UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

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

2011 LOWER TUOLUMNE RIVER ANNUAL REPORT

Report 2011-3

2011 Seine Report and Summary Update

Prepared by

Stillwater Sciences
Berkeley, CA

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EXECUTIVE SUMMARY

The 2011 seining survey was conducted at two-week intervals from 19 January to 24 May for a total of 10 sample periods. This was the 26th consecutive annual seining study on the Tuolumne River conducted by the Turlock and Modesto Irrigation Districts. 2011 flow releases were significantly higher than recent years going back to 2006 when flows at La Grange last exceeded 8,000 cubic feet per second (cfs). Chinook salmon catch was much lower this year due to the increased volume of water in the river and subsequent reduction of fish density. Sampling areas were also limited to flooded margins along the floodplain and micro-habitat conditions at the survey sites were less than ideal for large catches of salmon, especially juveniles >50 mm FL.

A total of 164 natural Chinook salmon were caught in the Tuolumne River and 19 in the San Joaquin River. This was the 4th lowest number of salmon caught during the 1986-2011 period and salmon were caught throughout the Tuolumne and at both San Joaquin sites. Peak density of salmon caught in the Tuolumne was 4.3 salmon per 1,000 square feet on 01 February and 3.2 salmon per 1,000 square feet on 15 March in the San Joaquin River. Minimum and maximum fork length (FL) in the Tuolumne River both occurred on 01 February and were 31 and 76 mm FL, respectively. Minimum Fl in the San Joaquin River was 37 mm FL on 15 February and 01 March and maximum FL was 68 mm FL on 15 March.

Flows during the sampling period ranged from about 1,600 to 8,300 cubic feet per second (cfs) in the Tuolumne River at La Grange and from about 6,800 to 31,000 cfs in the San Joaquin River at Vernalis. Flows in 2011 were significantly higher than average due to abundant precipitation.

Water temperature in the Tuolumne ranged from 10.0°C to 16.8°C and in the San Joaquin from 10.7°C to 20.1°C. Conductivity in the Tuolumne River ranged from 24 to 57 μS and in the San Joaquin from 123 to 514 μS.

A comparative review of fork length and salmon density for the 2006-2011 period is included. Increase in average fork length in 2011 was much smaller in magnitude to the pattern observed in other years, due to low catch numbers.

Density of fry (≤ 50 mm) peaked on 15 February, similar in timing to other years of the 2006-2011 period. The density of juveniles (> 50 mm) peaked on 01 February, which was much earlier than other years in the period. In 2011, the average density of salmon in the Tuolumne River was 1.2 salmon per 1,000 ft^2, similar to 2007 and 2008.

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1 INTRODUCTION

Stillwater Sciences with assistance from FISHBIO conducted Chinook salmon seine surveys in the Tuolumne and San Joaquin Rivers in 2011 for the Turlock and Modesto Irrigation Districts (TID/MID). Seine sampling was done in both rivers pursuant to the Don Pedro Project (FERC #2299) river-wide monitoring program. The purpose of the seine monitoring program was to document juvenile Chinook salmon size, abundance and distribution in the Tuolumne and San Joaquin rivers. The Chinook salmon captured during the 2011 seine surveys were the progeny of the 2010 fall spawning run, which was estimated at about 766 fish as counted at the Tuolumne River weir (through Nov 2010).

This report, which is the 26th in the annual series, contains the results of the 2011 seining effort and a summary of monitoring data collected since 1996.

1.1 STUDY SITES

The seining study area includes 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) downstream to Gardner Cove (RM 79.4) (Figure 1). A total of 10 sites were sampled each survey period, eight on the Tuolumne and two on the San Joaquin. These sites have generally been sampled since the beginning of the program in 1986. However, alternate sites were utilized as necessary during high flows when conditions at the primary study locations were unsuitable for monitoring activities. The locations of the monitoring sites were as follows:

Site	Location	River Mile
	Tuolumne River	
1	Old La Grange Bridge (OLGB)	50.5[a]
2	Riffle 4B, 5	48.4, 48.0
3	Turlock Lake State Recreation Area (TLSRA)	42.0
4	Hickman Bridge	31.6
5	Charles Road	24.9
6	Legion Park	17.2
7	Riverdale Park, Venn Ranch	12.3, 6.4
8	Shiloh Road	3.4
	San Joaquin River	
9	Laird Park	90.2[b]
10	Gardner Cove, Old Fishermen's Club	79.4, 80.7

[a] As measured from the confluence with the San Joaquin River
[b] As measured from the confluence with the Sacramento River

The Tuolumne River monitoring reach was divided into three sections. The upper section (RM 52 to 34) that contained sites 1-3, was a higher gradient reach that included most of the primary

spawning riffles in the river. The middle section (RM 34 to 17), containing sites 4-6, was the transitional area from the gravel-bedded to sand-bedded river reaches. This section contained most of the in-channel sand/gravel mined areas. The lower section (RM 17 to 0), sites 7-8, was a low gradient, mostly sand-bottom reach located downstream of the Dry Creek confluence.

2 METHODS

2.1 STUDY TIMING

The 2011 seining study began on 19 January and ended on 24 May. Seining efforts were conducted on two-week intervals for a total of 10 sampling dates.

2.2 SAMPLING METHODS AND DATA RECORDING

Seining was conducted using a 4-foot high, 1/8-inch mesh nylon seine net 20 feet in length. Seine hauls were made with the current and parallel to shore. The captured Chinook salmon were anesthetized with MS-222, measured (FL in mm) and then revived before being released. Other data recorded during the seine surveys included the area sampled (determined from estimating average length and width of a seine haul), water temperature in degrees Celsius (C), dissolved oxygen in milligrams per liter (mg/L), underwater visibility, conductivity in microsiemens (µS), turbidity in Nephelometric Turbidity Units (NTU), and maximum depth. Other recorded observations included time of day, weather conditions, habitat type, substrate type, and other fish species captured in the seine hauls. Also noted were any salmon displaying signs of smoltification, such as losing scales or silvering up.

2.3 DATA ANALYSIS

Seining catch data were analyzed, arranged, and reported on a site, river section, and river-wide basis. 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 FL) were computed by multiplying the number of salmon caught by 1,000 and dividing it by the area of the site or section that was sampled. The 2011 density indices were compared to previous years catch and density data. Densities and sizes of salmon fry and juveniles were analyzed for each of the upper, middle, and lower river sections.

3 RESULTS AND DISCUSSION

3.1 2011 TUOLUMNE AND SAN JOAQUIN RIVER SAMPLING CONDITIONS

Flow releases during the 2011 study period were similar to those in 2006, which was the last wet year. Flows at the U.S. Geological Survey (USGS) gage (#11289500) in the Tuolumne River below La Grange Dam were approximately 1,600 cubic feet per second (cfs) in early February, which was the lowest level during the 2011 seine study period (Figure 2). Flows were gradually increased through the month, were lowered slightly in mid-March and then increased to over 8,000 cfs through mid-April. Flows remained above 3,000 cfs through the end of May. Although

seine surveys were terminated at the end of May due to low capture numbers, flows to the lower river increased to about 7,000 cfs in June, before decreasing through July.

The USGS stream gage at Vernalis (#11303500) (RM 72.5) and the California Department of Water Resources gage at Patterson Bridge (SJP) (RM 98.5) were used to represent flow levels at the Laird Park and Gardner Cove sampling locations. Laird Park and Gardner Cove are located on the San Joaquin River, upstream and downstream of the mouth of the Tuolumne River, respectively. Flows in the San Joaquin River at Vernalis (RM 72.5) ranged from 6,800 to 31,000 cfs from January through June 2011. Flows at Patterson ranged from 3,600 to 22,700 cfs from January through June 2011.

The minimum water temperature recorded in the Tuolumne River during the study period, based on hand-held temperature measurements, was 10.0°C (50.0°F) at Hickman Bridge on 01 March and the maximum temperature was 16.8°C (62.2°F) at the Venn Ranch on 24 May (Figure 3). The lowest San Joaquin River water temperature, 10.7°C (51.3°F) was at Laird Park on 01 February; the highest was 20.1°C (68.2°F) at Laird Park on 24 May.

Dissolved oxygen concentration in the Tuolumne River ranged from 8.7 to 14.1 mg/L and 7.0 to 11.2 mg/L in the San Joaquin River (Figure 3).

Conductivity in the Tuolumne River generally increased with increasing distance below La Grange Dam, from a low of 24 µS at OLGB to a high of 57 µS at Venn Ranch (Table 1). Conductivity was relatively low throughout the year due to high flows (Figure 4).

Conductivity in the San Joaquin River was much higher than in the Tuolumne and ranged from a low of 123 µS at the Old Fishermen's Club to a high of 514 µS at Laird Park (Table 1 and Figure 4).

Turbidity in the Tuolumne River was less than 7.5 NTU except for one reading at Legion Park on 01 February that was likely the result of storm runoff (Table 1). 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 11.3 at Gardner Cove to 33.4 NTU measured at Laird Park (Table 1 and Figure 4)

3.2 SEINE CATCH

A total of 164 fry and juvenile Chinook salmon were caught in the Tuolumne River and 19 in the San Joaquin (Table 2). Although the 2011 salmon catch was relatively low when compared to past years, salmon were caught at all of the Tuolumne and San Joaquin River survey sites.

3.2.1 Density of Fry and Juvenile Salmon

3.2.1.1 Tuolumne River

The highest density of Chinook salmon fry (14.5/1000 ft²) was recorded at the TLSRA site on 15 February (Table 3). The highest density of juvenile Chinook salmon (4.8/1000 ft²) was recorded at the Hickman site on 1 February (Table 3). On 1 February, the Hickman site also had the

highest combined density of fry and juveniles at 15.2 fish/1000 ft² (Table 3). The density of salmon fry by location exhibited a peak from 19 January to 15 February (Figure 5). The density of juveniles generally peaked from 01 February to 01 March for most locations (Figure 5).

The density of Chinook salmon fry in the Tuolumne River peaked in the upper section on 15 February with 4.3/1,000 ft² (Table 3 and Figure 6). The fry densities in the middle and lower sections peaked on 01 February with 6.2/1,000 ft² and 2.3/1,000 ft², respectively (Table 2 and Figure 6). The density of juveniles in the Tuolumne River peaked in the upper section on 26 April with 0.3/1,000 ft² (Table 2 and Figure 6). The juvenile densities in the middle and lower sections peaked on 01 February with 1.7/1,000 ft² and 0.4/1,000 ft², respectively (Table 2 and Figure 6).

The peak density of salmon fry in the Tuolumne River for the combined survey locations was 3.6/1,000 ft^2 found on 15 February (Table 2). The peak density of juvenile salmon in the Tuolumne River was 0.8/1,000 ft^2 found on 01 February. The highest combined fry and juvenile density for the entire Tuolumne River survey reach was 4.3/1000 ft² (Table 2). The average combined density of fry and juveniles for the entire survey period was 1.2/1000 ft² (Table 2).

3.2.1.2 San Joaquin River

A total of 19 fry and juvenile Chinook salmon were caught in the San Joaquin River from 01 February to 15 March at the Laird and Gardner Cove survey locations. The last year Chinook salmon were caught at these locations was in 2006 under similar high flow conditions. The peak fry density (2.7/1000 ft^2) and juvenile density (2.0/1000 ft^2) both occurred on 15 March at Gardner Cove (Table 2). The peak combined fry and juvenile density at this location and date was 4.7/1000 ft^2.

The peak combined fry and juvenile Chinook salmon density for both the Laird and Gardner Cove sites was 3.2/1000 ft^2. The average combined density of fry and juveniles for the entire survey period was 0.6/1000 ft² (Table 2).

3.2.2 Size, Growth, and Smoltification

The fork length of salmon caught in the Tuolumne River ranged from 31 mm to 76 mm (Tables 1 and 3). The average fork length (FL) of salmon generally increased throughout the survey period (Table 2 and Figure 7). The indirect method to estimate growth rate usually made by dividing the increase in maximum FL, over a period of time was not calculated in 2011 due to low numbers of juvenile salmon caught.

Length frequency distributions by survey period are shown in Figures 8 and 9. The change in FL by location generally shows no pattern throughout the survey period (Figure 10). Usually a pattern of increasing FL in a downstream direction is observed. None of the salmon that were caught in 2011 exhibited smolting characteristics.

3.2.3 Other Fish Species Caught

A list of other fish species caught during the seining study by species, location, and date is in Table 4. Ten species other than Chinook salmon were caught in the Tuolumne River and 11

other species in the San Joaquin River. Seven of these species were common to both rivers and 14 species were caught overall. Seven rainbow trout (*O. mykiss*) fry (21–40 mm FL) were caught in the Tuolumne River between 01 February and 26 April at OLGB, R4B, and R5 (Table 4).

4 COMPARATIVE REVIEW

The comparative review of Chinook salmon fork lengths and densities in this report is primarily for the 2006 to 2011 period.

4.1 SEINE: 1986–2011

Annual TID/MID Tuolumne River seining surveys began in 1986. Up to 11 sites and varying degrees of effort have been employed in the Tuolumne River during the course of the 1986 to 2011 study period (Tables 5 and 6). Beginning in 1999, the sites discussed in this report have been consistently monitored. However, two alternate sites (Riffle 4B and TSLRA) were utilized during the 2011 effort because the Riffle 5 and TRR sites were unsuitable due to high flows (Tables 5 and 6). The number of salmon caught and the related density indices are subject to river conditions that affect the seining operations. For example, high flow conditions may result in marginal seining conditions at one location and improved at others, which is what occurred in 2011.

The number of salmon captured in the Tuolumne River has ranged from 120 in 1991 to 14,825 in 1987 (Table 5). The total number of salmon captured in 2011 was 164, which was the fourth lowest for the entire 26-year study period.

The San Joaquin River Laird and Gardner Cove sites have been during each of the study years. The total number of salmon captured at these sites has ranged from 0 to 854 with average densities much lower than the Tuolumne (Table 5). Nineteen salmon were captured in the San Joaquin River during 2011, which followed four years in a row of no captures.

4.1.1 Size and Growth

The average minimum FL found in 2011 remained below 43 mm through April (Figure 11). The 2011 increase in average FL during the January to March period was smaller than what was previously observed during the 2006 to 2010 period (Figure 12). In 2011, the average maximum FL for each of the survey periods was the lowest of the past six years (Figure 13). The estimated growth rate for 2011 was not calculated due to low catch numbers (Table 5).

4.1.2 Fry and Juvenile Salmon Density

4.1.2.1 Tuolumne River Section Density

For the 2006 to 2011 period, fry densities in the upper section of the river generally peaked from early February to early March and steadily declined through March (Figure 14). Peak juvenile Chinook salmon densities for the 2006 to 2011 period occur about a month later than the fry (Figure 14). In 2011, fry and juvenile salmon densities were generally low when compared to the earlier survey years.

Middle section density of fry generally peaks from early February to mid-March similar timing to the upper section (Figure 15). Middle section density of juveniles often peak from late February to late March. In 2011 juvenile density peaked on 01 February, the same date as the peak in fry occurred.

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 occurred on 01 February in 2011 (Figure 16). Peak density of juveniles was low throughout the 2011 surveys. The capture of fry and juvenile salmon in the lower section, while low, indicates salmon survival throughout the river.

Section density indices of fry and juvenile salmon combined were standardized as a percent of the annual riverwide average density index and plotted at section midpoints for recent years (Figure 17). In 2011 the standardized section density indices was highest in the middle section.

4.1.2.2 Tuolumne River-wide Density

The density of Tuolumne River Chinook salmon fry during the early winter of 2011 remained below those that were recorded in 2006, 2009, and 2010, but were higher that in 2007 and 2008 (Figure 18). Late winter through mid-spring fry densities were similar for 2006 to 2011.

The density of Tuolumne River Chinook salmon juveniles was extremely low throughout the survey period and generally lower than those experienced during 2006 to 2010 (Figure 19). High flows during the monitoring period limited sampling to the shallower margins which reduced the likelihood of capturing larger juvenile-sized salmon.

The combined fry and juvenile densities for the Tuolumne River for the years 2006–2011 are shown in Figure 20. In general, the 2011 densities were lower than those recorded in 2006–2010 (Figure 20). The 2011 average combined density (1.2/1000 ft^2) was the third lowest recorded since 1986 (Table 5).

4.1.2.3 San Joaquin River Density

Densities of salmon caught in the San Joaquin River at Laird Park and Gardner Cove sites were reviewed to compare relative abundance of salmon upstream and downstream of the Tuolumne River confluence. The density indices were developed by combining the fry and juvenile salmon due to the low numbers of fish that were caught.

The average salmon density at Laird Park, downstream of the Merced confluence, was extremely low for all years between 1986 and 2011(Figure 21). The total number of wild Chinook salmon caught at Laird Park during the 1986 to 2011 period of record was 152. Four salmon were caught at Laird Park in 2011.

A total of 1,097 salmon were caught at Gardner Cove during the 1986–2011 period, 509 of which were caught in 1999. Fifteen salmon were caught at Gardner Cove in 2011. The average density at Gardner Cove, downstream of the Tuolumne River confluence, was much higher in 1986 and 1999 and moderately higher in 1995, 1998, 2001, 2006 and 2011.

4.1.3 Tuolumne River Fry Density versus Number of Female Spawners

An analysis to determine the relationship of adult female spawner escapement to the following peak and average fry densities was conducted using the 1986 to 2011 data sets. All fry density data for the individual study years were entered into an Excel spreadsheet and plotted on a chart. A "best fit" line was run through the data points to determine if a correlation between spawning females and fry could be identified. The best fit line through the peak fry density data points resulted in an R-squared of .732 for the 1986–2011 period (Figure 22, Table 7). A similar result with R-squared of .780 was found using average fry density from 15 January to 15 March (Figure 23). However, a review of Figures 20 and 21 show a wide variation between relatively similar female spawner numbers and the subsequent fry densities.

4.1.4 Other Fish Species

Between 10 and 16 fish species, other than Chinook salmon, were caught during 1992–2011 seining efforts in the Tuolumne River (Table 8). The numbers of captured individuals of each species for the 2011 survey season are listed by site and date of capture in Table 4. Ten other species were caught in the Tuolumne River during 2011, including 5 native species. Eleven other fish species, including 3 native, were caught in the San Joaquin River in 2011.

Sacramento pikeminnow, Sacramento sucker and prickly sculpin, all native species, were caught in both the Tuolumne and San Joaquin rivers. Other native species including rainbow trout, hardhead, and riffle sculpin were caught only in the Tuolumne River. Native species recorded in prior years, but not caught in either river in 2011, were Pacific lamprey, Sacramento blackfish, hitch, Sacramento splittail, and tule perch. The number of species observed in the Tuolumne River during the 1992–2011 period of years has remained fairly constant (Table 8). The number of species observed in the San Joaquin River has decreased since 2005.

