

# Annual Project Performance Report *(rev. 7/07)*

**1. State:** California

**Grant number:** F-119-R-5

**Grant name:** Central Valley Angler Survey

**Project number and name:** F-119-R, Central Valley Angler Survey

**2. Report Period:** July 1, 2009 to June 30, 2010

**Report due date:** September 1, 2010

**Date prepared:** September 1, 2010

**3. Location of work:** Central Valley, California including portions of the Sacramento, Feather, Yuba, American, Mokelumne, and Calaveras rivers, and portions of the Sacramento-San Joaquin Delta within Congressional Districts 1 – 5, 7, 10 – 11; Shasta, Tehama, Glenn, Butte, Colusa, Sutter, Yuba, Yolo, Sacramento, San Joaquin, Calaveras, Solano, and Contra Costa counties. The project is based in Sacramento, with a satellite office in Red Bluff.

#### **4. Objectives:**

a. Conduct an angler survey on the Sacramento River, its associated tributaries, and on a portion of the Sacramento-San Joaquin Delta using a stratified, random sampling design.

b. Analyze collected data and prepare reports describing angler effort, catch, and harvest for all species contacted by anglers. Emphasis is on fisheries involving key anadromous and delta species, including Chinook salmon, steelhead/rainbow trout, sturgeon, striped bass, American shad, and splittail.

c. Estimate the proportionate contribution of hatchery and natural production in the Central Valley sport catch of Chinook salmon. Estimate the age structure of the Central Valley sport catch of Chinook salmon and steelhead. Develop trends in relative abundance and age structure of Central Valley steelhead, based upon returns of spawning adults to Central Valley anadromous salmonid hatcheries.

#### **5. If the work in this grant was part of a larger undertaking with other components and funding, present a brief overview of the larger activity and the role of this project.**

The Central Valley Angler Survey is the primary angler survey for anadromous fishes in the Central Valley, California. However, we coordinate aspects of this survey with the striped bass and sturgeon tag-recovery survey being conducted in the Sacramento-San Joaquin Delta (SFRA grant F-51-R, project: #71: Bay-Delta Sport Fish Resource Assessment Project - Striped Bass) to assist with respective project objectives.

The Central Valley Angler Survey also provides an estimate of Chinook salmon harvest in the Central Valley recreational fishery. This estimate complements Chinook salmon harvest estimates for California ocean commercial and recreational fisheries generated by CDFG's Ocean Salmon Project. Combined, these estimates are used by the Pacific Fishery Management Council to forecast Chinook salmon harvest quotas in ocean

waters off the coasts of Washington, Oregon, and California. The inland recreational harvest component, for Chinook salmon of both hatchery and wild origin, has been lacking throughout most of the management history of Chinook salmon fisheries supported by the Central Valley. The Central Valley Angler Survey fills this essential information gap.

**6. Describe how the objectives were met.**

**Introduction**

This is the fifth year of field implementation of the Central Valley Angler Survey. Currently, the geographic scope of the survey is at the full extent of grant obligations (Table 1). In all, 244 survey months were expended from July 2009 through June 2010 (Table 2).

**Table 1.** Survey section numbers and descriptions for river and delta sections surveyed by the Central Valley Angler Survey, July 2009 through June 2010.

Section No.	Section Description
<b>Sacramento River and Delta</b>	
1	Carquinez Bridge to Rio Vista Bridge.
1.1	Suisun Bay, Suisun Cutoff to Middle Grounds.
2	Rio Vista Bridge to mouth of American River.
3	American River to Knights Landing (Hwy. 113 Bridge).
4	Knights Landing to Colusa (River Rd. Bridge).
5	Colusa to Hamilton City (Hwy. 32 Bridge).
6	Hamilton City to Red Bluff Diversion Dam.
7	Red Bluff Diversion Dam to Balls Ferry Boat Ramp.
8	Balls Ferry Boat Ramp to Keswick Dam.
<b>American River</b>	
9	Discovery Park to the interstate 80 Bridge
10	Interstate 80 Bridge to Hazel Avenue Bridge.
10.1	Hazel Avenue Bridge to Nimbus Dam (aka: Nimbus Basin).
<b>Feather River</b>	
11.1	Verona to Shanghai Rapids.
11.2	Shanghai Rapids to Sunset Pumps.
12	Palm Avenue Riffle to Feather River Hatchery.
12.1	Thermalito Afterbay Outlet (TAO).
12.2	Sunset Pumps to Palm Avenue Riffle.
<b>Yuba River</b>	
13	Marysville to Daguerre Point Dam.
14	Daguerre Point Dam to 1 mile upstream of Hwy, 20 Bridge.
<b>Mokelumne River</b>	
19	North Mackville road crossing to Camanche Dam (upper Mokelumne).
<b>Calaveras River</b>	
20	1 mile downstream of New Hogan Dam to New Hogan Dam (upper Calaveras).

**Table 2.** Implementation schedule for each river section surveyed by the Central Valley Angler Survey, July 2009 through June 2010. X = survey conducted, NS = no survey conducted.

River:	Sacramento								--American--			Feather			- Yuba-		Mok	Cal				
Section:	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20	
July	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
August	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
September	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
October	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
November	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	NS	NS	NS
December	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	NS	NS	NS
January	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
February	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
March	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
April	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	NS	NS	NS
May	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	NS	NS	NS
June	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TOTAL	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	8	8	8

## Job 1. Angler Survey – Field Component

### Statistical Design

A stratified, random sampling design, based on the design used by Smith (1950) and Wixom et al. (1995), was used to estimate the in-river harvest during the daytime sport fishery. A three-stage creel survey was used consisting of roving counts, roving interview, and access point interviews. Roving counts and access interviews were used to estimate total effort, while roving interviews were used to estimate catch per unit effort (CPUE, as catch/hour). Access interviews were used to construct an effort distribution model, evaluate fish contact rates between roving and access interview types, and to gather completed angler trip data. The effort distribution model determined the proportion of the whole represented by a single angler count. While a night fishery exists on Central Valley rivers, no effort was made during this reporting period to evaluate the harvest by nighttime sport anglers.

