Sept. 20-22	Sept. 19-21	Sept. 18-20	Sept. 18-20	Sept. 24-26	Sept. 17-19	Sept. 15-17	Sept. 20-22	Sept. 19-21	Sept. 18-20
LOCATIONS														
Riffle A7 (RM 50.7)	21	2	2	0	1	0	0	3	1	16	11	10	115	75
Riffle 2 (RM 49.9)	0	0	1	0	0	0	0	3	4	2	7	7	15	16
Riffle 3B (RM 49.1)	0	0	3	0	3	10	0	1	1	21	7	6	66	12
Riffle 5B (RM 47.9)	0	0	4	0	0	0	0	2	0	10	6	36	54	10
Sec. Total	**21**	**2**	**10**	**0**	**4**	**10**	**0**	**9**	**6**	**49**	**31**	**59**	**250**	**113**
Riffle 7 (RM 46.9)	0	1	0	0	0	0	0	0	2	9	2	2	106	7
Riffle 13B,13A (RM 45.5 / 45.6)	0	0	0	0	1	8	0	0	4	6	0	46	103	57
Riffle 21 (RM 43.1)	0	0	1	0	0	10	0	3	0	6	7	15	32	10
Riffle 23B-C (RM 42.3)	0	0	0	0	0	8	0	0	0	1	0	14	27	7
Sec. Total	**0**	**1**	**1**	**0**	**1**	**26**	**0**	**3**	**6**	**22**	**9**	**77**	**268**	**81**
Riffle 31 / 30B (RM 38.1 / 38.5)	0	0	0	0	0	0	0	0	0	0	0	1	21	4
Riffle 37 / 35A (RM 36.2 / 37.1)	0	0	1	0	0	4	0	0	0	0	0	2	4	0
Sec. Total	**0**	**0**	**1**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**3**	**25**	**4**
Riffle 41A (RM 35.3)	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Riffle 57 (RM 31.5)	0	0	0	0	0		0	0	0	0	0	0		0
Sec. Total	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Grand Total	**21**	**3**	**13**	**0**	**5**	**40**	**0**	**12**	**12**	**71**	**40**	**139**	**543**	**198**

TUOLUMNE RIVER SNORKEL SUMMARY -- YEARLY COMPARISON OF DENSITY INDICES (SALMONIDS OBSERVED / 1000 SQ. FT.)								TUOLUMNE RIVER SNORKEL SUMMARY -- YEARLY COMPARISON OF DENSITY INDICES (O. mykiss OBSERVED / 1000 SQ. FT.)						
	CHINOOK 2001	**CHINOOK 2002**	**CHINOOK 2003**	**CHINOOK 2004**	**CHINOOK 2005**	**CHINOOK 2006**	**CHINOOK 2007**	**RAINBOW 2001**	**RAINBOW 2002**	**RAINBOW 2003**	**RAINBOW 2004**	**RAINBOW 2005**	**RAINBOW 2006**	**RAINBOW 2007**
DATES	Sept. 18-20	Sept. 24-26	Sept. 17-19	Sept. 15-17	Sept. 20-22	Sept. 19-21	Sept. 18-20	Sept. 18-20	Sept. 24-26	Sept. 17-19	Sept. 15-17	Sept. 20-22	Sept. 19-21	Sept. 18-20
LOCATIONS														
Riffle A7 (RM 50.7)	2.97	0.14	0.21	0.00	0.08	0.00	0.00	0.42	0.07	1.68	1.06	0.83	9.58	11.11
Riffle 2 (RM 49.9)	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.20	0.21	0.19	0.31	0.23	0.88	0.82
Riffle 3B (RM 49.1)	0.00	0.00	0.33	0.00	0.26	1.11	0.00	0.08	0.12	2.33	0.60	0.53	7.33	1.04
Riffle 5B (RM 47.9)	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.16	0.00	0.80	0.26	1.56	2.40	0.41
Sec. Total	**0.45**	**0.03**	**0.24**	**0.00**	**0.05**	**0.17**	**0.00**	**0.19**	**0.09**	**1.18**	**0.46**	**0.77**	**4.13**	**1.81**
Riffle 7 (RM 46.9)	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.38	1.15	0.15	0.14	6.84	0.54
Riffle 13B,13A (RM 45.5 / 45.6)	0.00	0.00	0.00	0.00	0.12	0.80	0.00	0.00	0.48	0.74	0.00	5.41	10.30	4.96
Riffle 21 (RM 43.1)	0.00	0.00	0.17	0.00	0.00	0.89	0.00	0.67	0.00	1.03	0.52	1.25	2.84	1.05
Riffle 23B-C (RM 42.3)	0.00	0.00	0.00	0.00	0.00	1.23	0.00	0.00	0.00	0.19	0.00	2.00	4.15	1.12
Sec. Total	**0.00**	**0.04**	**0.04**	**0.00**	**0.02**	**0.60**	**0.00**	**0.12**	**0.22**	**0.82**	**0.22**	**1.86**	**6.20**	**2.01**
Riffle 31 / 30B (RM 38.1 / 38.5)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	1.33	0.33
Riffle 37 / 35A (RM 36.2 / 37.1)	0.00	0.00	0.14	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.18	0.29	0.00
Sec. Total	**0.00**	**0.00**	**0.07**	**0.00**	**0.00**	**0.13**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.11**	**0.84**	**0.15**
Riffle 41A (RM 35.3)	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Riffle 57 (RM 31.5)	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00		0.00
Sec. Total	**0.00**	**0.00**	**0.05**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Table 10. Tuolumne River snorkel locations and months surveyed, 2001-2007

	2001		2002		2003		2004			2005	2006	2007	
	JUN	SEP	JUN	SEP	JUN	SEP	JUN	AUG	SEP	SEP	SEP	JUN	SEP
LOCATIONS													
Riffle A3/A4 (RM 51.6)								X					
Riffle A7 (RM 50.7)	X	X	X	X	X	X	X	X	X	X	X	X	X
Riffle 1A (RM 50.4)								X					
Riffle 2 (RM 49.9)	X	X	X	X	X	X	X	X	X	X	X	X	X
Riffle 3B (RM 49.1)	X	X	X	X	X	X	X	X	X	X	X	X	X
Riffle 4B (RM 48.4)								X					
Riffle 5B (RM 48.0)	X	X	X	X	X	X	X	X	X	X	X	X	X
Riffle 7 (RM 46.9)	X	X	X	X	X	X	X	X	X	X	X	X	X
Riffle 9 (RM 46.4)								X					
Riffle 13A-B (RM 45.6)	X	X	X	X	X	X	X	X	X	X	X	X	X
Riffle 21 (RM 42.9)	X	X	X	X	X	X	X	X	X	X	X	X	X
Riffle 23B-C (RM 42.3)	X	X	X	X	X	X	X	X	X	X	X	X	X
Riffle 30B (RM 38.5)			X	X									
Riffle 31 (RM 38.1)	X	X			X	X	X	X	X	X	X	X	X
Riffle 33 (RM 37.8)													
Riffle 35A (RM 37.0)			X	X	X	X	X	X	X	X		X	X
Riffle 36A (RM 36.7)											X		
Riffle 37 (RM 36.2)	X	X											
Riffle 41A (RM 35.3)	X	X	X	X	X	X	X	X	X	X	X	X	X
Riffle 57-58 (RM 31.5)	X	X	X	X	X	X	X	X	X	X	X	X	X