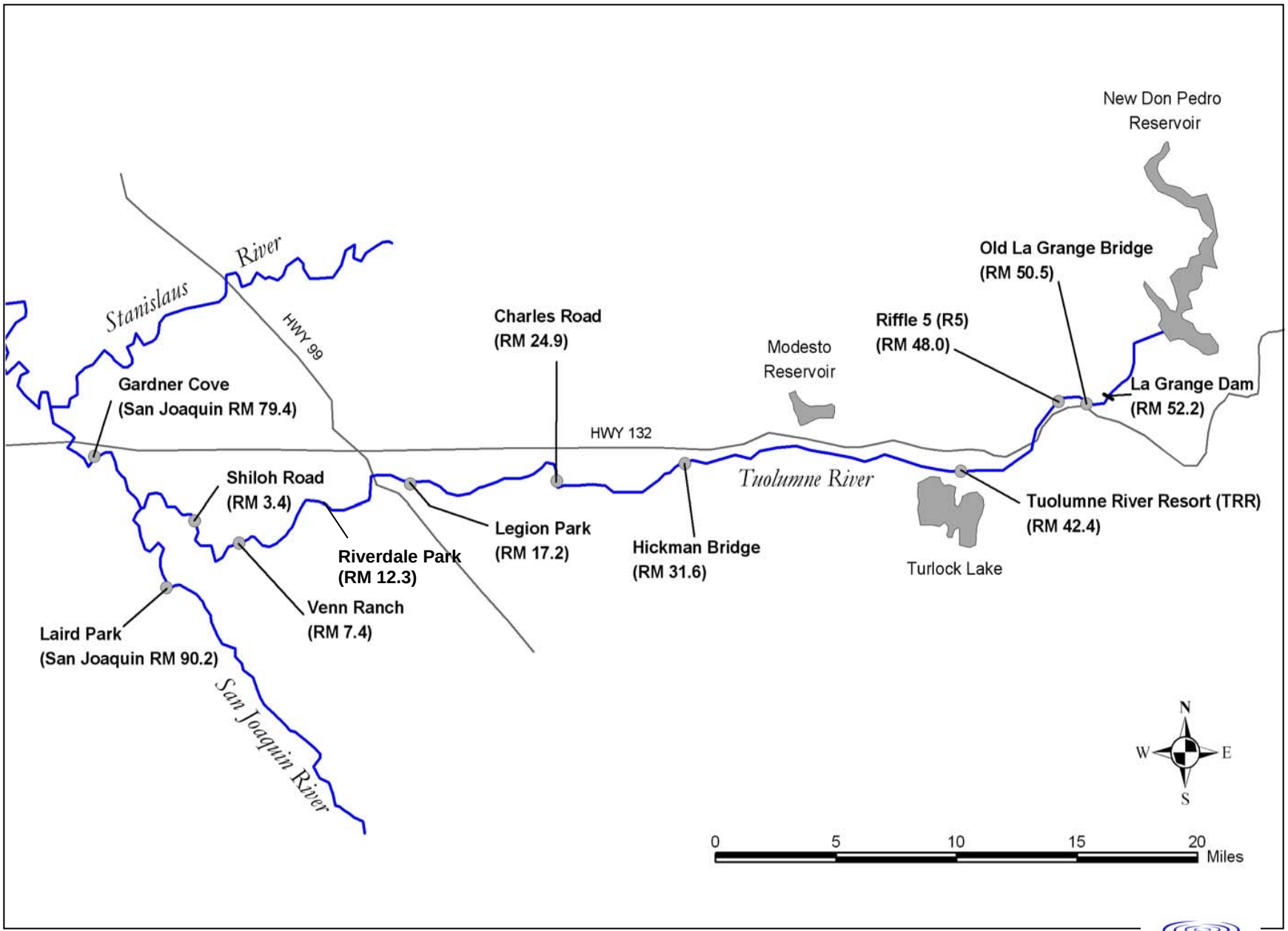

Figure 1. Locations of seine sampling sites on the lower Tuolumne and San Joaquin Rivers, 2011.

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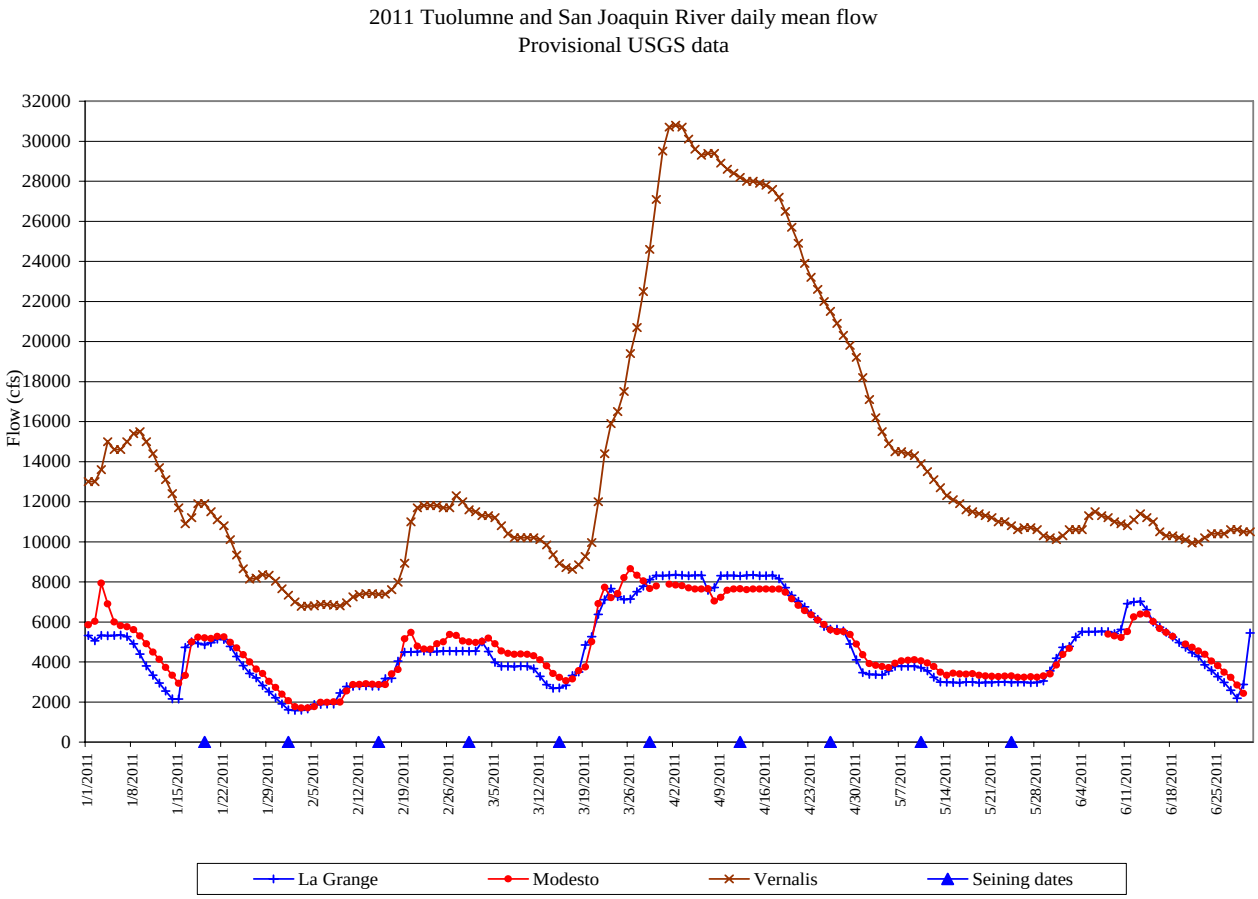


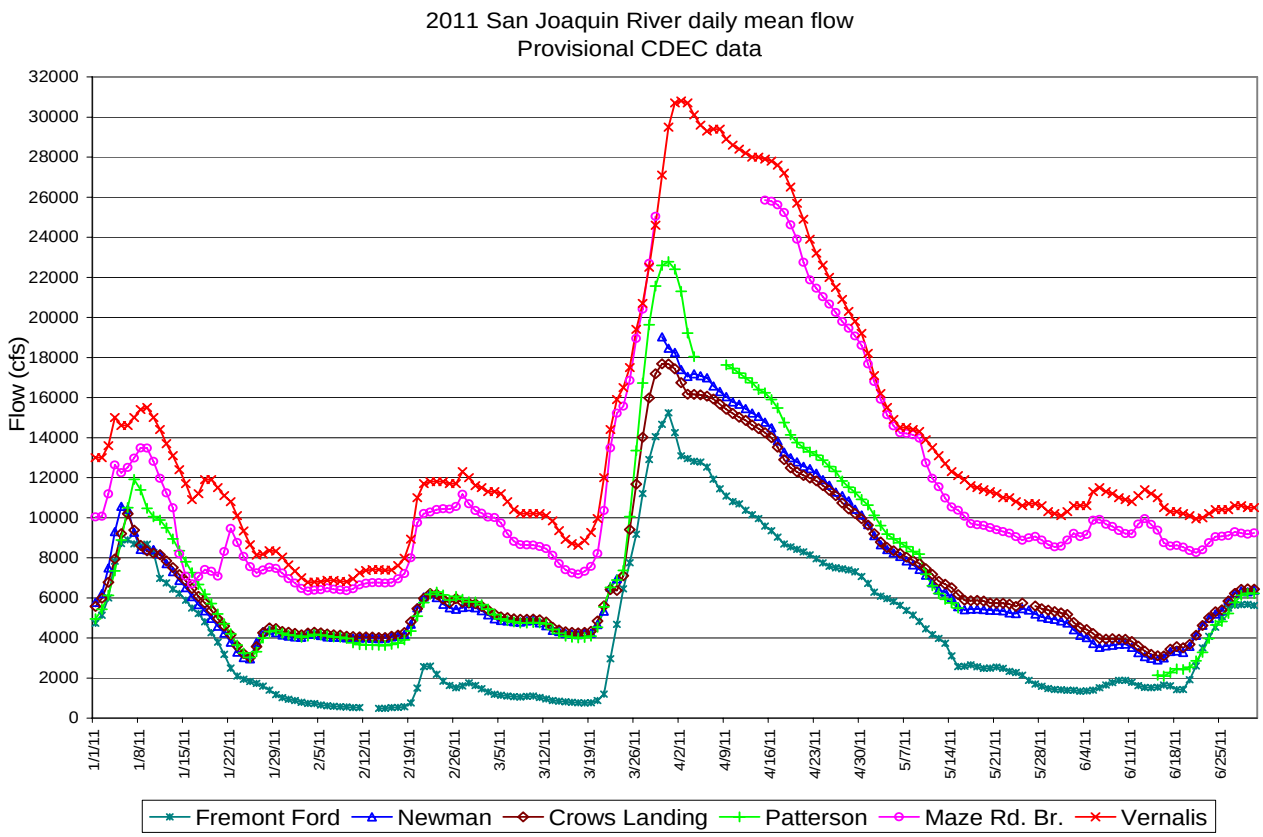


Figure 2. 2011 Tuolumne and San Joaquin River daily mean flows.

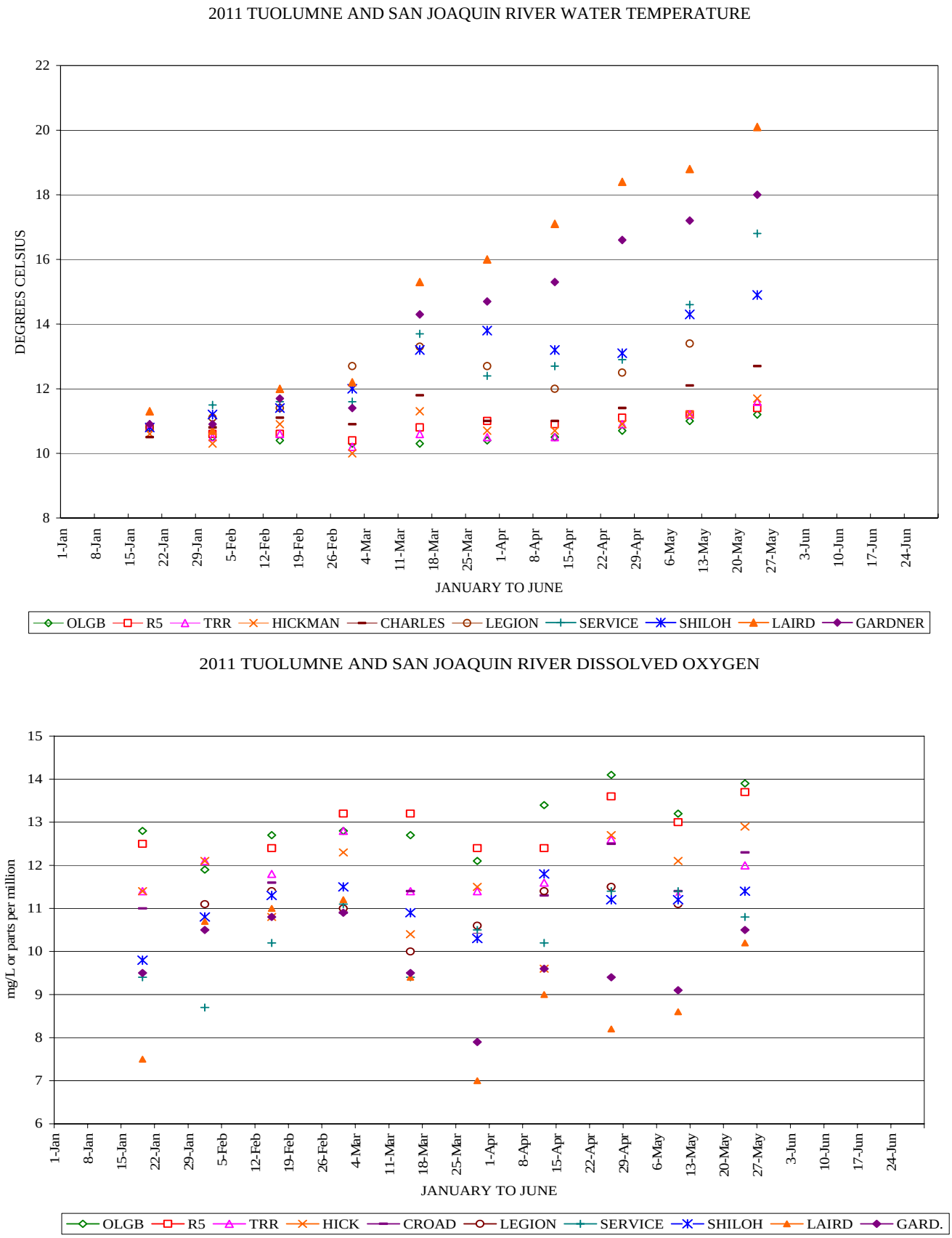
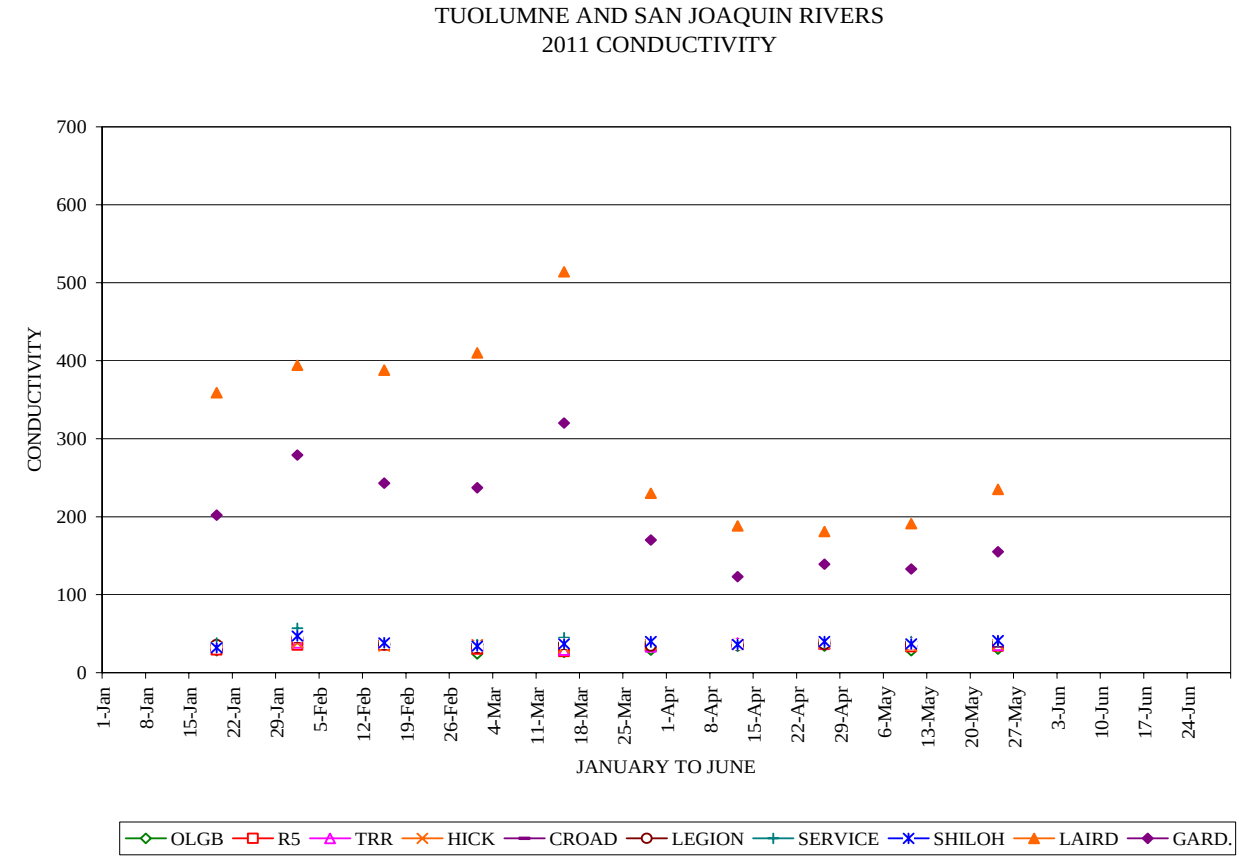


Figure 3. 2011 Tuolumne and San Joaquin River water temperature and dissolved oxygen.