A total of 21 sections was surveyed (Table 1). Eighteen of the survey sections ranged in length from 4 to 56 river miles. Three survey sections, that represented unique fishery locations, were approximately one river mile in length. Sampling schedules and data summaries were compiled on a monthly basis. Months were chosen as a convenient time step for survey periods, in part because historical Central Valley angler surveys (e.g., Wixom 1995, Murphy et al. 1999) used a monthly time step, which allows for time-based comparisons.

Generally, each survey section was targeted to be sampled eight randomly selected days per month: on four weekdays and four weekend days, each chosen randomly. Weekdays and weekend days were placed in separate sampling strata because more angling effort is commonly associated with weekend days. Sampling effort was increased from this routine schedule to improve resolution of statistics developed in the late-fall Chinook salmon season (see below).

Each survey section was surveyed by kayak, drift boat, or power boat, the latter both propeller and jet driven. Kayaks and drift boats were used in shallow, upstream reaches that could be routinely surveyed in a downstream direction. Power boats were used in rivers where tides, wind, and waves demanded the use of more seaworthy boats, and where the survey section was to be navigated against the current.

For each section surveyed on the main stem of the Sacramento River, a systematic start time and launch location were chosen. Start times were classified based on systematic sampling of access locations. Launch locations would either be at the upstream or downstream end of the sections to be surveyed. In those sections where kayaks or drift boats were used, the launch location was always at the upstream end of the section and one of three start times representing the start, middle, and end of the day was randomly chosen for a given survey day.

All data collected were linked by river mile. Actual river miles were used for the Sacramento River sections. Each tributary was given a unique number series to identify it from other rivers in the database. The number series assigned to each tributary were as follows: Feather River, 400 series; American River, 500 series; Yuba river, 600 series; Mokelumne River, 1900 series, and the Calaveras River 2000 series. River mile designations were marked in ascending order from downstream to upstream.

#### Data Collection

Three sets of field data were required to calculate angler effort and catch: hourly angling effort distribution models by month and survey section, angler counts, and angler catch data through interviews. Effort distribution models provide the proportionate breakdown of hourly angler counts for each month in each survey section. Development of updated effort distribution models from the current survey is incomplete; instead, we used analogous data sets of hourly angler counts for each month and survey section developed by Wixom et al. (1995). Preliminary analysis of updated effort distribution models indicates, however, that angling effort patterns have not changed significantly in the Sacramento River system over the past 15 to 20 years.

On each survey day, a high-speed pass was made through a given survey section, during which anglers were counted. Data collected during the angler count included: time of observation, location by river mile, number of boats, number of boat anglers, and the number of shore anglers. At the end of the angler count, a second pass was made traveling back through the section to conduct angler interviews. Prior to beginning the interviews, the survey crew determined the feasibility of interviewing all anglers counted during the angler count. If it was determined that this was not feasible given time restrictions, then they chose every  $N^{\text{th}}$  angler to be interviewed. Once an  $N^{\text{th}}$  angler interval was chosen, that interval was maintained throughout the entire survey section for that survey date. Data collected during each interview included: location by river mile, time of interview, fishing method, number of hours fished, number of anglers in the group, target species, zip code, whether the trip was completed, and the number of fish kept and released by species. Access interviews were conducted at popular launch locations and were temporally scheduled to encompass all hours of a virtual day to be used in the effort distribution model, for that survey section, month, and day-type (weekday or weekend) stratum.

All common sportfish species found in Central Valley rivers were considered “Target Species.” Those species were: Chinook salmon, steelhead, rainbow trout, striped bass, white sturgeon, green sturgeon (as incidental catch), American shad, Sacramento splittail, black bass (all species), sunfish (all species), catfish (all species) and carp.

The number of fish kept and released was recorded separately for each of the 11 target species. All other fish species caught were recorded separately by species in a column labeled “Other.”

A length measurement was used to differentiate between steelhead and rainbow trout. All *O. mykiss* greater than 16 inches or marked externally with an adipose fin clip were considered to be steelhead. For reporting purposes, *O. mykiss* on the Sacramento River below Colusa, Feather River, and American River were considered to be juvenile steelhead. This length criterion was not used to distinguish target species by steelhead and rainbow trout; it was only applied to reported catch and fish measurements.

#### LITERATURE CITED

- Murphy, K, L. Hanson, M. Harris, and T. Schroyer. 1999. Central Valley Salmon and Steelhead Harvest Monitoring Project, 1998 angler survey. California Department of Fish and Game, Sacramento Valley – Central Sierra Region.
- Smith, S. H. 1950. Upper Sacramento River Sport Fishery. U.S. Department of Interior, Fish and Wildlife Service, Special Scientific Report – Fisheries, No. 34.
- Wixom, L. H., J. Pisciotto, and C. Lake. 1995. Final performance report: Sacramento River system sport fish catch inventory. California Department of Fish and Game, Inland Fisheries Division.

### Job 2. Angler Survey Data Analysis and Reporting

A total of 1,949 survey days was completed during the current reporting period. Allocation of survey effort by survey section and month varied somewhat to accommodate different fisheries (Table 3). Overall, though, an average of 8 survey days was expended in each survey section and month. The cumulative survey effort resulted in an estimated 2,277,740 angler hours (Table 4), for an average of 9,335 angler hours per survey section and month.

#### Chinook Salmon Fishery

During the current reporting period, the fall-run Chinook salmon sport fishery remained closed due to continued low abundance of Sacramento River fall-run Chinook. Angling for other species continued, however, and the Central Valley Angler Survey followed its normal survey schedule throughout the survey area (Table 2). This provided the opportunity to estimate fishing effort targeting Chinook salmon that occurred out-of-season during this period, along with resultant catch and harvest.