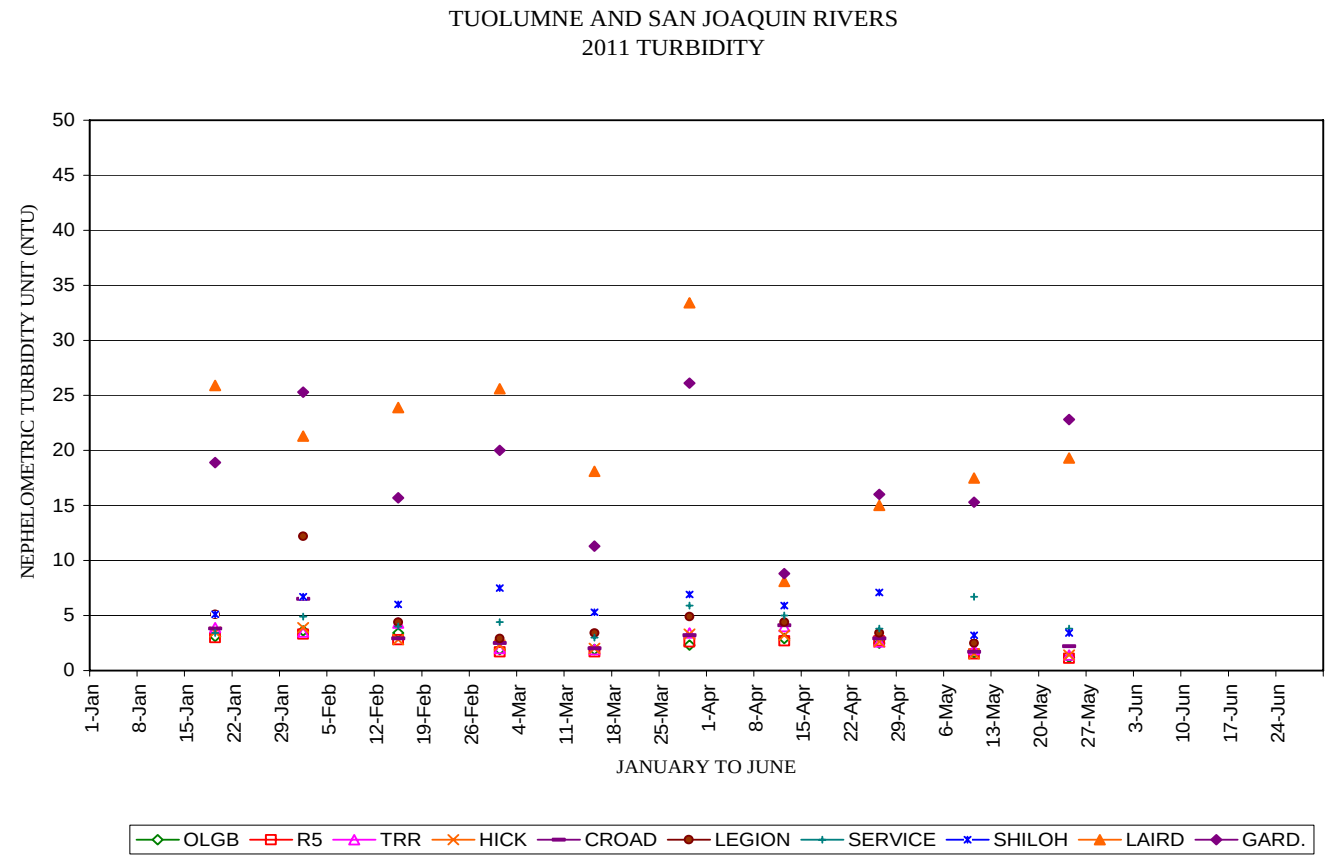
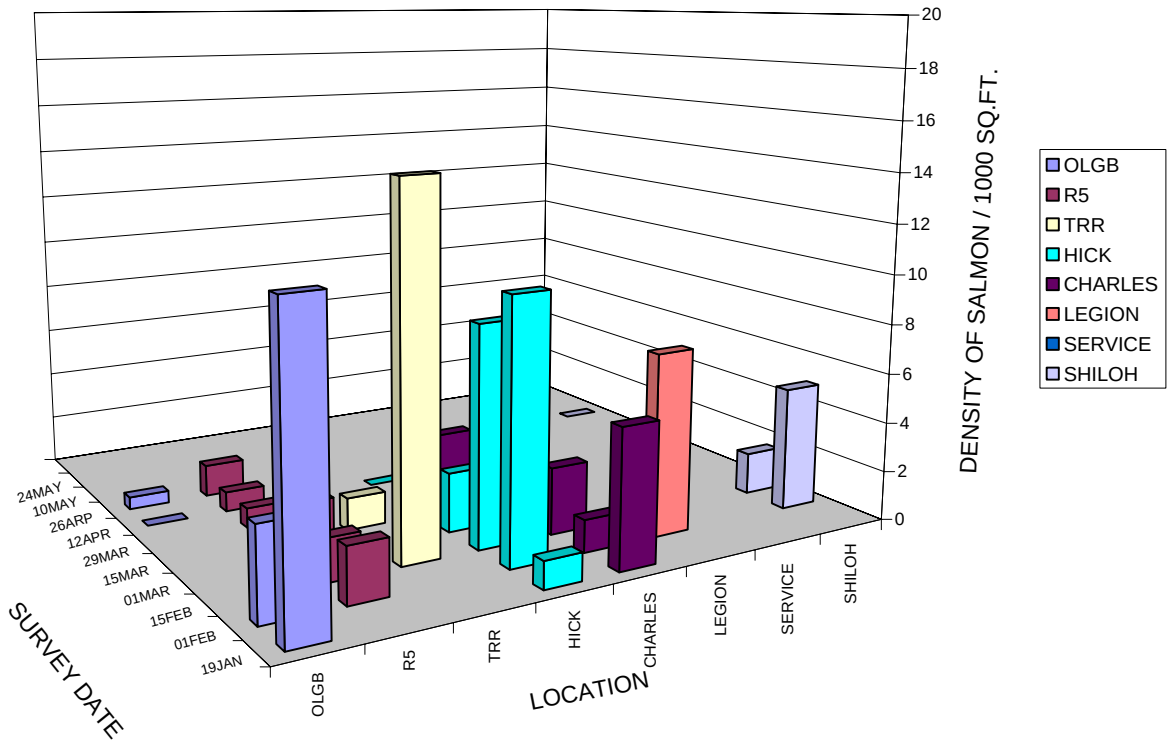


Figure 4. Conductivity and turbidity in the Tuolumne and San Joaquin Rivers, 2011.

TUOLUMNE RIVER JUVENILE SALMON STUDY
2011 SEINING - DENSITY OF FRY BY LOCATION



TUOLUMNE RIVER JUVENILE SALMON STUDY
2011 SEINING - DENSITY OF JUVENILES BY LOCATION

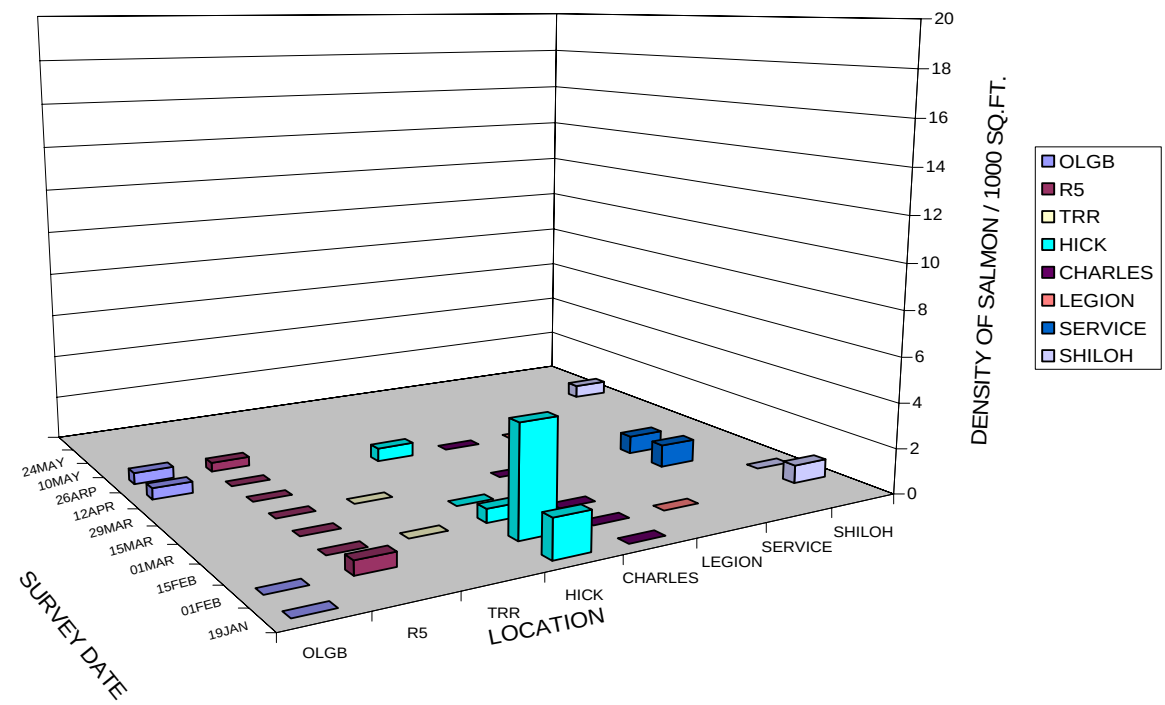


Figure 5. Tuolumne River density of fry and juvenile Chinook salmon by location.

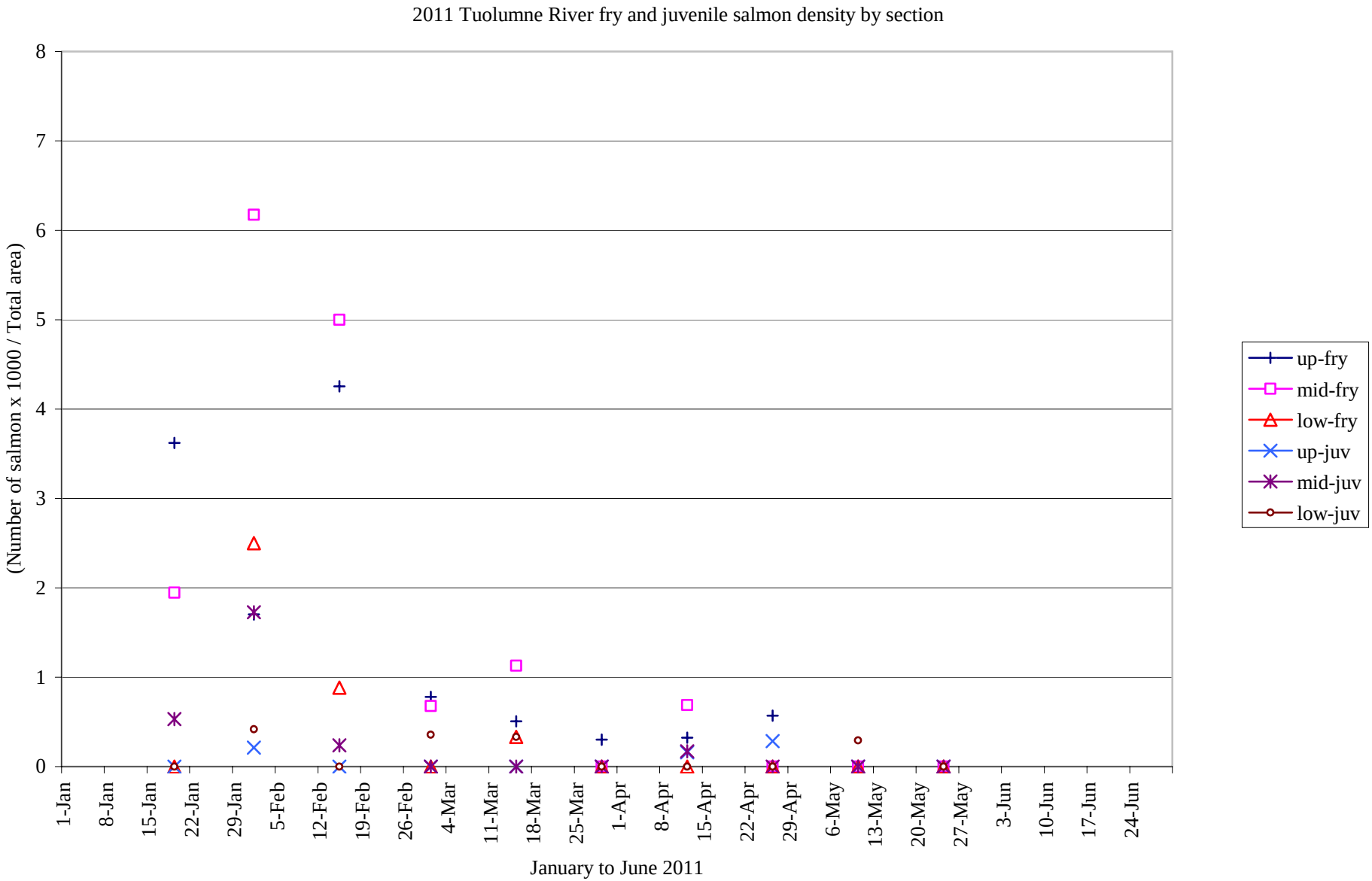


Figure 6. 2011 Tuolumne River fry and juvenile salmon density by section.

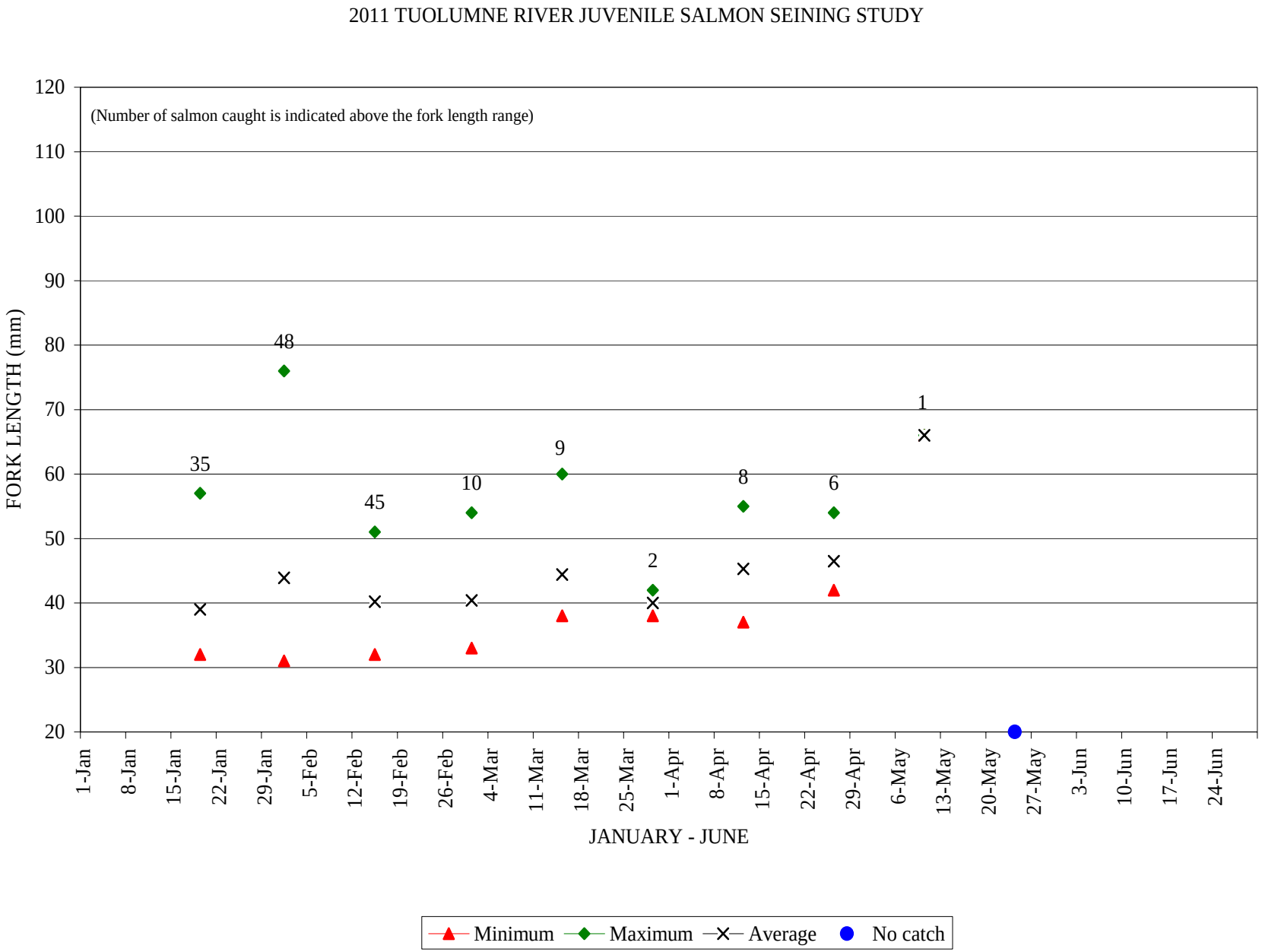
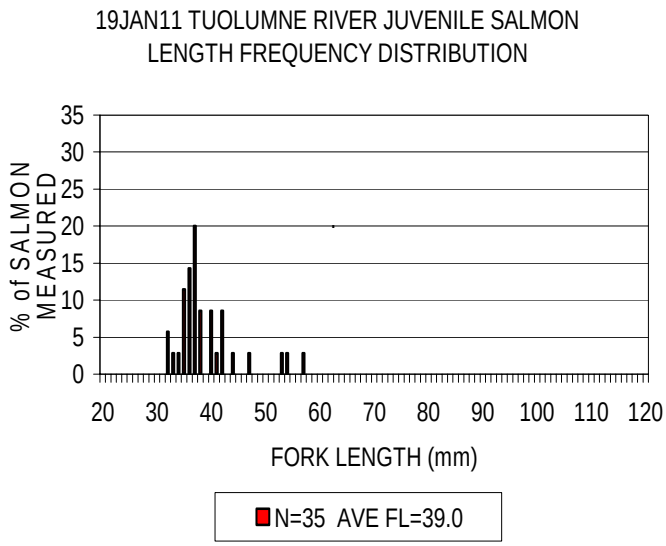
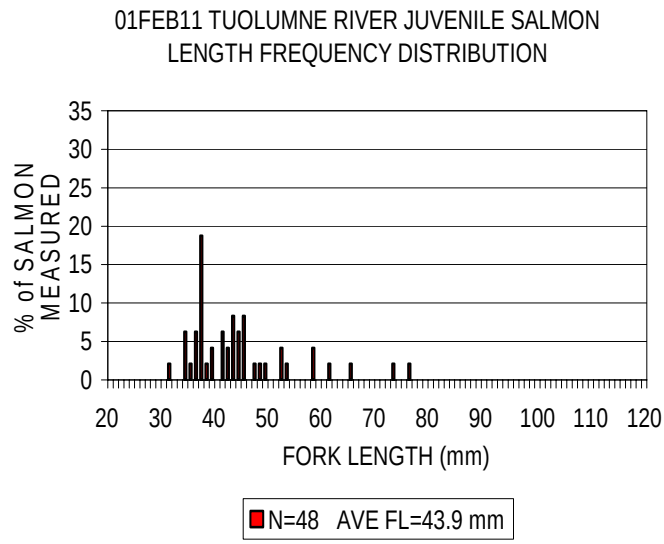
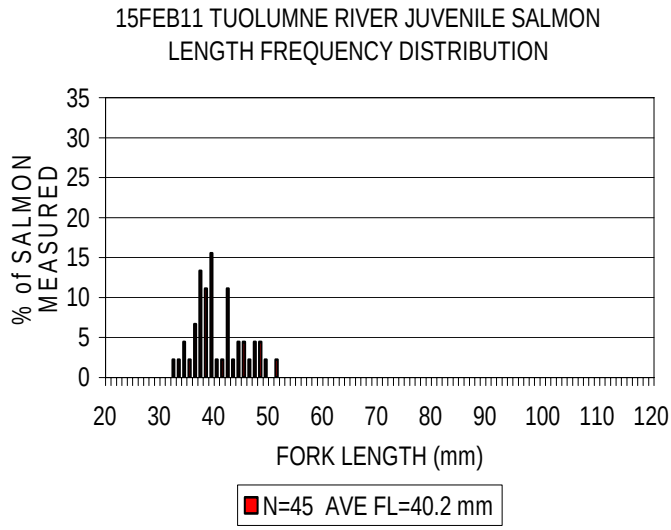
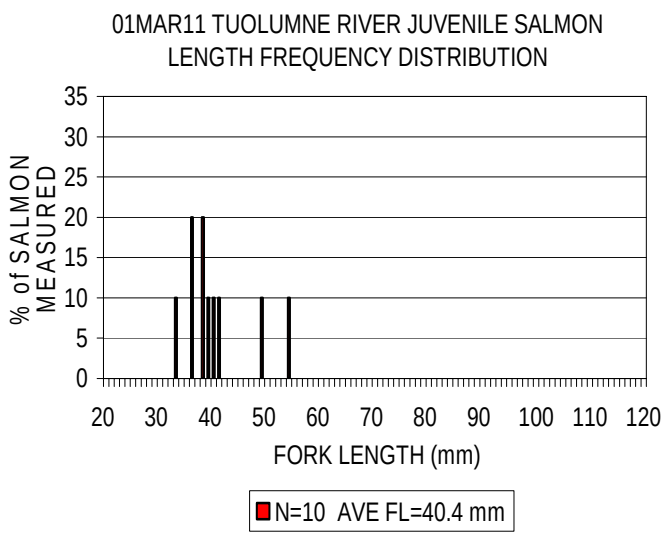


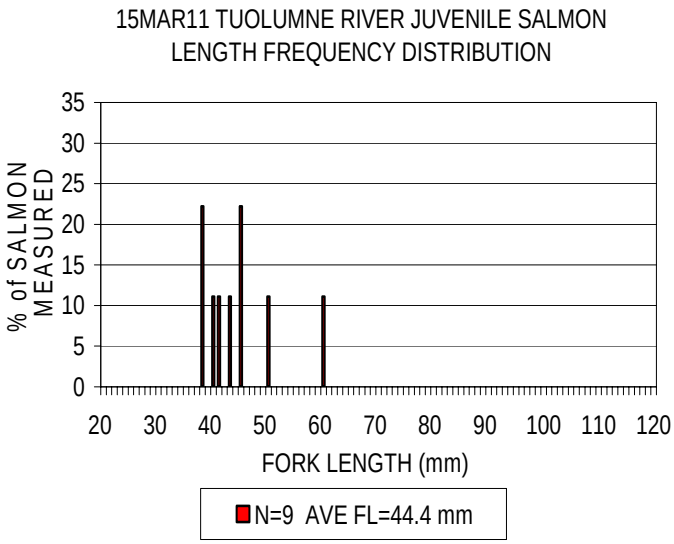
Figure 7. Fork length ranges of wild salmon in the Tuolumne River, 2011.











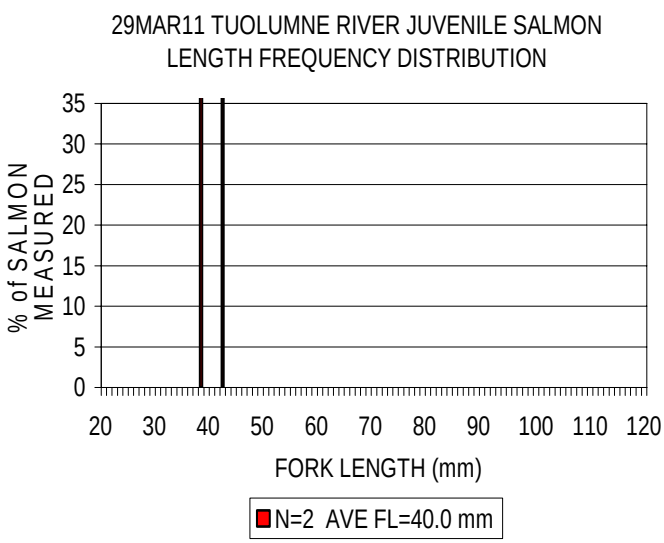
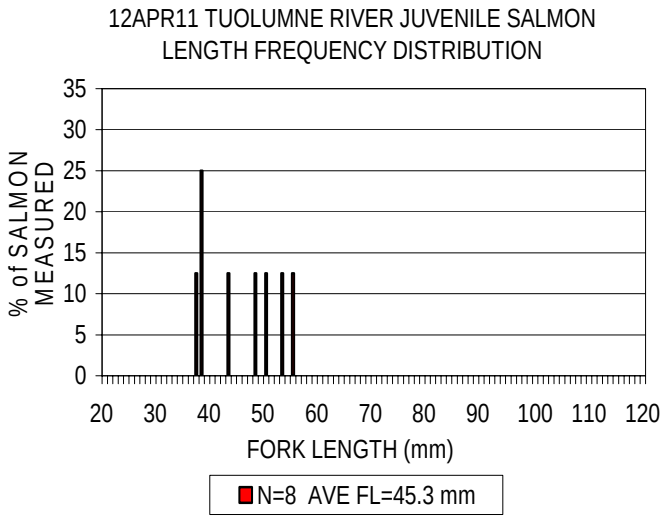
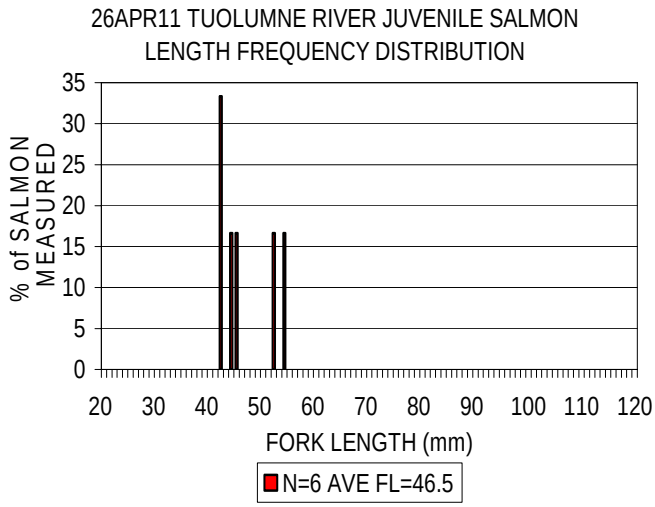
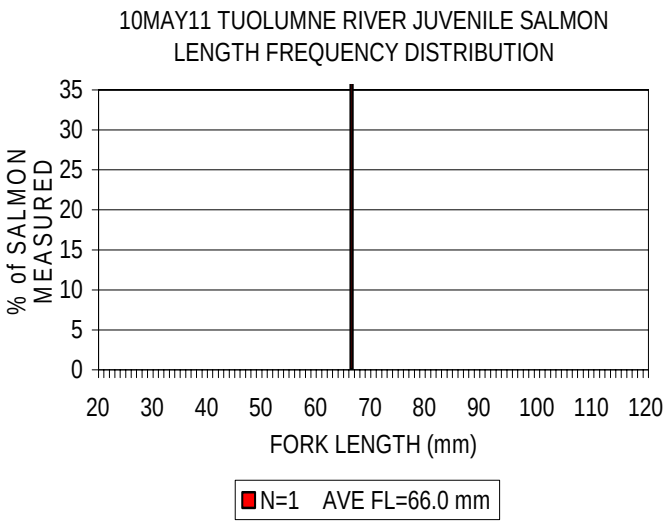


Figure 8. Length frequency distribution by date of salmon in the Tuolumne River, 2011.







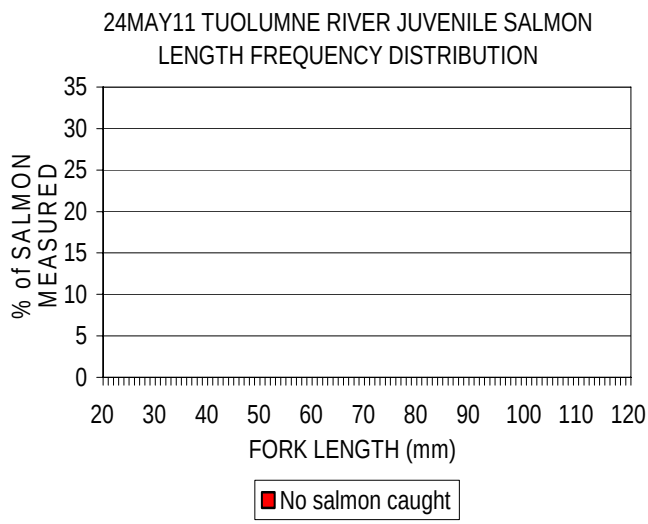
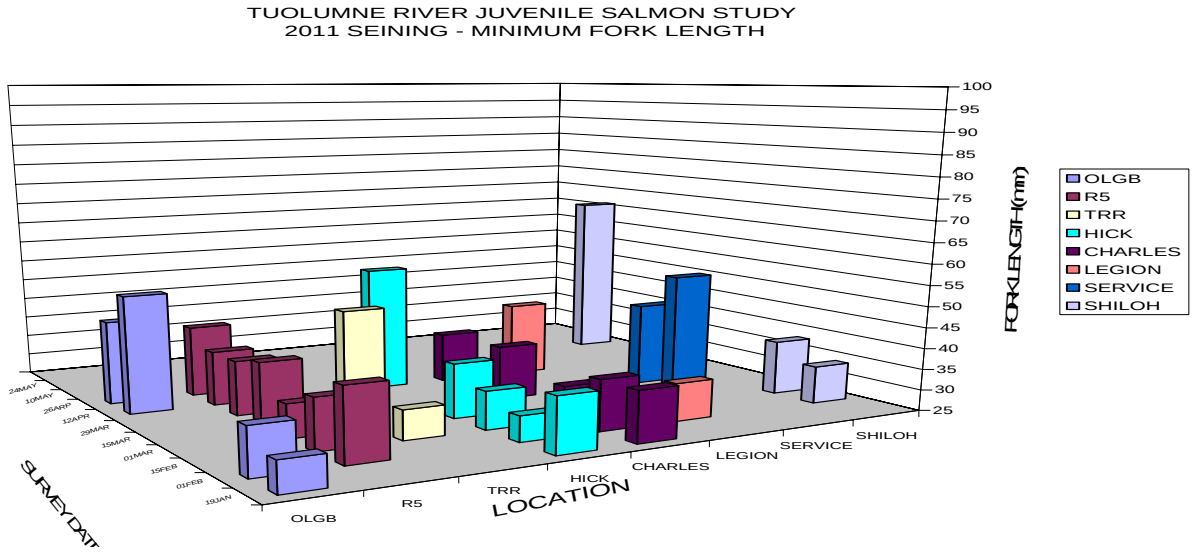
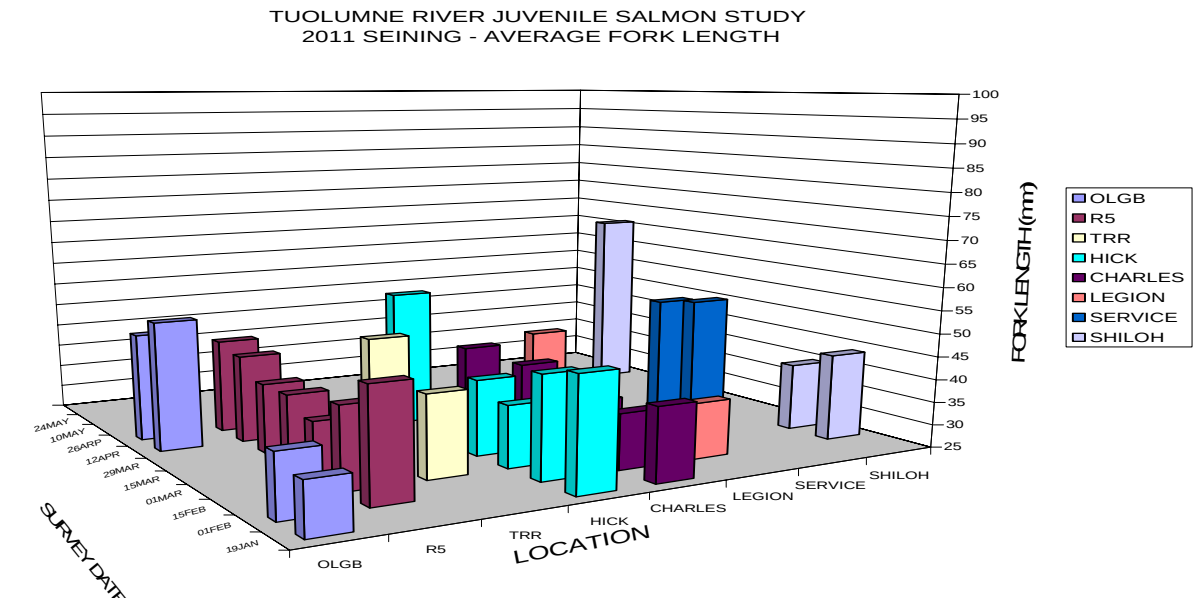


Figure 9. Length frequency distribution by date of salmon in the Tuolumne River, 2011.





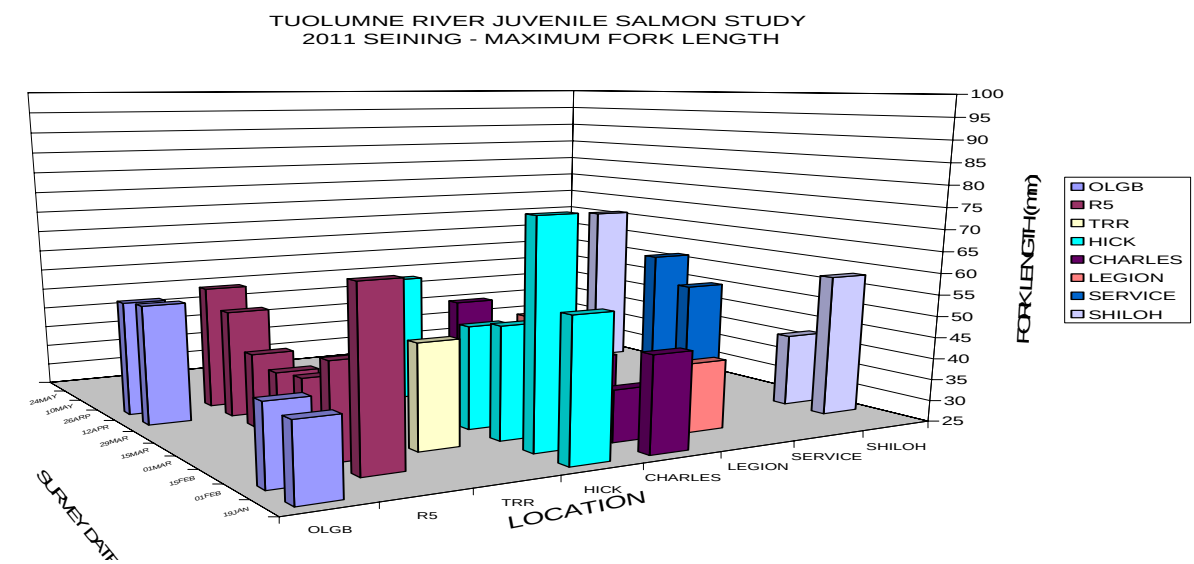
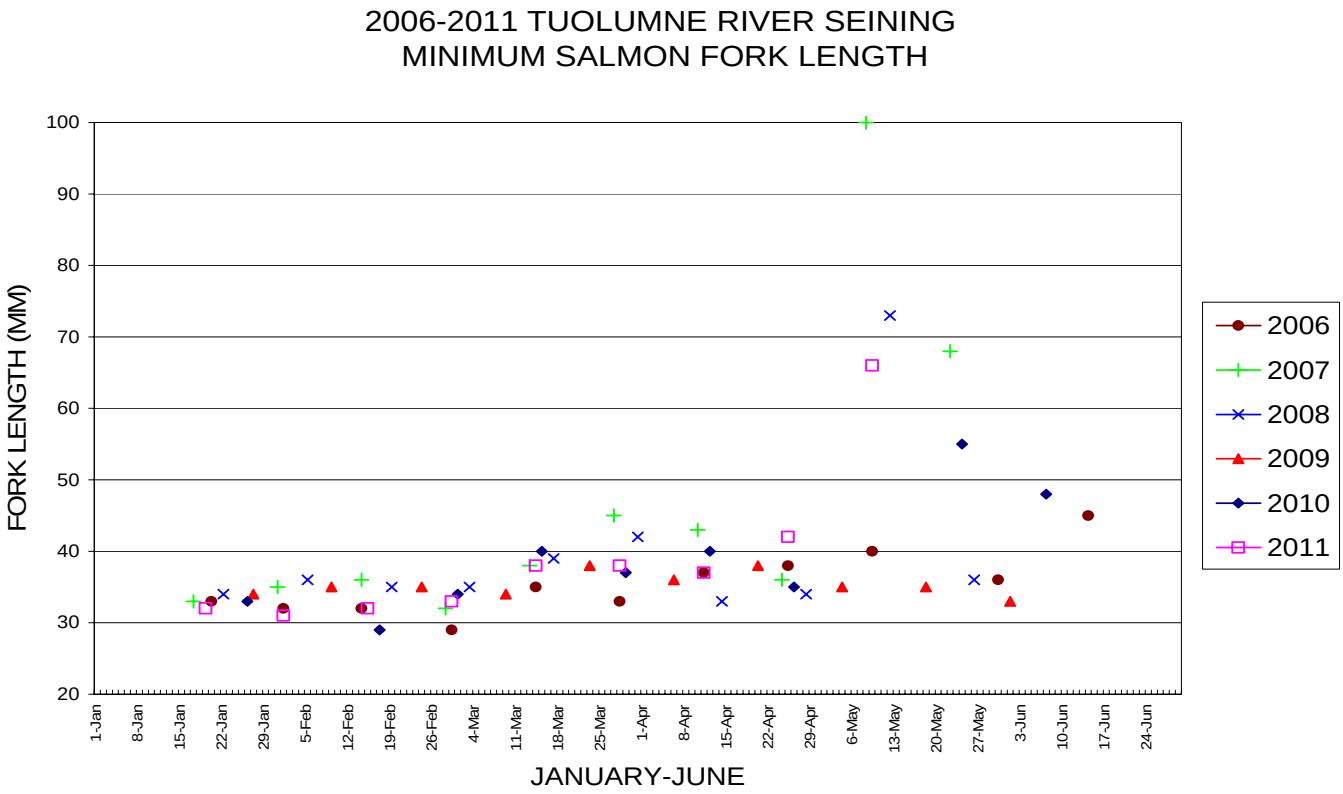
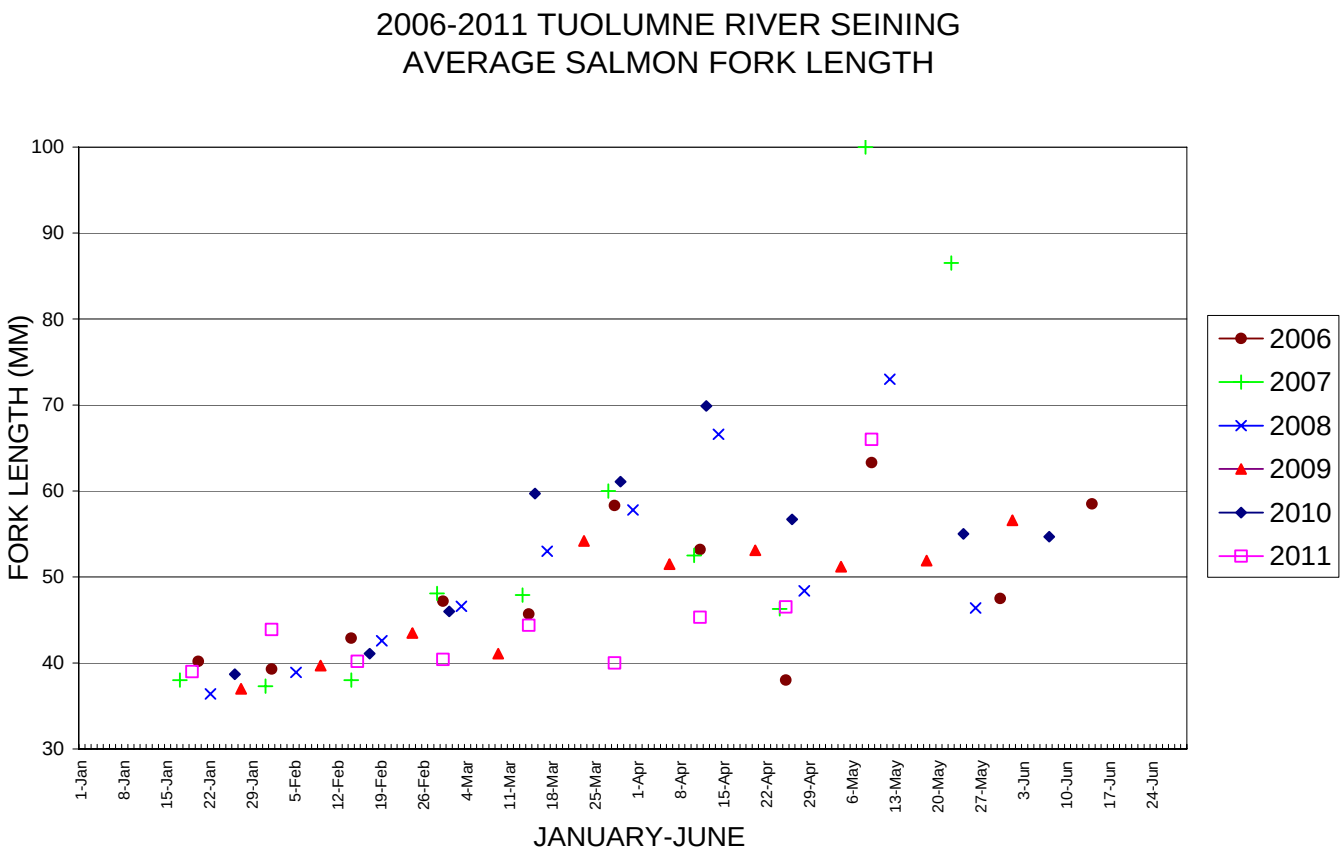


Figure 10. Minimum, average, and maximum Chinook salmon fork length by location and survey period, 2011.