An estimated 559 hours of fishing effort was directed at Chinook salmon on the lower Sacramento and American rivers during the closed season (Table 5), resulting in an estimated out-of-season Chinook salmon harvest of 25 fish (Appendix Table 2). About 83% of this fishing effort occurred in a snag and “flossing” fishery in the Nimbus Basin on the lower American River (Section 10.1). The estimated harvest of 25 Chinook salmon was based on the expanded count of one salmon that was kept as an incidental catch in the striped bass fishery on the lower Sacramento River (Section 3) during May 2010. This salmon was adipose-fin clipped and contained a coded-wire tag that

indicated it was a spring-run Chinook salmon produced at Feather River Hatchery. Out-of-season fishing effort for Chinook salmon accounted for about 0.025% of total fishing effort in the survey area (Table 5).

As in 2008, a limited late-fall-run Chinook salmon fishery was allowed on the Sacramento River between Knights Landing and the Red Bluff Diversion Dam from 16 November 2009 through 31 December 2009. Effort expended in this fishery totaled 75,036 hours, corresponding to about 13,399 fishing trips. The fishery produced an estimated catch of 1,300 salmon, of which only 44 were released, yielding a retention rate of 96.6%. CPUE for the late-fall-run Chinook fishery was 0.02 / hr, the lowest of all the Central Valley sport fisheries surveyed. See Job 3, Stock Assessment, for results on coded-wire tag recovery and analysis in this fishery.

**Table 3.** Total number of sample days by survey section and month, as determined by the Central Valley Angler Survey, July 2009 through June 2010. N/S not Surveyed.

River:	----- Sacramento River-----					--American River--					----- Feather River -----				--- Yuba ---		Mok	Cal			
Section:	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	5	6	8	8	8	8	8	8	8	6	7	7	6	6	7	7	7	7	7	6	6
August	6	6	8	8	8	8	8	8	9	8	7	7	6	6	8	8	8	8	8	6	6
September	8	8	8	8	8	8	8	8	7	6	6	6	6	6	8	8	7	8	8	6	7
October	7	7	8	8	7	7	8	8	8	6	8	8	6	6	8	8	8	6	6	4	4
November	6	6	8	8	9	8	8	8	8	6	8	8	6	6	6	6	6	6	6	N/S	N/S
December	8	8	6	8	10	10	10	7	8	6	7	7	6	6	8	8	8	8	8	N/S	N/S
January	8	8	9	8	8	7	7	7	7	8	8	8	6	6	8	8	8	6	6	8	8
February	4	4	7	7	6	8	8	8	8	7	7	7	6	5	8	8	8	8	8	5	5
March	7	7	8	8	8	8	7	8	8	8	6	6	6	6	8	8	8	8	8	6	6
April	7	7	8	8	8	8	8	7	7	8	8	8	8	8	8	8	8	8	8	N/S	N/S
May	6	6	8	8	8	8	7	7	8	6	7	6	6	6	7	7	8	8	8	N/S	N/S
June	1	1	8	8	8	8	7	8	9	8	7	7	8	8	8	8	8	8	8	8	8
TOTALS:	80	79	94	87	92	99	100	96	95	69	89	89	77	73	94	94	62	92	92	51	51

### Steelhead Fishery

The majority (78.4%) of sport angling effort estimated for steelhead during the current reporting period was expended on the American and Feather rivers (Table 5). The percentage of overall estimated effort on the Yuba, Sacramento, Mokelumne and Calaveras rivers was 11.2%, 5.6%, 4.5%, and > 0.1%, respectively. An estimated total of 113,416 angler hours targeted steelhead (Table 5), resulting in an estimated harvest of 1,395 fish, and a release of 67,584 fish (Appendix Table 3). Thus, only about 2.0% of the catch was harvested. The overall CPUE for steelhead was 0.61 / hr which was the second highest catch rate following the American shad fishery.

**Table 4.** Expanded estimates of total angler hours by river and month, as determined by the Central Valley Angler Survey, July 2009 through June 2010. \* = not surveyed

River Sections	Sacramento			American	Feather	Yuba	Mokelumne	Calaveras
	1-3	4-7	8	9-10.1	11-12.2	13-14	19	20
July	70,151	28,110	6,753	30,155	13,570	6,632	2,580	572
August	89,679	37,465	7,294	24,908	10,778	3,321	2,324	934
September	56,581	21,069	8,785	21,566	11,374	3,651	1,509	396
October	101,753	18,799	15,188	13,419	10,938	9,622	958	300
November	110,175	56,213	8,122	9,185	7,153	2,544	*	*
December	57,290	32,468	4,089	12,117	1,837	2,845	*	*
January	68,557	6,240	4,626	15,528	6,037	1,780	1,851	720
February	102,223	13,079	5,656	18,624	7,092	1,870	1,288	423
March						10,26		
	130,212	31,726	14,643	20,018	40,481	8	8,790	1,542
April	170,779	64,074	14,337	11,286	33,139	4,663	*	*
May		143,76						
	149,056	9	9,530	15,912	36,775	3,574	*	*
June	60,313	48,747	3,642	29,338	21,684	5,491	1,935	880
TOTAL:	1,166,76	501,75	103,03	222,05	200,85	56,26	21,235	5,767

**Table 5.** Expanded estimates of angler hours by survey section and species, as determined by the Central Valley Angler Survey, July 2009 through June 2010.