Figures 11 & 12. Minimum and average fork lengths of fry and juvenile Chinook salmon, 2006-2011.

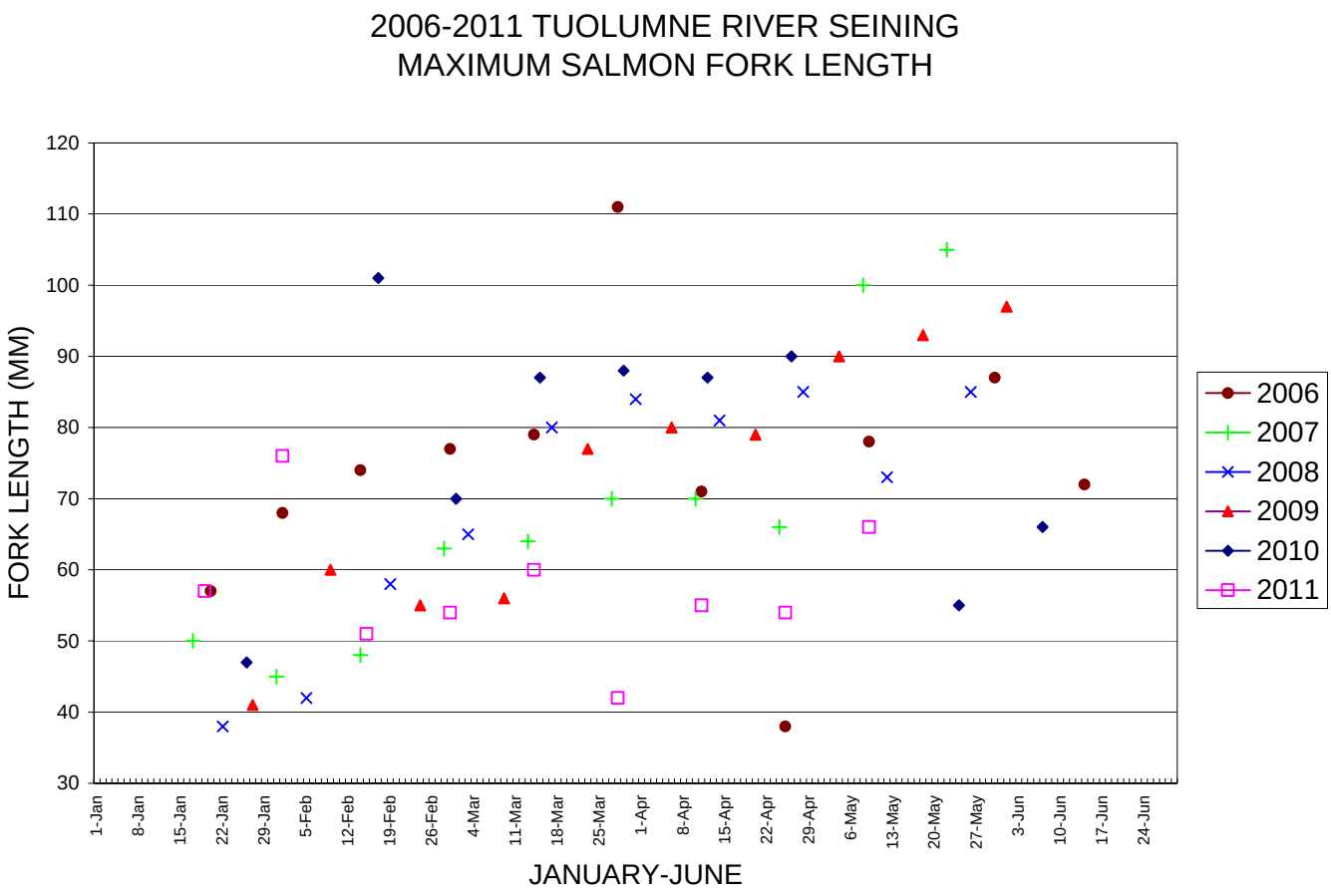
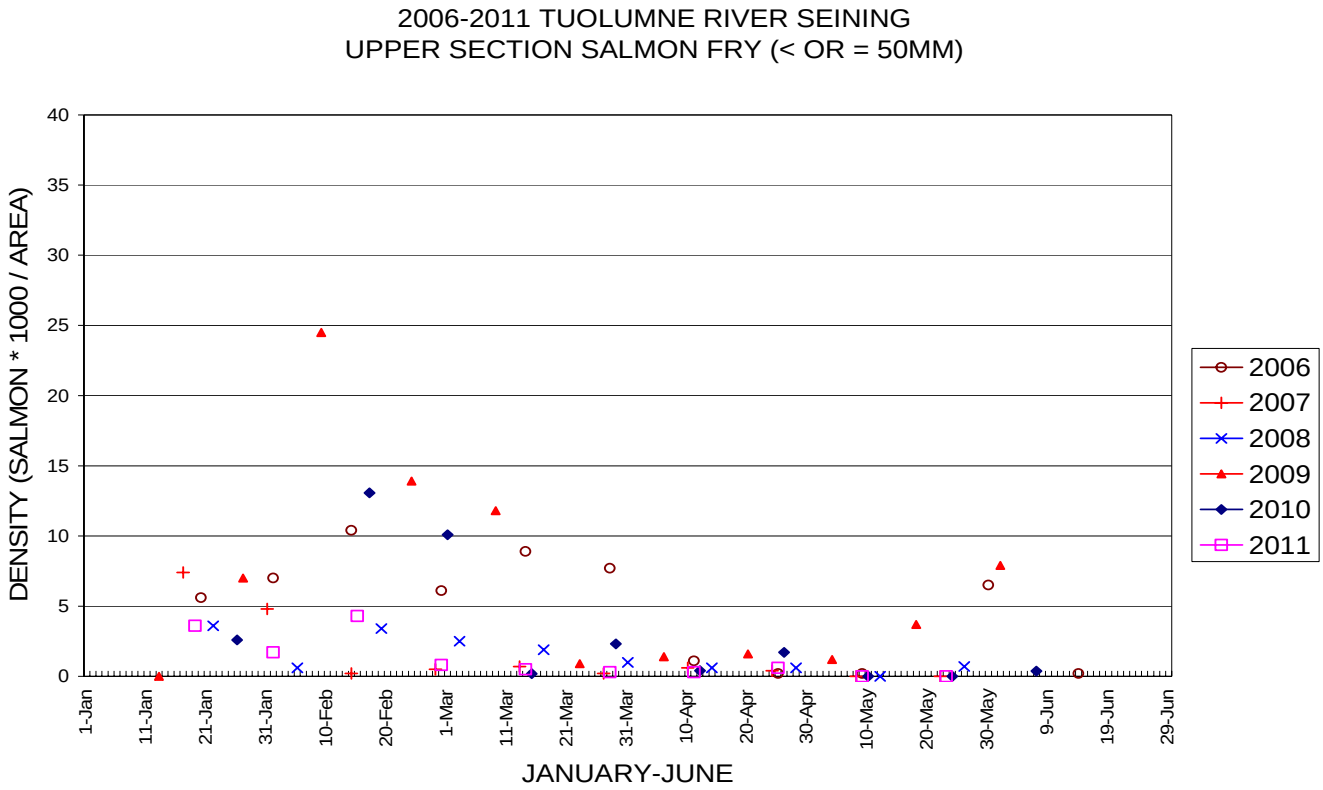


Figure 13. Maximum fork length of Tuolumne River Chinook salmon fry, 2006-2011.



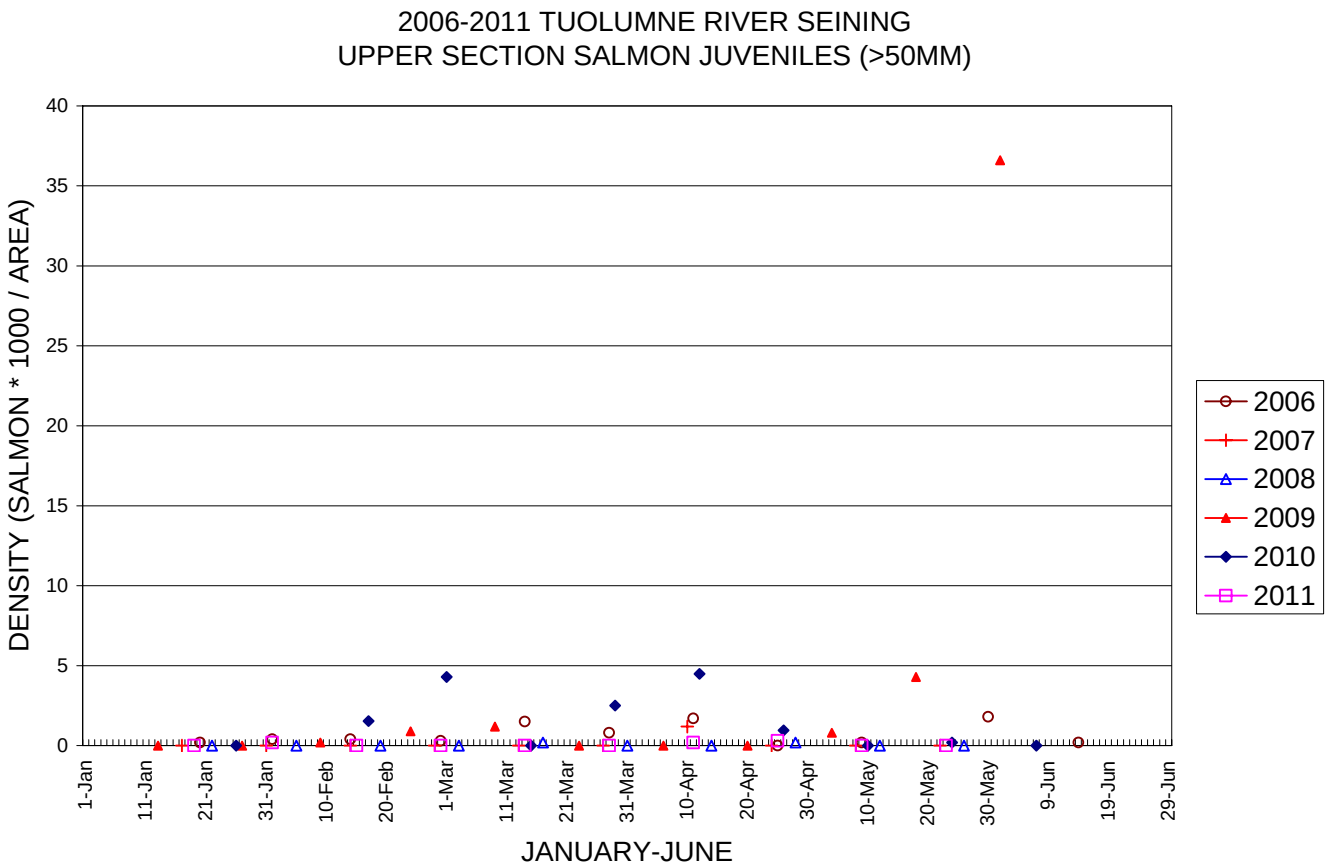


Figure 14. Upper section density indices for salmon fry and juveniles, 2006-2011.

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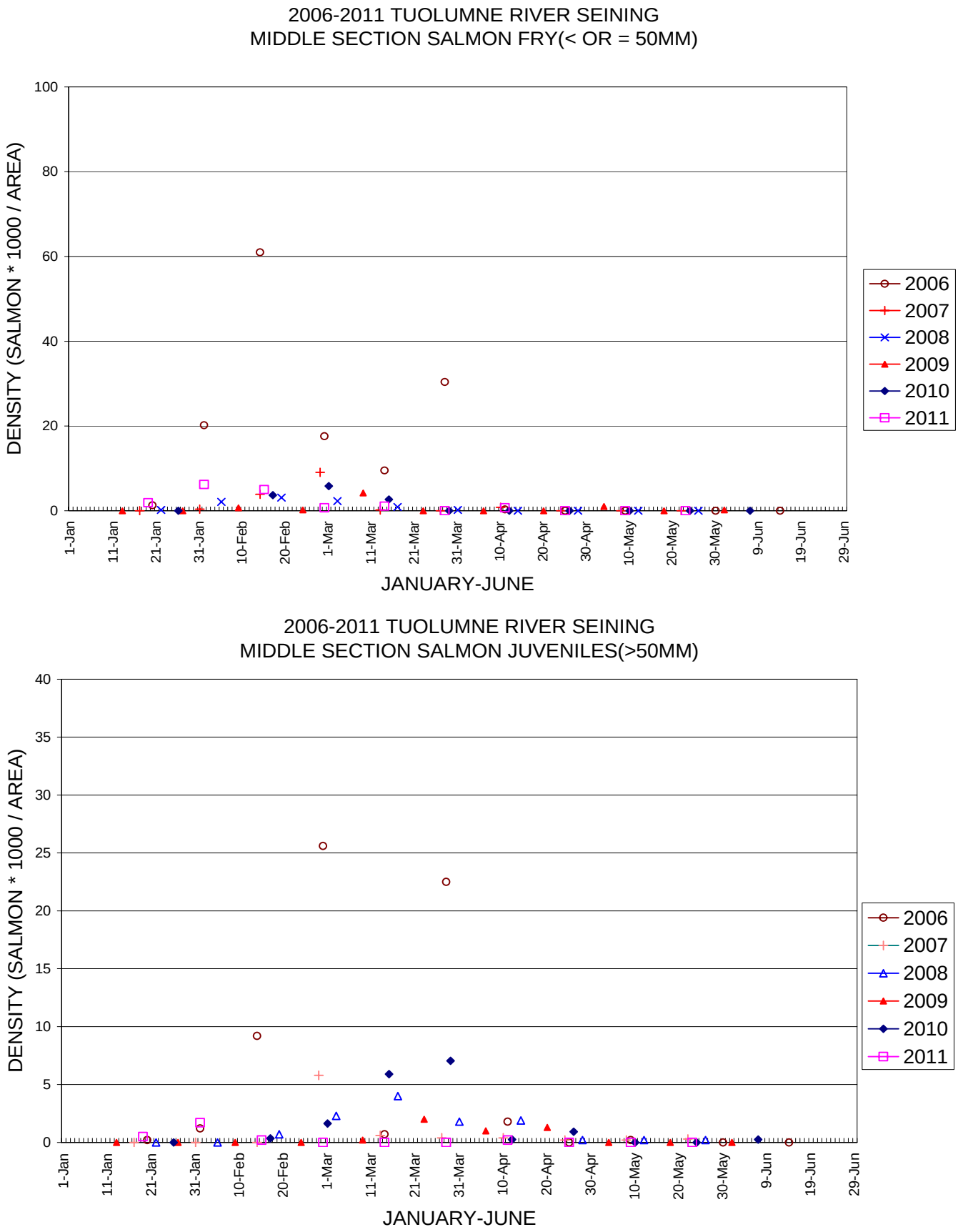


Figure 15. Middle section density indices for salmon fry and juveniles, 2006-2011.

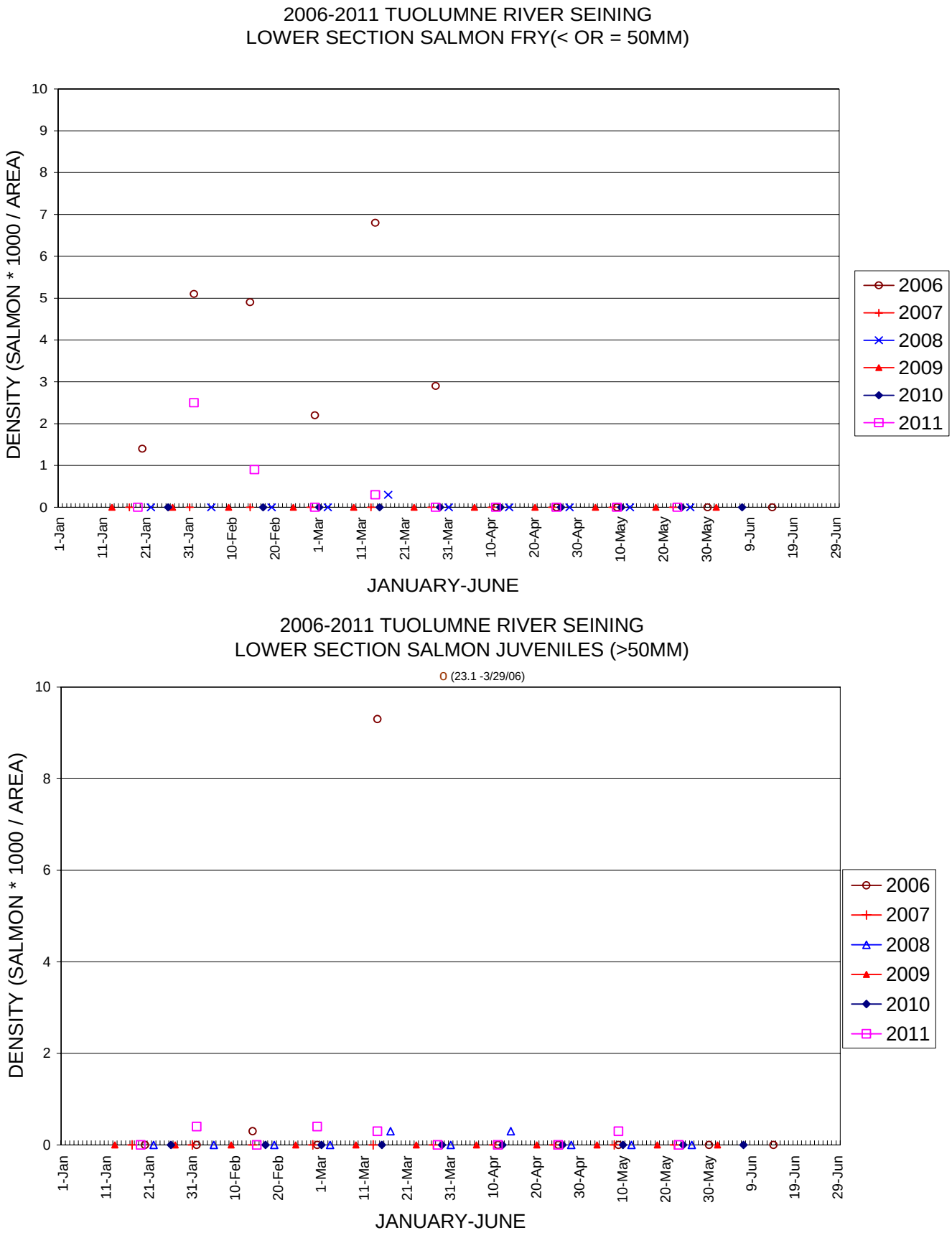


Figure 16. Lower section density indices for salmon fry and juveniles, 2006-2011.