River Sections	ALL	Sacramento			American	Feather	Yuba	Mokelumne	Calaveras
		1-3	4-7	8	9-10.1	11-12.2	13-14	19	20
ANY	149,794	84,216	13,886	386	23,955	23,830	3,299	223	0
Chinook Salmon	75,595	93	75,035	0	466	0	0	0	0
Steelhead	113,416	172	5,474	710	71,583	17,335	12,687	5,043	412
Rainbow Trout	212,482	75	46,232	100,897	3,902	8,514	31,640	15,867	5,353
Striped Bass	1,168,965	701,765	295,011	0	76,529	93,273	2,387	0	0
Sturgeon	290,136	254,435	35,163	0	325	213	0	0	0
American Shad	132,699	51,773	19,336	0	33,283	22,571	5,737	0	0
Sacramento Splittail	27,470	25,026	218	0	243	1,983	0	0	0
Other	107,182	49,211	11,402	1,045	11,771	33,139	511	102	2
TOTAL:	2,277,740	1,166,767	501,758	103,039	222,057	200,857	56,260	21,235	5,767

### Rainbow Trout Fishery

All harvested fish reported as rainbow trout within the lower Sacramento, Feather, and American river survey sections covered were recorded as steelhead, given the strongly anadromous life history of the species in the lower Sacramento River system. Recognized resident rainbow trout fisheries on the upper Sacramento, Yuba, Mokelumne, and Calaveras rivers were surveyed during the current reporting period, and the catch at these locations was characterized based on the length criteria described in Job 1 above.

The rainbow trout fisheries on the Sacramento, Yuba, Mokelumne, and Calaveras rivers

were surveyed over their entire seasonal duration (Table 2). No surveys were conducted on the Calaveras and Mokelumne rivers during their fishing closure periods in November and December 2009 and again in April and May 2010.

An estimated 212,482 angler hours targeted rainbow trout (Table 5), resulting in an estimated harvest of 707 fish, the catch-and-release of an estimated 71,650 fish (Appendix Table 4), and thus a retention rate of less than 1%. Effort for rainbow trout in survey sections 6, 7 and 8 on the Sacramento River comprised the majority (69.0%) of the overall effort for rainbow trout throughout the survey area (Appendix Table 4). Effort on the Yuba, Mokelumne, and Calaveras rivers accounted for 15.0%, 7.5% and 2.5%, respectively, of total effort for rainbow trout. The overall CPUE for rainbow trout was 0.34 / hr.

### Striped Bass Fishery

Angler survey work conducted during the current reporting period sampled the core of the striped bass fishery on the Sacramento River system. An estimated total of 1,168,965 angler hours targeted striped bass (Table 5). About 85.3% of that effort occurred on the Sacramento River from the Carquinez Bridge to the Red Bluff Diversion Dam, 8.0% on the Feather River, and 6.5% on the lower American River (Table 5), accounting for 99.8% of all striped bass angling effort in the survey area. Total angler effort resulted in an estimated striped bass harvest of 58,116 fish, and a catch-and-release of 342,590 fish (Appendix Table 5). About 14.5% of striped bass caught were harvested. The overall CPUE for striped bass was 0.34 / hr. The striped bass fishery was the most popular fishery in the survey and accounted for 51% of total angling effort, surpassing the next largest fishery – that for sturgeon – by 878,829 hours of dedicated effort (Table 5).

### Sturgeon Fishery

An estimated 290,136 angler hours targeted sturgeon during the current reporting period, and essentially all of this effort occurred on the mainstem Sacramento River from the Carquinez Bridge to the Red Bluff Diversion Dam (Table 5; Appendix Table 6). The fishery resulted in an estimated harvest of 2,093 white sturgeon and the catch-and-release of 9,303 white sturgeon (Appendix Table 6), for a harvest rate of about 18%. No green sturgeon were reported kept and an estimated 398 were released (Appendix Table 7). Reported catches of green sturgeon occurred mainly in Suisun Bay and on the Sacramento River from Rio Vista to Sacramento (Section 2) and from Hamilton City to the Red Bluff Diversion Dam (Section 6). Anglers had reportedly differentiated between white and green sturgeon for > 99% of sturgeon released; among those fish, 95.9% were identified as white sturgeon and 4.1% as green sturgeon (Appendix Tables 6–8). The overall CPUE for sturgeon was low: about 0.04 / hr.

### American Shad Fishery

With the exception of July 2010, nearly the entire 2010 Central Valley American shad fishery was surveyed during the current reporting period. An estimated 132,699 angler hours targeted American shad (Table 5). About 54% of this effort occurred on the Sacramento River from Rio Vista to the Red Bluff Diversion Dam, 25% on the lower American River, 17% on the Feather River, and 4% on the Yuba River. This effort



resulted in an estimated harvest of 40,038 shad, and the catch-and-release of 44,645 shad (Appendix Table 9), for a harvest rate of about 47%. The American shad fishery was very successful as reflected in an overall CPUE of 0.64 / hr, the highest catch rate among the fisheries monitored in the angler survey, although 36% lower than that estimated for the 2009 season. The American shad fishery, which accounted for 5.8% of the total fishing effort in the survey, ranked as the fourth most popular fishery in the Central Valley (Table 5).

### Sacramento Splittail Fishery

About 91.0% of the Sacramento splittail fishery surveyed during the current reporting period occurred on the lower Sacramento River from Rio Vista to Knights Landing (survey sections 1–3; Table 5). The remaining 7.2%, 0.9%, and 0.8% occurred on the Feather River from Verona to Shanghai Rapids (Section 11.1), the American River, and on the Sacramento River from Knights Landing to Colusa (Section 4), respectively. We suspect that anglers reporting splittail effort on the American River were in fact fishing for Sacramento pikeminnow, although their catch was not examined. At an estimated total effort of 27,470 angler hours, the Sacramento splittail fishery was the smallest fishery targeted in the angler survey (Table 5). However, with an estimated harvest of 8,071 splittail and a catch-and-release of only 338 splittail (Appendix Table 10), this fishery had the second highest harvest rate of 96.0%. The overall CPUE for splittail was 0.31 / hr.

### **Job 3. Stock Assessment**

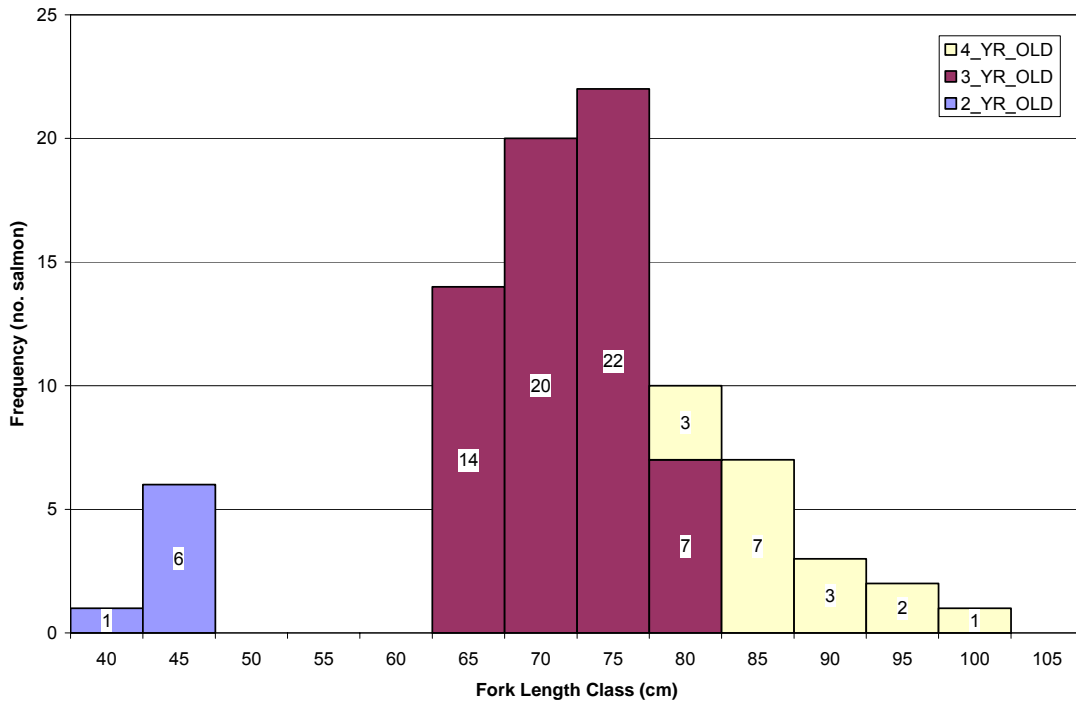
#### Composition of Chinook Salmon Sport Catch

The basis for determining the stock origin (hatchery vs. natural production by run) of Chinook salmon caught in Central Valley sport fisheries is the recovery of coded-wire tags. A fraction (currently 25%) of the production of fall-run Chinook salmon from Central Valley hatcheries is coded-wire tagged and identifiable with an adipose fin clip, while 100% of spring run from Feather River Hatchery, late-fall run from Coleman National Fish Hatchery, and winter run from Livingston Stone National Fish Hatchery is clipped and tagged.

Of the 168 Chinook salmon observed in the catch during the current reporting period, 93, or 55%, had an adipose fin clip and were thus identified as being of hatchery origin. Anglers surrendered the head from 92 (99%) clipped salmon and tags were recovered and read from 90 (98%) heads collected. The proportionate breakdown of coded-wire-tag recoveries was 97% late-fall-run Chinook salmon from Coleman National Fish Hatchery, 2% winter-run Chinook salmon from Livingston Stone National Fish Hatchery, and 1% spring-run Chinook salmon from the Feather River Hatchery. The spring-run Chinook salmon was harvested out-of-season as an incidental catch in the striped bass fishery (see Job 2, Chinook Salmon Fishery, above). All remaining coded-wire tag recoveries were made during the open season for late-fall-run Chinook salmon on the Sacramento River.

Scales were collected from 85 (94%) of the 90 Chinook salmon for which heads were collected and tags recovered. Preliminary ageing by a single reader yielded the following results: Of 16 Chinook salmon from the 2006 brood stock, 15 (94%) were

aged correctly as 4-year-olds. Of 62 Chinook salmon from the 2007 brood stock, 43 (69%) were aged correctly as 3-year-olds. Of seven Chinook salmon from the 2008 brood stock, six (86%) were aged correctly as 2-year-olds. The length-frequency distributions of known-age Chinook salmon caught in the Sacramento River during 2009-10 (Figure 1) indicate a clear distinction between 2-year-olds and 3-year-olds, and overlap only in the 80 cm fork-length class between 3-year-olds and 4-year-olds.



**Figure 1.** Length-frequency distributions of known-age Chinook salmon recovered in the Sacramento River recreational fishery during 2009-2010. Ages were determined from coded-wire tags.

### Age Structure of Adult Steelhead

A total of 1,004 scale samples was collected from adult steelhead at state-run Central Valley anadromous fish hatcheries (Feather River, Nimbus, and Mokelumne River hatcheries). Of those, 125 (12.5%) were steelhead of natural origin, given their lack of an adipose fin clip. Comparative assessment of steelhead age structure and growth rates by origin (hatchery and natural) is underway.

**7. Discuss differences between work anticipated in grant proposal and grant agreement, and that actually carried out with Federal Aid grant funds; include differences between expected and actual costs.**

N/A.

**8. List any publications or in-house reports resulting from this work. Provide citations, including status (indicate if not completed), note any that are included with this report, and note where reports or publications may be obtained.**

Data generated by F-119-R for inland recreational harvest of Chinook salmon are being

used by the Pacific Fishery Management Council Salmon Technical Team to develop an index for Sacramento River fall-run Chinook salmon for fishery management purposes, as presented in the following report:

O'Farrell, M. R., M. S. Mohr, M. L. Palmer-Zwahlen, and A. M. Grover. 2008. The Sacramento Index. Report prepared by National Marine Fisheries Service and California Department of Fish and Game for the Pacific Fishery Management Council, Salmon Technical Team.

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## **Job 2 Appendix Tables**

**Appendix Table 1.** Expanded estimates of angler hours targeting Chinook salmon, and numbers of Chinook salmon kept and released, by survey section and month, as determined by the Central Valley Angler Survey, July 2009 through June 2010.