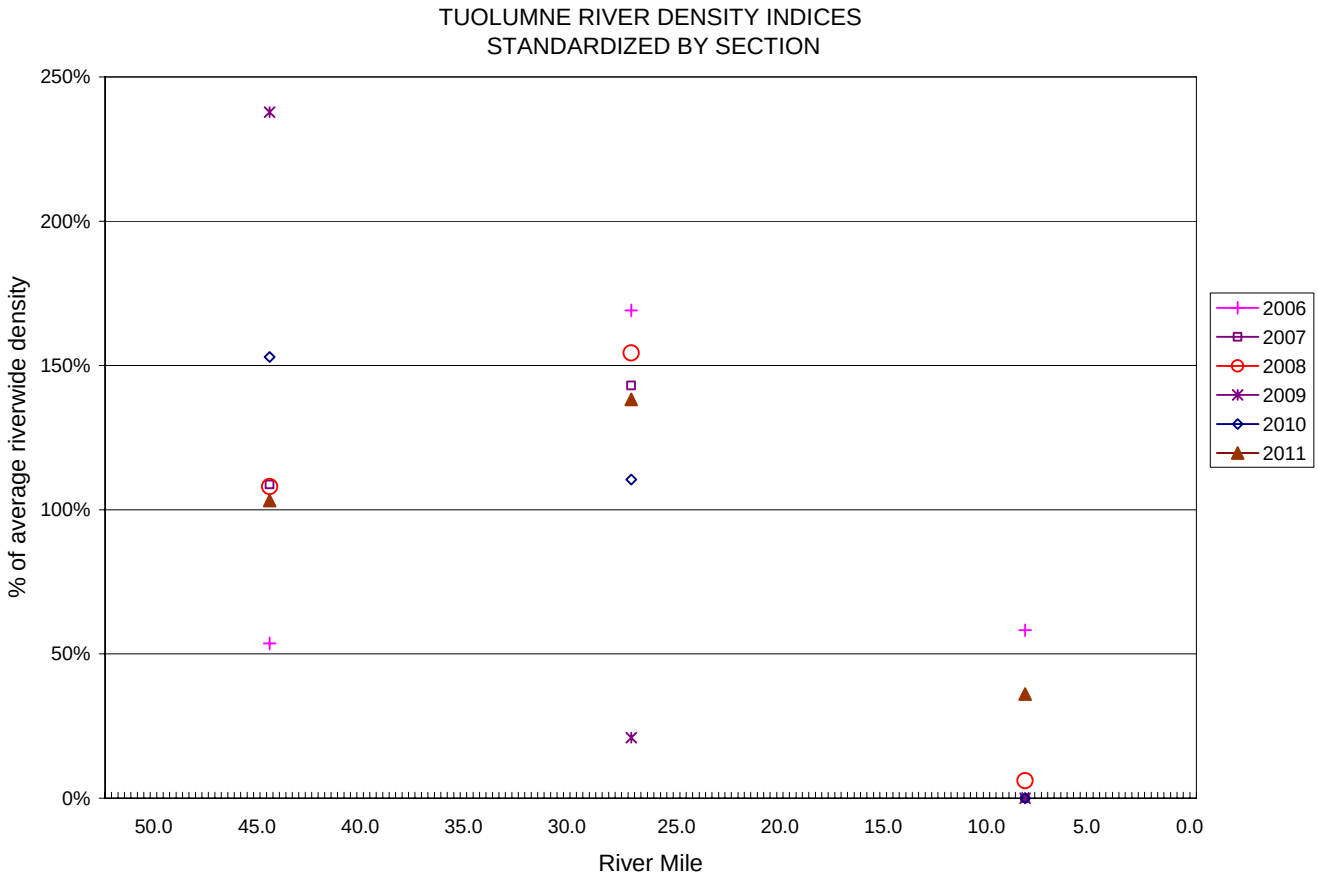


Figure 17. Tuolumne River abundance indices standardized by section, 2006-2011.

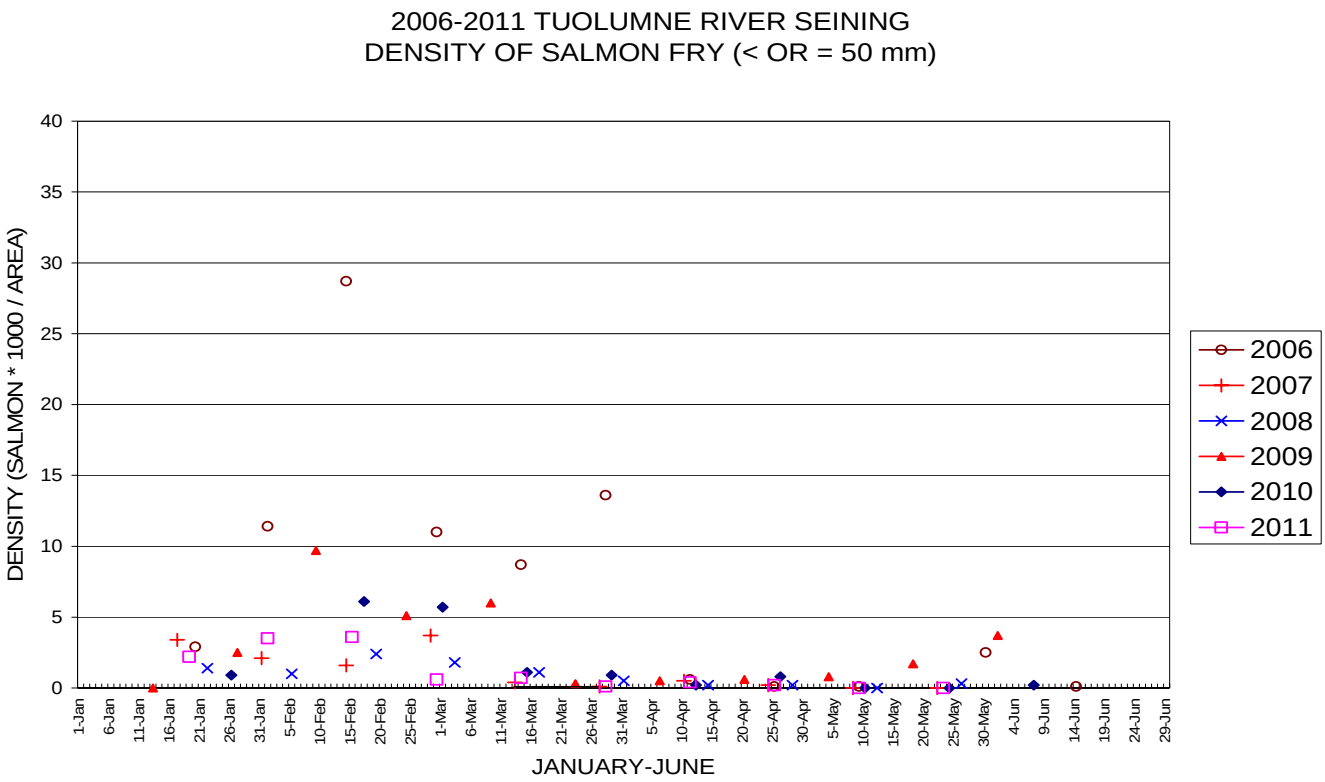
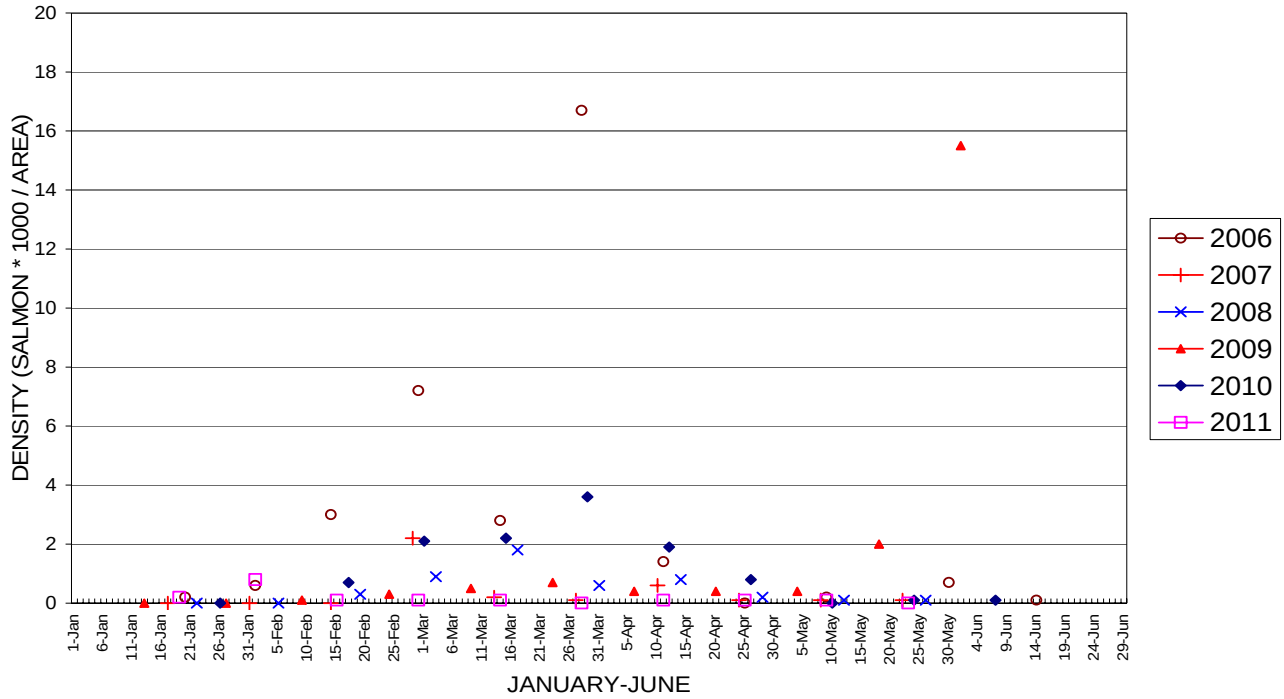
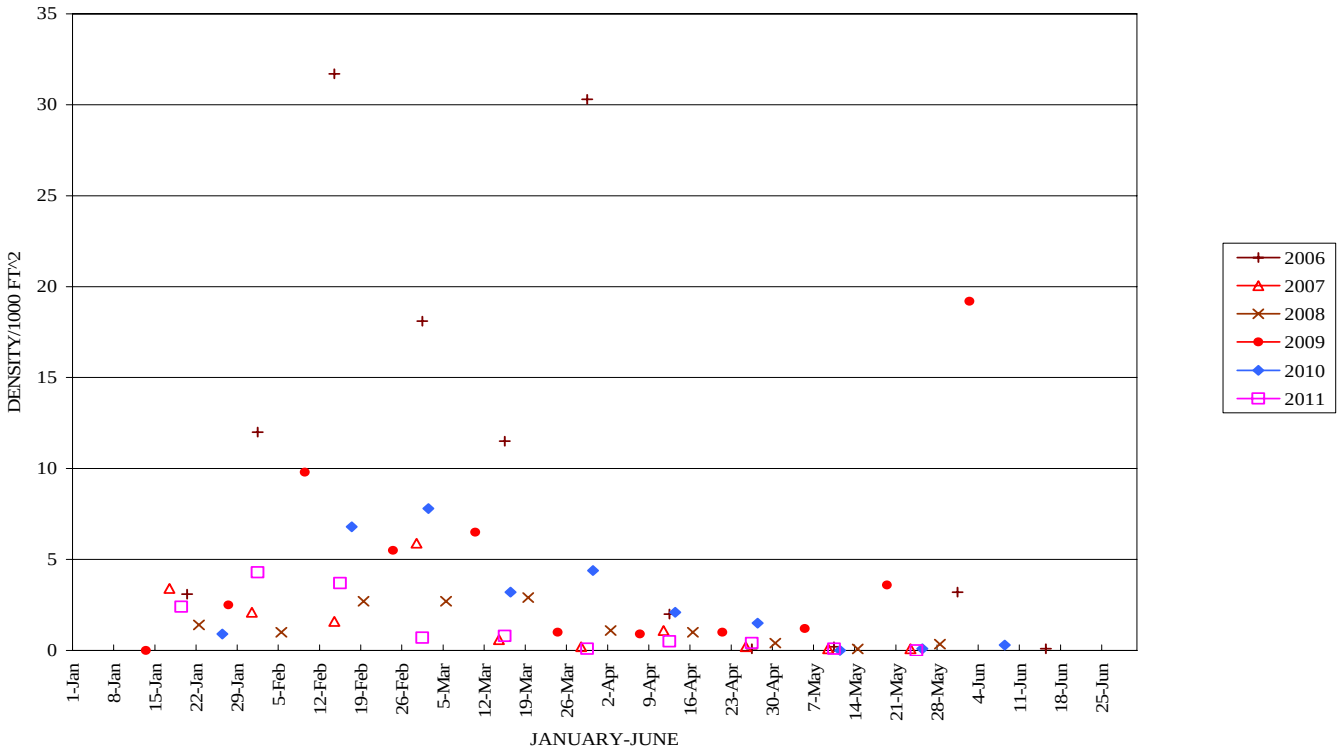


Figure 18. Density of Tuolumne River Chinook salmon fry, 2006-2011.

2006-2011 TUOLUMNE RIVER SEINING
DENSITY OF SALMON JUVENILES (> 50 mm)



2006-2011 TUOLUMNE RIVER SEINING
COMBINED FRY AND JUVENILE SALMON DENSITY INDEX



Figures 19 & 20. Density index of Chinook salmon juveniles (>50 mm) and combined fry and juvenile catch, 2006-2011.

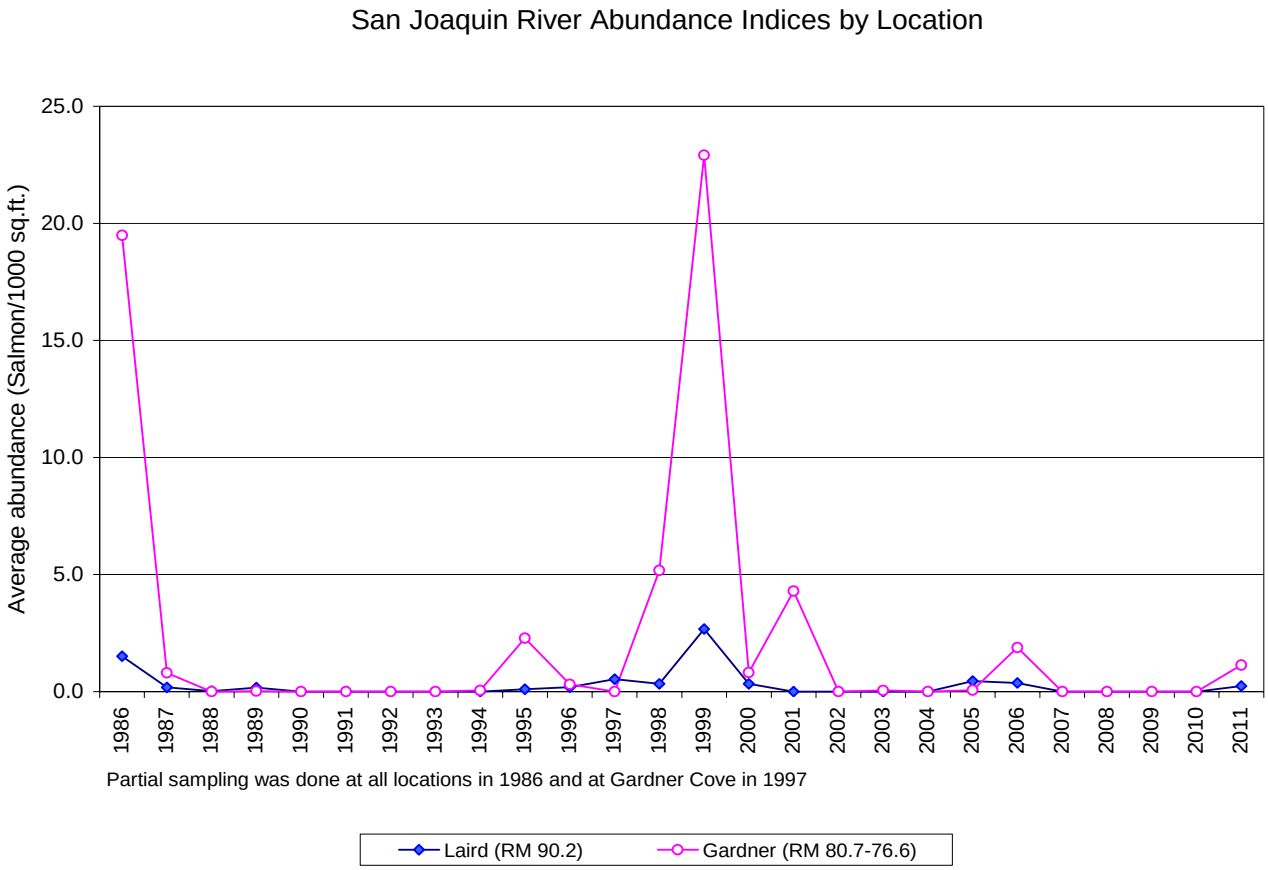


Figure 21. San Joaquin River Chinook salmon abundance indices by location, 1986-2011.

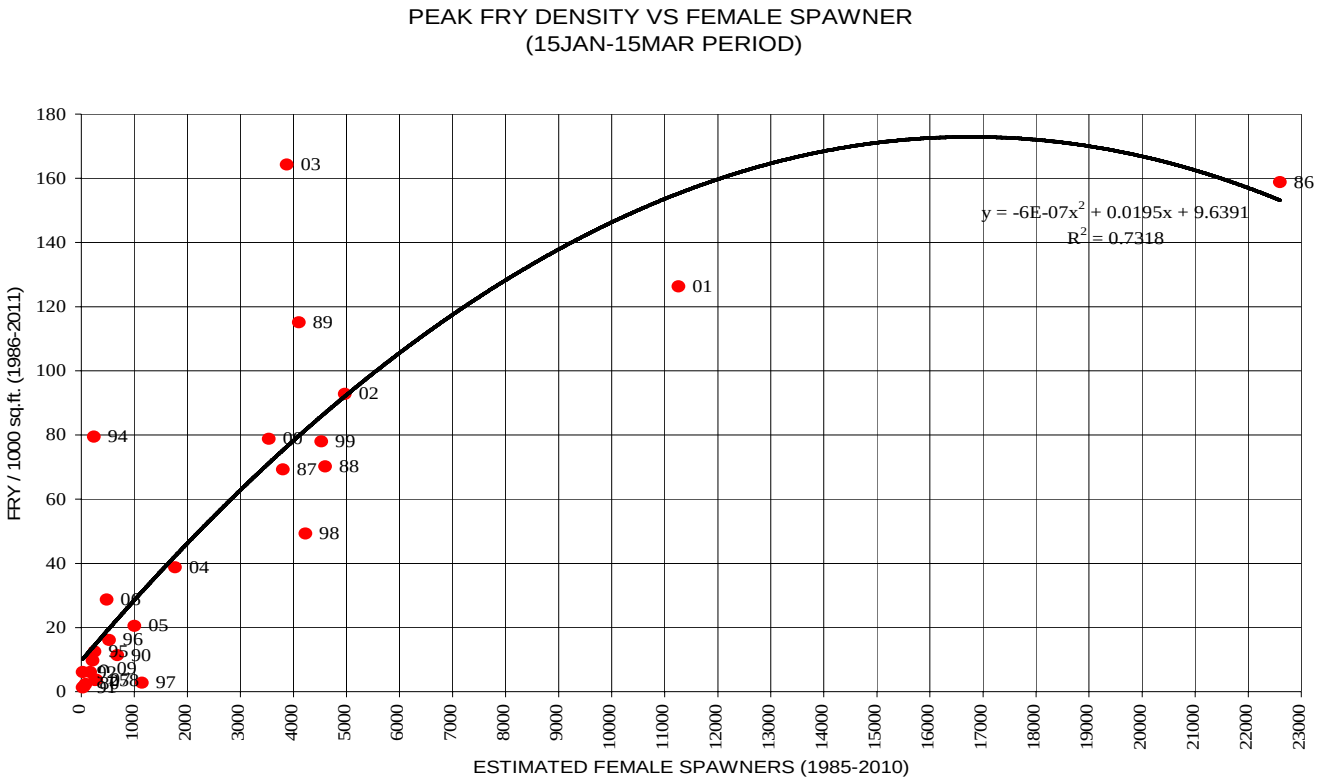


Figure 22. Tuolumne River peak Chinook salmon fry density vs female spawners.