**CENTRAL VALLEY ANGLER SURVEY**

2009 - 2010 Angler Survey Effort Estimate Summary

**TOTAL NUMBER OF ANGLER-HOURS**

River Section No.	Sacramento								American				Feather				Yuba		Mokelum	Calaveras	
	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	17,060	4,248	32,220	16,623	7,461	7,214	5,881	7,555	6,753	4,988	22,821	2,347	4,813	4,521	2,298	633	1,305	4,068	2,565	2,580	572
August	31,406	5,362	37,628	15,283	12,020	8,912	11,241	5,292	7,294	5,355	16,076	3,477	5,837	1,752	2,362	276	550	978	2,343	2,324	932
September	22,494	6,680	18,934	8,473	7,720	3,437	6,574	3,338	8,785	2,993	10,704	7,869	3,673	2,611	4,056	177	856	1,279	2,372	1,509	396
October	55,101	15,695	21,424	9,533	6,534	3,075	2,130	7,061	15,188	1,236	8,229	3,955	4,405	1,819	3,322	487	905	998	8,624	958	300
November	67,852	16,202	19,956	6,164	30,770	10,589	8,596	6,259	8,122	94	4,970	4,121	3,695	237	2,432	0	789	406	2,138	-	-
December	33,469	8,250	11,909	3,662	18,384	7,685	4,778	1,621	4,089	197	6,121	5,799	620	410	707	0	99	267	2,578	-	-
January	30,429	17,237	15,951	4,940	3,349	514	1,335	1,042	4,626	94	10,894	4,539	3,698	280	1,897	133	30	201	1,579	1,851	720
February	40,428	12,505	34,888	14,402	9,733	1,688	908	749	5,657	1,784	12,507	4,334	4,881	414	1,765	0	32	201	1,669	1,288	423
March	29,745	17,992	57,143	25,332	21,349	7,373	1,403	1,601	14,643	1,879	16,682	1,458	29,701	3,777	5,589	643	770	575	9,693	8,790	1,542
April	37,399	9,542	86,803	37,035	40,840	21,161	566	1,507	14,337	1,730	9,115	441	27,781	2,403	1,780	212	965	620	4,043	-	-
May	15,085	3,525	68,709	61,737	97,177	37,194	4,943	4,455	9,530	3,628	11,900	384	30,243	4,162	1,612	217	541	666	2,908	-	-
June	3,585	0	37,264	19,464	24,521	16,408	5,347	2,471	3,642	3,014	23,307	3,017	14,379	3,978	2,155	165	1,006	3,605	1,885	1,935	880
TOTAL:	384,053	117,237	442,829	222,648	279,856	125,250	53,702	42,951	102,666	26,992	153,325	41,740	133,726	26,364	29,975	2,944	7,848	13,864	42,396	21,236	5,765
CI 80%	29,917	12,557	29,338	16,419	29,729	12,160	6,617	5,133	7,238	2,754	13,507	7,985	15,928	4,114	4,520	1,081	1,397	2,737	5,367	6,667	1,196

**TOTAL NUMBER OF ANGLER-HOURS BY SPECIES**

River Section No.	Sacramento								American				Feather				Yuba		Mokelum	Calaveras	
	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
ANY	26,848	3,972	37,260	16,136	5,065	5,011	2,354	1,457	386	4,449	16,101	3,405	12,438	2,856	3,981	317	4,237	3,262	36	223	0
CHINOOK S.	0	0	70	23	45,873	16,880	12,283	0	0	0	0	466	0	0	0	0	0	0	0	0	0
STEELHEAD	0	0	172	0	0	1,227	2,840	1,407	710	248	46,522	24,814	615	642	15,688	308	82	561	12,126	5,043	412
RT	62	0	10	3	0	430	7,776	38,026	100,897	151	3,416	335	730	146	7,276	110	253	1,430	30,210	15,867	5,353
SB	241,433	43,527	271,640	145,165	193,489	82,278	19,193	50	0	16,317	50,042	10,170	79,449	11,186	952	1,073	613	2,387	0	0	0
ST	113,339	69,718	56,553	14,824	26,946	7,460	757	0	0	140	185	0	148	65	0	0	0	0	0	0	0
AS	0	0	30,059	21,714	3,305	8,691	7,322	18	0	2,554	28,960	1,769	21,203	1,096	0	272	0	5,713	24	0	0
SPT	0	19	16,039	8,967	218	0	0	0	0	0	243	0	1,983	0	0	0	0	0	0	0	0
other	2,371	0	31,026	15,815	4,961	3,272	1,177	1,992	672	3,133	7,856	781	17,161	10,373	2,078	864	2,663	511	0	103	0
TOTAL:	384,053	117,237	442,829	222,648	279,856	125,250	53,702	42,951	102,666	26,992	153,325	41,740	133,726	26,364	29,975	2,944	7,848	13,864	42,396	21,236	5,765

**Appendix Table 2.** Expanded estimates of angler hours targeting Chinook salmon, and numbers of Chinook salmon kept and released, by survey section and month, as determined by the Central Valley Angler Survey, July 2009 through June 2010.

**CENTRAL VALLEY ANGLER SURVEY**

2009 - 2010 Angler Survey Effort Estimate Summary

**TOTAL NUMBER OF ANGLER-HOURS TARGETING CHINOOK SALMON**

River	Sacramento								American				Feather			Yuba		Mokelumne	Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0	0	0	0	0	57	0	0	0	0	0	0	0	0	0
September	0	0	70	0	0	0	0	0	0	0	0	156	0	0	0	0	0	0	0	0	0
October	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	0	0	0	23	28,757	9,435	7,813	0	0	0	0	164	0	0	0	0	0	0	0	-	-
December	0	0	0	0	17,116	7,445	4,470	0	0	0	0	89	0	0	0	0	0	0	0	-	-
January	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	0	0	70	23	45,873	16,880	12,283	0	0	0	0	466	0	0	0	0	0	0	0	0	0