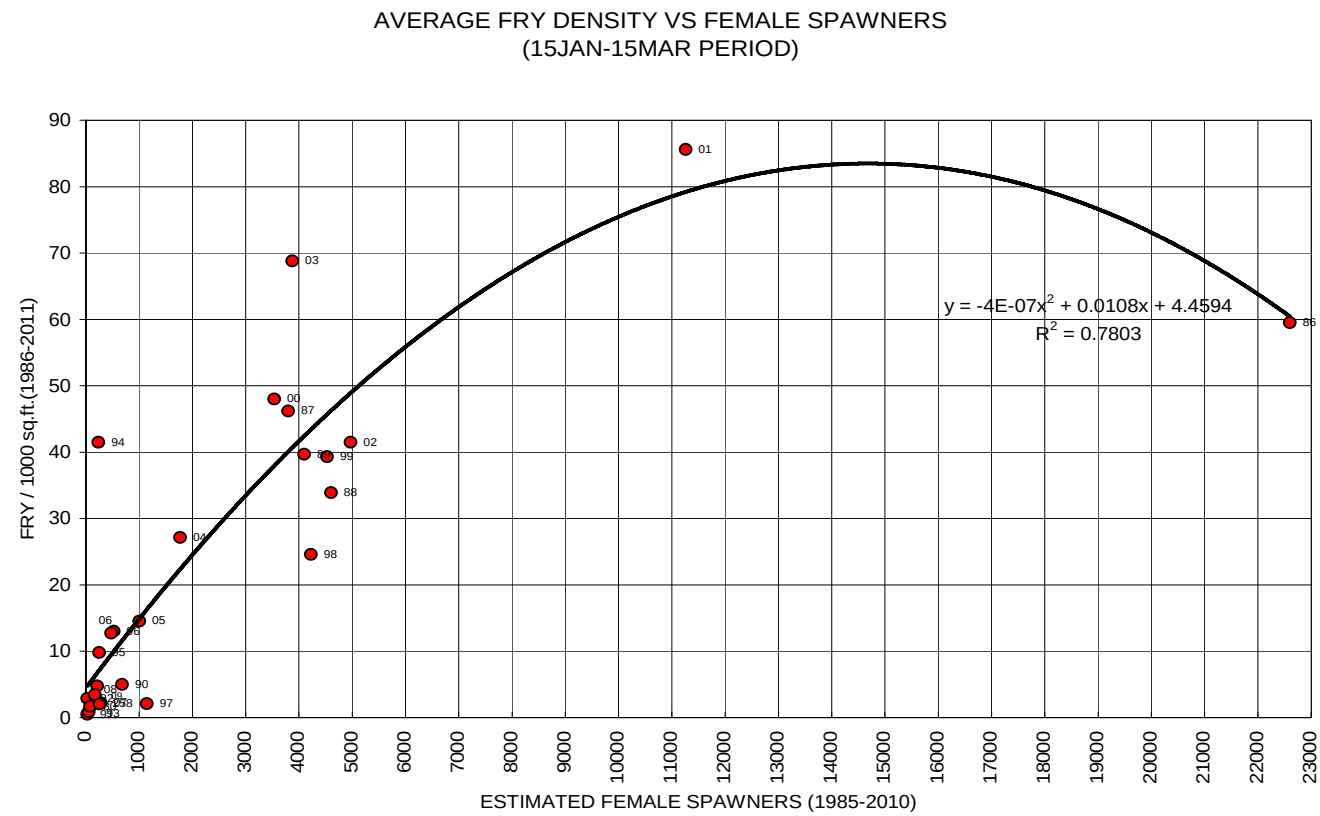


Figure 23. Tuolumne River average Chinook salmon fry density vs female spawners.

Table 1. Summary table of weekly seine catch by location for the Tuolumne and San Joaquin Rivers, 2011.

2011 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 UPPER	SECTION MIDDLE	SECTION LOWER	TURB.	D.O. (ppm)
19JAN	OLGB	50.5	21	1,800	11.7	32	42	35.9	21	0	0	10.8	28		3.6	2.5	0.0	3.1	12.8
19JAN	R4B	48.4	0	2,000	0.0							10.8	29					3.0	12.5
19JAN	TLSRA	42.0	0	2,000	0.0							10.9	36					3.9	11.4
19JAN	HICK	31.6	5	1,800	2.8	38	57	49.2	5	0	0	10.6	33					3.5	11.4
19JAN	CHARLES	24.9	9	1,650	5.5	37	47	40.8	9	0	0	10.5	29					3.8	11.0
19JAN	LEGION	17.2	0	2,200	0.0							10.8	36					5.1	9.8
19JAN	VENN	6.4	0	1,650	0.0							10.9	38					3.4	9.4
19JAN	SHILOH	3.4	0	1,650	0.0							10.8	32					5.1	9.8
19JAN	LAIRD	90.2	0	1,350	0.0							11.3	359					25.9	7.5
19JAN	GARDNER	79.5	0	600	0.0							10.9	202					18.9	9.5
TR TOT.			35	14,750	2.4	32	57	39.0	35	0	0								
SJR TOT.			0	1,950	0.0														

2011 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 UPPER	SECTION MIDDLE	SECTION LOWER	TURB.	D.O. (ppm)
01FEB	OLGB	50.5	4	1,100	3.6	36	43	38.3	4	0	0	10.5	37		1.9	7.9	2.9	3.6	11.9
01FEB	R5	48.0	5	1,800	2.8	42	65	48.8	5	0	0	10.6	35					3.3	N.A.
01FEB	TRR	42.3	0	1,800	0.0							10.5	38					3.5	12.1
01FEB	HICK	31.6	22	1,450	15.2	31	76	47.0	22	0	0	10.3	38					3.9	12.1
01FEB	CHARLES	24.9	2	1,500	1.3	37	37	37.0	2	0	0	10.8	42					6.5	10.8
01FEB	LEGION	17.2	8	1,100	7.3	34	41	37.1	8	0	0	11.1	45					12.2	11.1
01FEB	VENN	6.4	0	1,200	0.0							11.5	57					4.9	8.7
01FEB	SHILOH	3.4	7	1,200	5.8	34	58	43.9	7	0	0	11.2	47					6.7	10.8
01FEB	LAIRD	90.2	0	1,200	0.0							10.7	394					21.3	10.7
01FEB	GARDNER	79.5	2	1,200	1.7	42	43	42.5	2	0	0	10.9	279					25.3	10.5
TR TOT.			48	11,150	4.3	31	76	43.9	48	0	0								
SJR TOT.			2	2,400	0.8	42	43	42.5	2	0	0								

2011 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 UPPER	SECTION MIDDLE	SECTION LOWER	TURB.	D.O. (ppm)
15FEB	OLGB	50.5	0	1,200	0.0							10.4	35		4.3	5.2	0.9	3.4	12.7
15FEB	R5	48.0	4	2,400	1.7	37	47	42.5	4	0	0	10.6	35					2.8	12.4
15FEB	TLSRA	42.0	16	1,100	14.5	32	49	42.7	16	0	0	10.6	38					4.3	11.8
15FEB	HICK	31.6	16	1,700	9.4	34	51	38.4	16	0	0	10.9	34					2.8	10.8
15FEB	CHARLES	24.9	6	2,200	2.7	33	42	37.2	6	0	0	11.1	36					2.9	11.6
15FEB	LEGION	17.2	0	300	0.0							11.4	36					4.4	11.4
15FEB	VENN	6.4	0	1,600	0.0							11.6	38					4.0	10.2
15FEB	SHILOH	3.4	3	1,800	1.7	38	42	39.7	3	0	0	11.4	38					6.0	11.3
15FEB	LAIRD	90.2	1	1,650	0.6	40	40	40.0	1	0	0	12.0	388					23.9	11.0
15FEB	GARDNER	79.5	4	1,650	2.4	37	45	41.3	4	0	0	11.7	243					15.7	10.8
TR TOT.			45	12300	3.7	32	51	40.2	45	0	0								
SJR TOT.			5	3300	1.5	37	45	41.0	5	0	0								

2011 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 UPPER	SECTION MIDDLE	SECTION LOWER	TURB.	D.O. (ppm)
01MAR	OLGB	50.5	0	2,400	0.0							10.3	24		0.8	0.7	0.4	1.9	12.8
01MAR	R4B	48.4	5	2,200	2.3	33	41	36.8	5	0	0	10.4	30					1.7	13.2
01MAR	TLSRA	42.0	0	1,800	0.0							10.2	35					2.0	12.8
01MAR	HICK	31.6	4	1,700	2.4	38	49	41.5	4	0	0	10.0	36					2.3	12.3
01MAR	CHARLES	24.9	0	1,800	0.0							10.9	36					2.5	10.9
01MAR	LEGION	17.2	0	2,400	0.0							12.7	32					2.9	11.0
01MAR	VENN	6.4	1	1,000	1.0	54	54	54.0	1	0	0	11.6	36					4.4	11.1
01MAR	SHILOH	3.4	0	1,800	0.0							12.0	34					7.5	11.5
01MAR	LAIRD	90.2	0	1,650	0.0							12.2	410					25.6	11.2
01MAR	GARDNER	79.5	2	1,000	2.0	37	38	37.5	2	0	0	11.4	237					20.0	10.9
TR TOT.			10	15100	0.7	33	54	40.4	10	0	0								
SJR TOT.			2	2650	0.8	37	38	37.5	2	0	0								

2011 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 UPPER	SECTION MIDDLE	SECTION LOWER	TURB.	D.O. (ppm)
15MAR	OLGB	50.5	0	1,350	0.0							10.3	26		0.5	1.1	0.7	1.9	12.7
15MAR	R5	48.0	1	1,800	0.6	40	40	40.0	1	0	0	10.8	27					1.7	13.2
15MAR	TLSRA	42.0	1	800	1.3	50	50	50.0	1	0	0	10.6	29					1.9	11.4
15MAR	HICK	31.6	0	1,650	0.0							11.3	32					2.0	10.4
15MAR	CHARLES	24.9	5	1,950	2.6	38	45	41.0	5	0	0	11.8	37					2.0	11.4
15MAR	LEGION	17.2	0	825	0.0							13.3	36					3.4	10.0
15MAR	VENN	6.4	2	1,200	1.7	45	60	52.5	2	0	0	13.7	45					3.0	9.4
15MAR	SHILOH	3.4	0	1,800	0.0							13.2	37					5.3	10.9
15MAR	LAIRD	90.2	3	1,600	1.9	46	59	53.0	3	0	0	15.3	514					18.1	9.4
15MAR	GARDNER	79.5	7	1,500	4.7	44	68	53.3	7	0	0	14.3	320					11.3	9.5
TR TOT.			9	11375	0.8	38	60	44.4	9	0	0								
SJR TOT.			10	3100	3.2	44	68	53.2	10	0	0								

Table 1. Summary table of weekly seine catch by location for the Tuolumne and San Joaquin Rivers, 2011.

continued.

2011 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)
29MAR	OLGB	50.5	0	2,200	0.0							10.4	29		0.3	0.0	0.0	2.3	12.1
29MAR	R4B	48.4	2	2,400	0.8	38	42	40.0	2	0	0	11.0	34					2.6	12.4
29MAR	TLSRA	42.0	0	2,000	0.0							10.5	33					3.4	11.4
29MAR	HICK	31.6	0	1,800	0.0							10.7	36					3.3	11.5
29MAR	CHARLES	24.9	0	1,800	0.0							11.0	37					3.2	10.4
29MAR	LEGION	17.2	0	1,800	0.0							12.7	34					4.9	10.6
29MAR	RDP	12.3	0	1,800	0.0							12.4	39					5.9	10.5
29MAR	SHILOH	3.4	0	1,800	0.0							13.8	40					6.9	10.3
29MAR	LAIRD	90.2	0	2,400	0.0							16.0	230					33.4	7.0
29MAR	GARDNER	79.5	0	1,800	0.0							14.7	170					26.1	7.9
TR TOT.			2	15600	0.1	38	42	40.0	2	0	0								
SJR TOT.			0	4200	0.0														

2011 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)
12APR	OLGB	50.5	1	2,000	0.5	53	53	53.0	1	0	0	10.5	34		0.5	0.9	0.0	2.9	13.4
12APR	R4B	48.4	2	2,400	0.8	38	50	44.0	2	0	0	10.9	36					2.7	12.4
12APR	TLSRA	42.0	0	1,800	0.0							10.5	38					4.0	11.6
12APR	HICK	31.6	1	1,600	0.6	55	55	55.0	1	0	0	10.7	36					3.2	9.6
12APR	STREETER	25.4	3	1,800	1.7	37	48	41.0	3	0	0	11.0	35					4.1	11.3
12APR	LEGION	17.2	1	2,400	0.4	43	43	43.0	1	0	0	12.0	35					4.4	11.4
12APR	RDP	12.3	0	2,200	0.0							12.7	34					5.0	10.2
12APR	SHILOH	3.4	0	2,000	0.0							13.2	36					5.9	11.8
12APR	LAIRD	90.2	0	1,800	0.0							17.1	188					8.1	9.0
12APR	OFC	80.7	0	2,400	0.0							15.3	123					8.8	9.6
TR TOT.			8	16200	0.5	37	55	45.3	8	0	0								
SJR TOT.			0	4200	0.0														

2011 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)
26APR	OLGB	50.5	2	2,200	0.9	45	52	48.5	2	0	0	10.7	34		0.9	0.0	0.0	2.5	14.1
26APR	R4B	48.4	4	2,400	1.7	42	54	45.5	4	0	0	11.1	36					2.7	13.6
26APR	TLSRA	42.0	0	2,400	0.0							10.9	37					2.6	12.6
26APR	HICK	31.6	0	2,100	0.0							10.9	37					2.6	12.7
26APR	STREETER	25.4	0	1,650	0.0							11.4	38					2.9	12.5
26APR	LEGION	17.2	0	2,400	0.0							12.5	36					3.4	11.5
26APR	RDP	12.3	0	1,800	0.0							12.9	38					3.8	11.4
26APR	SHILOH	3.4	0	1,400	0.0							13.1	40					7.1	11.2
26APR	LAIRD	90.2	0	1,800	0.0							18.4	181					15.0	8.2
26APR	OFC	80.7	0	1,300	0.0							16.6	139					16.0	9.4
TR TOT.			6	16350	0.4	42	54	46.5	6	0	0								
SJR TOT.			0	3100	0.0														

2011 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)
10MAY	OLGB	50.5	0	1,800	0.0							11.0	28		0.0	0.0	0.3	1.6	13.2
10MAY	R4B	48.4	0	1,800	0.0							11.2	33					1.5	13.0
10MAY	TLSRA	42.0	0	1,800	0.0							11.2	39					1.9	11.3
10MAY	HICK	31.6	0	1,800	0.0							11.2	34					1.5	12.1
10MAY	CHARLES	24.9	0	1,800	0.0							12.1	34					1.7	11.4
10MAY	LEGION	17.2	0	1,600	0.0							13.4	37					2.5	11.1
10MAY	VENN	6.4	0	1,600	0.0							14.6	40					6.7	11.4
10MAY	SHILOH	3.4	1	1,800	0.6	66	66	66.0	1	0	0	14.3	37					3.2	11.2
10MAY	LAIRD	90.2	0	1,800	0.0							18.8	191					17.5	8.6
10MAY	GARDNER	79.5	Not sampled due to high flow									17.2	133					15.3	9.1
TR TOT.			1	14000	0.1	66	66	66.0	1	0	0								
SJR TOT.			0	1800	0.0														

2011 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)
24MAY	OLGB	50.5	0	1,800	0.0							11.2	30		0.0	0.0	0.0	1.2	13.9
24MAY	R4B	48.4	0	1,800	0.0							11.4	34					1.1	13.7
24MAY	TLSRA	42.0	0	1,400	0.0							11.6	35					1.4	12.0
24MAY	HICK	31.6	0	1,600	0.0							11.7	36					1.4	12.9
24MAY	CHARLES	24.9	0	1,800	0.0							12.7	34					2.2	12.3
24MAY	LEGION	17.2	Not sampled																
24MAY	VENN	6.4	0	1,650	0.0							16.8	39					3.8	10.8
24MAY	SHILOH	3.4	0	1,800	0.0							14.9	41					3.4	11.4
24MAY	LAIRD	90.2	0	1,600	0.0							20.1	235					19.3	10.2
24MAY	GARDNER	79.5	0	1,800	0.0							18.0	155					22.8	10.5
TR TOT.			0	11850	0.0														
SJR TOT.			0	3400	0.0														

TABLE 2. 2011 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
19JAN	35	14,750	2.4	32	57	39.0	35	0	0
01FEB	48	11,150	4.3	31	76	43.9	48	0	0
15FEB	45	12,300	3.7	32	51	40.2	45	0	0
01MAR	10	15,100	0.7	33	54	40.4	10	0	0
15MAR	9	11,375	0.8	38	60	44.4	9	0	0
29MAR	2	15,600	0.1	38	42	40.0	2	0	0
12APR	8	16,200	0.5	37	55	45.3	8	0	0
26APR	6	16,350	0.4	42	54	46.5	6	0	0
10MAY	1	14,000	0.1	66	66	66.0	1	0	0
24MAY	0	11,850	0.0						
TOTAL:	164	138,675	1.2				164	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
19JAN	0	1,950	0.0						
01FEB	2	2,400	0.8	42	43	42.5	2	0	0
15FEB	5	3,300	1.5	37	45	41.0	5	0	0
01MAR	2	2,650	0.8	37	38	37.5	2	0	0
15MAR	10	3100	3.2	44	68	53.2	10	0	0
29MAR	0	4,200	0.0						
12APR	0	4,200	0.0						
26APR	0	3,100	0.0						
10MAY	0	1,800	0.0						
24MAY	0	3,400	0.0						
TOTAL:	19	30,100	0.6				19	0	0

Table 3. Summary table of weekly seine catch by location for the Tuolumne and San Joaquin Rivers, 2011

2011 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
19JAN	OLGB	21	1,800	21	0	11.7	0.0	11.7	35.9	3.6	1.9	0.0	0.0	0.5	0.0
19JAN	R4B	0	2,000					0.0							
19JAN	TLSRA	0	2,000					0.0							
19JAN	HICKMAN	5	1,800	2	3	1.1	1.7	2.8	49.2						
19JAN	CHARLES	9	1,650	9	0	5.5	0.0	5.5	40.8						
19JAN	LEGION	0	2,200					0.0							
19JAN	VENN	0	1,650					0.0							
19JAN	SHILOH	0	1,650					0.0							
19JAN	LAIRD	0	1,350					0.0							
19JAN	GARDNER	0	600					0.0							
TUOL.TOT.		35	14750	32	3	2.2	0.2	2.4	39.0						
SJR. TOT.		0	1950					0.0							

2011 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
01FEB	OLGB	4	1,100	4	0	3.6	0.0	3.6	38.3	1.7	6.2	2.5	0.2	1.7	0.4
01FEB	R5	5	1,800	4	1	2.2	0.6	2.8	48.8						
01FEB	TRR	0	1,800					0.0							
01FEB	HICKMAN	22	1,450	15	7	10.3	4.8	15.2	47.0						
01FEB	CHARLES	2	1,500	2	0	1.3	0.0	1.3	37.0						
01FEB	LEGION	8	1,100	8	0	7.3	0.0	7.3	37.1						
01FEB	VENN	0	1,200					0.0							
01FEB	SHILOH	7	1,200	6	1	5.0	0.8	5.8	43.9						
01FEB	LAIRD	0	1,200					0.0							
01FEB	GARDNER	2	1,200	2	0	1.7	0.0	1.7	42.5						
TUOL.TOT.		48	11150	39	9	3.5	0.8	4.3	43.9						
SJR. TOT.		2	2400	2	0	0.8	0.0	0.8	42.5						