**TOTAL KEPT CHINOOK SALMON**

River	Sacramento								American				Feather			Yuba		Mokelumne	Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	0	0	0	0	369	287	61	0	0	0	0	0	0	0	0	0	0	0	0	-	-
December	0	0	0	0	196	288	55	0	0	0	0	0	0	0	0	0	0	0	0	-	-
January	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
May	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	0	0	0	25	565	575	116	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**TOTAL RELEASED CHINOOK SALMON**

River	Sacramento								American				Feather			Yuba		Mokelumne	Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	0	0	0	0	25	0	0	0	45	0	0	41	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	13	0	0	0	0	0	0	0	0	0	0	78	0	0	28	32	0	0	0	0	0
October	0	0	12	0	0	0	0	64	0	0	187	559	0	0	48	0	0	0	0	0	0
November	0	0	14	0	8	32	0	11	0	0	0	547	0	0	0	0	0	0	0	-	-
December	0	0	15	0	0	0	5	0	0	0	0	306	0	0	0	0	0	0	0	-	-
January	0	0	0	0	0	0	0	0	0	0	25	56	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0	0	24	66	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	-	-
May	0	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
June	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0
TOTAL:	13	0	41	0	67	32	5	75	45	0	237	1,652	40	0	76	32	0	0	0	0	0

**Appendix Table 3.** Expanded estimates of angler hours targeting steelhead, and numbers of steelhead kept and released, by survey section and month, as determined by the Central Valley Angler Survey, July 2009 through June 2010.

**CENTRAL VALLEY ANGLER SURVEY**

2009 - 2010 Angler Survey Effort Estimate Summary

**TOTAL NUMBER OF ANGLER-HOURS TARGETING STEELHEAD**

River	Sacramento								American				Feather				Yuba		Mokelumne	Calaveras	
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	0	0	0	0	0	0	0	0	0	0	15	0	0	0	1,665	0	0	0	729	798	120
August	0	0	0	0	0	0	103	0	0	0	528	474	0	0	0	0	0	57	0	25	0
September	0	0	0	0	0	25	1,791	525	0	0	1,606	2,279	172	57	2,017	0	0	22	721	86	212
October	0	0	0	0	0	390	79	307	0	0	3,547	2,826	0	585	2,724	308	0	252	3,517	414	0
November	0	0	93	0	0	568	301	38	0	13	3,100	3,376	212	0	2,240	0	0	210	321	0	0
December	0	0	0	0	0	0	20	116	31	0	4,779	5,608	0	0	607	0	50	0	840	0	0
January	0	0	0	0	0	0	169	313	0	0	10,215	4,521	73	0	810	0	0	0	1,558	1,091	0
February	0	0	79	0	0	0	0	0	92	236	10,676	4,334	0	0	941	0	0	19	69	504	0
March	0	0	0	0	0	244	0	107	370	0	8,825	1,319	148	0	1,842	0	0	0	3,521	2,125	80
April	0	0	0	0	0	0	0	0	204	0	2,836	0	10	0	1,608	0	0	0	851	0	0
May	0	0	0	0	0	0	377	0	14	0	342	77	0	0	859	0	0	0	0	0	0
June	0	0	0	0	0	0	0	0	0	0	51	0	0	0	375	0	32	0	0	0	0
TOTAL:	0	0	172	0	0	1,227	2,840	1,407	710	248	46,522	24,814	615	642	15,688	308	82	561	12,126	5,043	412
																	88,918				

**TOTAL KEPT STEELHEAD**

River	Sacramento								American				Feather				Yuba		Mokelumne	Calaveras	
Section No.	1*	1.1*	2*	3*	4*	5	6	7	8	9*	10*	10.1*	11.1*	11.2*	12*	12.1*	12.2*	13	14	19	20
July	0	0	0	0	0	0	34	134	0	0	61	0	0	0	49	0	0	0	0	0	0
August	0	0	0	0	0	0	69	67	0	0	0	0	0	0	0	0	0	0	0	0	0
September	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
December	0	0	0	0	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	-	-
January	0	0	0	0	0	0	20	35	0	0	0	37	0	0	0	0	0	0	0	0	0
February	0	0	0	17	0	0	0	0	0	0	98	33	0	32	0	0	0	0	0	0	0
March	0	0	0	11	0	0	0	43	0	0	384	43	91	0	0	0	0	0	0	0	0
April	0	0	0	33	0	0	0	0	0	0	26	0	0	0	0	0	0	0	0	-	-
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
June	0	0	0	0	0	0	0	18	0	0	0	0	20	0	0	0	0	0	0	0	0
TOTAL:	0	0	0	61	16	0	123	297	0	0	568	138	111	32	49	0	0	0	0	0	0

**TOTAL RELEASED STEELHEAD**

River	Sacramento								American				Feather				Yuba		Mokelumne	Calaveras	
Section No.	1*	1.1*	2*	3*	4*	5	6	7	8	9*	10*	10.1*	11.1*	11.2*	12*	12.1*	12.2*	13	14	19	20
July	0	0	0	22	0	0	149	1,959	1,429	0	0	0	0	0	97	0	0	0	648	195	481
August	0	0	0	63	0	0	310	179	2,500	68	282	0	0	0	276	0	0	0	164	50	0
September	0	0	0	0	0	0	129	219	2,483	0	147	78	0	0	195	0	0	0	191	0	37
October	0	0	0	0	0	85	0	891	3,524	0	983	172	0	130	335	0	0	46	558	0	0
November	0	0	0	0	0	25	80	951	1,865	0	440	27	0	0	153	0	0	14	24	-	-
December	0	0	0	0	0	0	0	83	1,278	0	34	178	0	0	59	0	0	0	175	-	-
January	0	0	0	0	0	0	80	69	1,366	0	483	224	0	0	293	0	0	0	145	25	30
February	0	0	13	8	0	5	0	0	1,511	1,930	2,743	197	382	0	333	0	0	38	69	7,057	103
March	0	0	0	0	0	216	214	3,536	57	2,341	0	227	0	1,067	0	0	0	0	886	5,689	0
April	0	0	0	16	0	16	0	0	5,637	15	511	0	134	0	108	0	0	0	426	-	-
May	0	0	0	0	0	17	48	303	2,210	0	171	0	87	0	259	0	0	31	257	-	-
June	0	0	0	0	0	0	0	36	353	36	0	0	41	0	62	0	0	0	168	845	0
TOTAL:	0	0	13	109	0	148	1,011	4,905	27,691	2,106	8,134	877	871	130	3,239	0	0	129	3,710	13,861	651

\* Any Rainbow Trout reported as kept or released on the American, Feather and lower Sacramento Rivers were assumed to be a Steelhead

**Appendix Table 4.** Expanded estimates of angler hours targeting rainbow trout, and numbers of rainbow trout kept and released, by survey section and month, as determined by the Central Valley Angler Survey, July 2009 through June 2010.