2011 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
15FEB	OLGB	0	1,200					0.0		4.3	5.0	0.9	0.0	0.2	0.0
15FEB	R5	4	2,400	4	0	1.7	0.0	1.7	42.5						
15FEB	TLSRA	16	1,100	16	0	14.5	0.0	14.5	42.7						
15FEB	HICKMAN	16	1,700	15	1	8.8	0.6	9.4	38.4						
15FEB	CHARLES	6	2,200	6	0	2.7	0.0	2.7	37.2						
15FEB	LEGION	0	300					0.0							
15FEB	VENN	0	1,600					0.0							
15FEB	SHILOH	3	1,800	3	0	1.7	0.0	1.7	39.7						
15FEB	LAIRD	1	1,650	1	0	0.6	0.0	0.6	40.0						
15FEB	GARDNER	4	1,650	4	0	2.4	0.0	2.4	41.3						
TUOL.TOT.		45	12300	44	1	3.6	0.1	3.7	40.2						
SJR. TOT.		5	3300	5	0	1.5	0.0	1.5	41.0						

2011 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
01MAR	OLGB	0	2,400					0.0		0.8	0.7	0.0	0.0	0.0	0.4
01MAR	R4B	5	2,200	5	0	2.3	0.0	2.3	36.8						
01MAR	TLSRA	0	1,800					0.0							
01MAR	HICKMAN	4	1,700	4	0	2.4	0.0	2.4	41.5						
01MAR	CHARLES	0	1,800					0.0							
01MAR	LEGION	0	2,400					0.0							
01MAR	VENN	1	1,000	0	1	0.0	1.0	1.0	54.0						
01MAR	SHILOH	0	1,800					0.0							
01MAR	LAIRD	0	1,650					0.0							
01MAR	GARDNER	2	1,000	2	0	2.0	0.0	2.0	37.5						
TUOL.TOT.		10	15100	9	1	0.6	0.1	0.7	40.4						
SJR. TOT.		2	2650	2	0	0.8	0.0	0.8	37.5						

2011 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
15MAR	OLGB	0	1,350					0.0		0.5	1.1	0.3	0.0	0.0	0.3
15MAR	R5	1	1,800	1	0	0.6	0.0	0.6	40.0						
15MAR	TLSRA	1	800	1	0	1.3	0.0	1.3	50.0						
15MAR	HICKMAN	0	1,650					0.0							
15MAR	CHARLES	5	1,950	5	0	2.6	0.0	2.6	41.0						
15MAR	LEGION	0	825					0.0							
15MAR	VENN	2	1,200	1	1	0.8	0.8	1.7	52.5						
15MAR	SHILOH	0	1,800					0.0							
15MAR	LAIRD	3	1,600	1	2	0.6	1.3	1.9	53.0						
15MAR	GARDNER	7	1,500	4	3	2.7	2.0	4.7	53.3						
TUOL.TOT.		9	11375	8	1	0.7	0.1	0.8	44.4						
SJR. TOT.		10	3100	5	5	1.6	1.6	3.2	53.2						

Table 3. Summary table of weekly seine catch by location for the Tuolumne and San Joaquin Rivers, 2011 (cont.)

2011 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
29MAR	OLGB	0	2,200					0.0			0.3	0.0	0.0	0.0	0.0	0.0
29MAR	R4B	2	2,400	2	0	0.8	0.0	0.8	40.0							
29MAR	TLSRA	0	2,000					0.0								
29MAR	HICKMAN	0	1,800					0.0								
29MAR	CHARLES	0	1,800					0.0								
29MAR	LEGION	0	1,800					0.0								
29MAR	VENN	0	1,800					0.0								
29MAR	SHILOH	0	1,800					0.0								
29MAR	LAIRD	0	2,400					0.0								
29MAR	GARDNER	0	1,800					0.0								
TUOL.TOT.		2	15600	2	0	0.1	0.0	0.1	40.0							
SJR. TOT.		0	4200					0.0								

2011 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
12APR	OLGB	1	2,000	0	1	0.0	0.5	0.5	53.0		0.3	0.7	0.0	0.2	0.2	0.0
12APR	R4B	2	2,400	2	0	0.8	0.0	0.8	44.0							
12APR	TLSRA	0	1,800					0.0								
12APR	HICKMAN	1	1,600	0	1	0.0	0.6	0.6	55.0							
12APR	STREETER	3	1,800	3	0	1.7	0.0	1.7	41.0							
12APR	LEGION	1	2,400	1	0	0.4	0.0	0.4	43.0							
12APR	RDP	0	2,200					0.0								
12APR	SHILOH	0	2,000					0.0								
12APR	LAIRD	0	1,800					0.0								
12APR	OFC	0	2,400					0.0								
TUOL.TOT.		8	16200	6	2	0.4	0.1	0.5	45.3							
SJR. TOT.		0	4200					0.0								

2011 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
26APR	OLGB	2	2,200	1	1	0.5	0.5	0.9	48.5		0.6	0.0	0.0	0.3	0.0	0.0
26APR	R4B	4	2,400	3	1	1.3	0.4	1.7	45.5							
26APR	TLSRA	0	2,400					0.0								
26APR	HICKMAN	0	2,100					0.0								
26APR	STREETER	0	1,650					0.0								
26APR	LEGION	0	2,400					0.0								
26APR	RDP	0	1,800					0.0								
26APR	SHILOH	0	1,400					0.0								
26APR	LAIRD	0	1,800					0.0								
26APR	OFC	0	1,300					0.0								
TUOL.TOT.		6	16350	4	2	0.2	0.1	0.4	46.5							
SJR. TOT.		0	3100					0.0								

2011 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
10MAY	OLGB	0	1,800					0.0			0.0	0.0	0.0	0.0	0.0	0.3
10MAY	R4B	0	1,800					0.0								
10MAY	TLSRA	0	1,800					0.0								
10MAY	HICKMAN	0	1,800					0.0								
10MAY	CHARLES	0	1,800					0.0								
10MAY	LEGION	0	1,600					0.0								
10MAY	VENN	0	1,600					0.0								
10MAY	SHILOH	1	1,800	0	1	0.0	0.6	0.6	66.0							
10MAY	LAIRD	0	1,800					0.0								
10MAY	GARDNER	Not sampled due to high flow														
TUOL.TOT.		1	14000	0	1	0.0	0.1	0.1								
SJR. TOT.		0	1800					0.0								

2011 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
24MAY	OLGB	0	1,800					0.0			0.0	0.0	0.0	0.0	0.0	0.0
24MAY	R4B	0	1,800					0.0								
24MAY	TLSRA	0	1,400					0.0								
24MAY	HICKMAN	0	1,600					0.0								
24MAY	CHARLES	0	1,800					0.0								
24MAY	LEGION	Not sampled														
24MAY	VENN	0	1,650					0.0								
24MAY	SHILOH	0	1,800					0.0								
24MAY	LAIRD	0	1,600					0.0								
24MAY	GARDNER	0	1,800					0.0								
TUOL.TOT.		0	11,850					0.0								
SJR. TOT.		0	3,400					0.0								

Table 4. 2011 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
19JAN	1	OLGB	50.5														1															
19JAN	2	R4B	48.4																													
19JAN	3	TLSRA	42.0								10		10						20													
19JAN	4	HICK	31.6										2																			
19JAN	5	CHARLES	24.9																													
19JAN	6	LEGION	17.2														1		1													
19JAN	7	VENN	6.4														1															
19JAN	8	SHILOH	3.4												1		1															
19JAN	9	LAIRD	90.2												50		5															
19JAN	10	GARDNER	77.8												40					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
01FEB	1	OLGB	50.5																													
01FEB	2	R5	48.0			1											1															
01FEB	3	TRR	42.3										40				YOY		1													
01FEB	4	HICK	31.6														1															
01FEB	5	CHARLES	24.9								1						1															
01FEB	6	LEGION	17.2														1		11													1
01FEB	7	VENN	6.4																20													
01FEB	8	SHILOH	3.4												2																	1
01FEB	9	LAIRD	90.2												200					5												
01FEB	10	GARDNER	77.8												80					15										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
15FEB	1	OLGB	50.5																													
15FEB	2	R5	48.0																													
15FEB	3	TLSRA	42.0														5															
15FEB	4	HICK	31.6								1		2																			
15FEB	5	CHARLES	24.9														4															
15FEB	6	LEGION	17.2														2															
15FEB	7	VENN	6.4																													
15FEB	8	SHILOH	3.4												6																	
15FEB	9	LAIRD	90.2												40					10												
15FEB	10	GARDNER	77.8												20	1				10												

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
01MAR	1	OLGB	50.5														1		2													
01MAR	2	R4B	48.4																													
01MAR	3	TLSRA	42.0														20		3													
01MAR	4	HICK	31.6														3															
01MAR	5	CHARLES	24.9										1																			
01MAR	6	LEGION	17.2												2																	
01MAR	7	RDP	12.3																1													
01MAR	8	SHILOH	3.4												10		2		2													
01MAR	9	LAIRD	90.2												20				5													
01MAR	10	GARDNER	77.8												20					1				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
15MAR	1	OLGB	50.5														1															
15MAR	2	R5	48.0																													
15MAR	3	TLSRA	42.0														2							1								
15MAR	4	HICK	31.6										1																			
15MAR	5	CHARLES	24.9										1																			
15MAR	6	LEGION	17.2																1													
15MAR	7	VENN	6.4														1															
15MAR	8	SHILOH	3.4														YOY		2													
15MAR	9	LAIRD	90.2												200	1				20												
15MAR	10	GARDNER	77.8												40					5												

Table 4. 2011 Other species sampled (Cont.)

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
29MAR	1	OLGB	50.5			1													1													
29MAR	2	R4B	48.4																													
29MAR	3	TLSRA	42.0																													
29MAR	4	HICK	31.6										1																			
29MAR	5	CHARLES	24.9																2													
29MAR	6	LEGION	17.2										10						6													
29MAR	7	RDP	12.3																1													
29MAR	8	SHILOH	3.4										3																			
29MAR	9	LAIRD	90.2												100					6												
29MAR	10	GARDNER	77.8																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
12APR	1	OLGB	50.5														3															
12APR	2	R4B	48.4																													
12APR	3	TLSRA	42.0																1													
12APR	4	HICK	31.6										1																			
12APR	5	CHARLES	24.9																2													
12APR	6	LEGION	17.2																12													
12APR	7	RDP	12.3												1		YOY		5													
12APR	8	SHILOH	3.4												2				5													
12APR	9	LAIRD	90.2												1				6													
12APR	10	GARDNER	77.8												6				5				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
26APR	1	OLGB	50.5			4																										
26APR	2	R4B	48.4			1																										
26APR	3	TLSRA	42.0										5						12										15			
26APR	4	HICK	31.6																													
26APR	5	CHARLES	24.9																													
26APR	6	LEGION	17.2														3		1													
26APR	7	RDP	12.3														YOY															
26APR	8	SHILOH	3.4				20										YOY											1PSCP				
26APR	9	LAIRD	90.2				1										YOY		5									4PSCP				
26APR	10	GARDNER	77.8										1		30					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
10MAY	1	OLGB	50.5																													
10MAY	2	R4B	48.4																													
10MAY	3	TLSRA	42.0										20				YOY		20													
10MAY	4	HICK	31.6																													
10MAY	5	CHARLES	24.9																													
10MAY	6	LEGION	17.2												2																	
10MAY	7	RDP	12.3				5																						4PSCP			
10MAY	8	SHILOH	3.4																													
10MAY	9	LAIRD	90.2				100								300		YOY															
10MAY	10	GARDNER	77.8																													

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
24MAY	1	OLGB	50.5																													
24MAY	2	R4B	48.4																													
24MAY	3	TLSRA	42.0										1				YOY		20										4			
24MAY	4	HICK	31.6														YOY												3			
24MAY	5	CHARLES	24.9														YOY												2			
24MAY	6	LEGION	17.2																													
24MAY	7	RDP	12.3				60										YOY															
24MAY	8	SHILOH	3.4												15																	
24MAY	9	LAIRD	90.2				100								200		YOY															
24MAY	10	GARDNER	77.8				20								100					1									PSCP(3)			

Table 4. KEY TO OTHER SPECIES SAMPLED AND DISTRIBUTION
(List includes all species caught during 1986-2011 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	X
Salmonidae	rainbow trout	N	RT		X
Cyprinidae	carp		CP	X	X
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	X
Cyprinidae	Sacramento splittail	N	ST		
Cyprinidae	red shiner		PRS	X	X
Cyprinidae	fathead minnow		FHM	X	
Catostomidae	Sacramento sucker	N	SKR	X	X
Ictaluridae	channel catfish		CCF		
Ictaluridae	white catfish		WCF		
Ictaluridae	brown bullhead		BBH		
Poeciliidae	western mosquitofish		GAM	X	X
Atherinidae	inland silverside		ISS	X	
Moronidae	striped bass		SB		
Centrarchidae	white/black crappie		WCR/BCR		
Centrarchidae	warmouth		WM		
Centrarchidae	green sunfish		GSF	X	
Centrarchidae	bluegill		BG	X	X
Centrarchidae	redear sunfish		RSF	X	
Centrarchidae	largemouth bass		LMB		
Centrarchidae	smallmouth bass		SMB		
Percidae	bigscale logperch		BLP		
Embiotocidae	tule perch	N	TP		
Cottidae	prickly sculpin	N	PSCP	X	X
Cottidae	riffle sculpin	N	RSCP		X
TOTAL:	32			12	11

2011 species presence designated with 'X'

Table 5. Tuolumne River Seining Summary, 1986-2011.

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
2009	11	779	8	4.7	0.64	0	2	0	---	---		13JAN	02JUN
2010	10	386	8	2.9	0.65	0	2	0	---	---		26JAN	08JUN
2011	10	164	8	1.2	No estimate	19	2	0.6	---	---		19JAN	24MAY

--- Not Sampled

*All San Joaquin River locations were not always sampled

Table 6. Summary table of locations sampled, 1986-2011

1986 TO 2011 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	2009	2010	2011
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	X	X	X
2	Riffle 4B	48.4	X	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	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	X	X	
5	Turlock Lake State Rec. Area	42.0	X	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	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	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	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	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	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	2009	2010	2011
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	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	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	2009	2010	2011
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	2009	2010	2011
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.

Tuolumne Fall-run Estimate	Total Female Spawners	Juvenile Seining	Peak Fry Density 15JAN-15MAR	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
2008	212	2009	9.7	4.8
2009	170	2010	6.1	3.5
2010	258	2011	3.6	2.0

Table 8. Summary table of fish species caught during the1992-2011 seine studies.

Tuolumne River

FAMILY	COMMON NAME	NATIVE SPECIES	ABBREV.	1992	1993	1994	1995	1996	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Petromyzontidae	Pacific lamprey	N	LP											X		X						
Clupeidae	threadfin shad		TFS					X	X			X										
Salmonidae	Chinook salmon	N	CS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Salmonidae	rainbow trout	N	RT						X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cyprinidae	carp		CP														X					X
Cyprinidae	goldfish		GF																			
Cyprinidae	golden shiner		GSH	X	X	X							X		X		X		X	X	X	
Cyprinidae	Sacramento blackfish	N	SBF																			
Cyprinidae	hitch	N	HCH																			
Cyprinidae	hardhead	N	HH	X		X						X	X		X	X	X	X	X	X	X	X
Cyprinidae	Sacramento pikeminnow	N	PM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cyprinidae	Sacramento splittail	N	ST																			
Cyprinidae	red shiner		PRS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cyprinidae	fathead minnow		FHM								X											
Catostomidae	Sacramento sucker	N	SKR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ictaluridae	channel catfish		CCF								X			X						X	X	
Ictaluridae	white catfish		WCF		X	X						X										
Ictaluridae	brown bullhead		BBH			X																
Poeciliidae	western mosquitofish		GAM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Atherinidae	inland silverside		ISS	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	
Moronidae	striped bass		SB									X										
Centrarchidae	white/black crappie		WCR/BCR																			
Centrarchidae	warmouth		WM		X																	
Centrarchidae	green sunfish		GSF	X	X		X				X	X	X	X	X	X	X			X	X	
Centrarchidae	bluegill		BG	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X
Centrarchidae	redear sunfish		RSF	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Centrarchidae	largemouth bass		LMB	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	
Centrarchidae	smallmouth bass		SMB	X		X						X	X	X	X				X	X	X	
Percidae	bigscale logperch		BLP	X			X		X	X								X	X			
Embiotocidae	tule perch	N	TP																			
Cottidae	prickly sculpin	N	PSCP				X	X	X						X	X	X					X
Cottidae	riffle sculpin	N	RSCP	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TOTAL:	32			15	13	15	12	11	14	11	14	17	15	15	16	15	16	12	15	15	16	11

(List includes all species caught during 1986-2011 seining studies

San Joaquin River

FAMILY	COMMON NAME	NATIVE SPECIES	ABBREV.	1992	1993	1994	1995	1996	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Petromyzontidae	Pacific lamprey	N	LP																			
Clupeidae	threadfin shad		TFS		X		X		X	X	X			X								
Salmonidae	Chinook salmon	N	CS	X		X	X	X	X	X	X	X	X	X		X	X					X
Salmonidae	rainbow trout	N	RT																			
Cyprinidae	carp		CP	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X			X
Cyprinidae	goldfish		GF	X		X	X	X	X	X		X	X		X	X	X					
Cyprinidae	golden shiner		GSH	X			X								X							
Cyprinidae	Sacramento blackfish	N	SBF	X	X	X	X	X	X	X	X											
Cyprinidae	hitch	N	HCH					X		X	X											
Cyprinidae	hardhead	N	HH																			
Cyprinidae	Sacramento pikeminnow	N	PM	X	X		X	X	X		X	X			X	X	X		X	X	X	X
Cyprinidae	Sacramento splittail	N	ST	X			X	X	X			X					X					
Cyprinidae	red shiner		PRS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cyprinidae	fathead minnow		FHM	X	X	X	X	X	X	X	X	X	X		X	X	X					X
Catostomidae	Sacramento sucker	N	SKR	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X	X
Ictaluridae	channel catfish		CCF			X		X										X				
Ictaluridae	white catfish		WCF											X								
Ictaluridae	brown bullhead		BBH					X														
Poeciliidae	western mosquitofish		GAM	X	X		X	X	X			X	X	X	X		X			X	X	X
Atherinidae	inland silverside		ISS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Moronidae	striped bass		SB	X	X	X		X	X		X	X			X							
Centrarchidae	white/black crappie		WCR/BCR	X		X		X					X		X	X					X	
Centrarchidae	warmouth		WM																			
Centrarchidae	green sunfish		GSF	X	X		X	X	X				X	X	X		X					X
Centrarchidae	bluegill		BG	X	X	X	X		X	X	X	X	X	X	X	X	X		X	X	X	X
Centrarchidae	redear sunfish		RSF	X	X	X	X			X			X	X	X					X	X	X
Centrarchidae	largemouth bass		LMB		X	X	X	X		X	X	X	X	X	X	X			X	X	X	
Centrarchidae	smallmouth bass		SMB	X		X				X	X				X			X		X	X	
Percidae	bigscale logperch		BLP			X	X	X	X	X	X	X	X	X	X							
Embiotocidae	tule perch	N	TP	X	X	X	X	X	X		X	X	X	X	X				X			
Cottidae	prickly sculpin	N	PSCP				X	X	X	X						X	X					X
Cottidae	riffle sculpin	N	RSCP																			
TOTAL:	32			19	15	17	20	21	18	16	15	15	14	14	18	12	13	5	8	9	10	12

(List includes all species caught during 1986-2011 seining studies