**CENTRAL VALLEY ANGLER SURVEY**

2009 - 2010 Angler Survey Effort Estimate Summary

**TOTAL NUMBER OF ANGLER-HOURS TARGETING RAINBOW TROUT**

River	Sacramento								American				Feather				Yuba		Mokelumne	Calaveras	
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	0	0	0	0	0	80	1,054	7,502	6,678	0	182	0	0	0	24	0	0	0	1,836	1,743	451
August	0	0	10	0	0	243	2,171	4,839	6,948	0	305	171	0	0	1,686	0	0	57	2,343	2,299	932
September	0	0	0	0	0	8	508	2,637	8,607	0	49	0	0	0	880	0	0	0	1,651	1,344	184
October	0	0	0	0	0	0	634	6,753	15,043	0	480	0	0	0	174	0	0	688	5,107	544	300
November	0	0	0	0	0	0	126	5,961	8,092	0	104	21	0	0	182	0	18	196	1,817	-	-
December	0	0	0	3	0	3	136	1,330	4,059	0	0	0	0	0	23	0	50	0	1,717	-	-
January	0	0	0	0	0	28	563	417	4,573	0	121	0	0	0	1,087	0	30	67	21	710	720
February	0	0	0	0	0	0	199	588	5,523	151	129	0	229	146	716	0	0	0	1,597	719	423
March	62	969	0	0	0	0	1,257	969	14,186	0	1,161	0	204	0	1,639	0	0	34	6,172	6,665	1,462
April	0	0	0	0	0	69	226	900	14,106	0	837	51	235	0	18	0	121	0	3,192	-	-
May	0	0	0	0	0	0	490	3,999	9,440	0	50	0	0	0	535	0	35	0	2,908	-	-
June	0	0	0	0	0	0	412	2,130	3,642	0	0	93	61	0	312	110	0	389	1,850	1,843	880
TOTAL:	62	0	10	3	0	430	7,776	38,026	100,897	151	3,416	335	730	146	7,276	110	253	1,430	30,210	15,867	5,353

**TOTAL KEPT RAINBOW TROUT**

River	Sacramento								American				Feather				Yuba		Mokelumne	Calaveras	
Section No.	1*	1.1*	2*	3*	4*	5	6	7	8	9*	10*	10.1*	11.1*	11.2*	12*	12.1*	12.2*	13	14	19	20
July	0	0	0	0	0	0	0	107	10	0	0	0	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0	0	0	0
September	0	0	0	0	0	0	161	15	21	0	0	0	0	0	0	0	0	0	0	0	0
October	0	0	0	0	0	0	0	148	34	0	0	0	0	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	12	11	0	0	0	0	0	0	0	0	0	0	0	-	-
December	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
January	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
June	0	0	0	0	0	0	0	108	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	0	0	0	0	0	0	174	468	65	0	0	0	0	0	0	0	0	0	0	0	0

**TOTAL RELEASED RAINBOW TROUT**

River	Sacramento								American				Feather				Yuba		Mokelumne	Calaveras	
Section No.	1*	1.1*	2*	3*	4*	5	6	7	8	9*	10*	10.1*	11.1*	11.2*	12*	12.1*	12.2*	13	14	19	20
July	0	0	0	0	0	0	354	2,899	2,847	-	0	0	0	0	0	0	0	0	1,080	467	361
August	0	0	0	0	0	0	1,861	1,432	3,122	-	0	0	0	0	0	0	0	0	329	1,025	1,297
September	0	0	0	0	0	17	290	657	2,989	0	0	0	0	0	0	0	0	0	763	791	847
October	0	0	0	0	0	21	114	3,583	6,312	0	0	0	0	0	0	0	0	229	1,786	479	0
November	0	0	0	0	0	25	68	2,613	2,077	0	0	0	0	0	0	0	0	70	190	-	-
December	0	0	0	0	0	0	15	200	672	0	0	0	0	0	0	0	-	0	320	-	-
January	0	0	0	0	0	0	199	0	1,253	0	0	0	0	0	0	0	-	0	228	950	925
February	0	0	0	0	0	0	25	50	2,157	0	0	0	0	0	0	0	-	0	164	0	718
March	0	0	0	0	0	0	247	193	6,446	0	0	0	0	0	0	0	0	0	1,971	411	638
April	0	0	0	0	0	97	33	458	4,160	0	0	0	0	0	0	0	0	0	650	-	-
May	0	0	0	0	0	0	72	1,539	2,611	0	0	0	0	0	0	0	0	31	540	-	-
June	0	0	0	0	0	0	0	431	803	0	0	0	0	0	0	0	0	130	407	872	40
TOTAL:	0	0	0	0	0	161	3,277	14,053	35,451	0	0	0	0	0	0	0	0	460	8,427	4,995	4,825

\* Any Rainbow Trout reported as kept or released on the American, Feather and lower Sacramento Rivers were assumed to be a Steelhead



**Appendix Table 5.** Expanded estimates of angler hours targeting striped bass, and numbers of striped bass kept and released, by survey section and month, as determined by the Central Valley Angler Survey, July 2009 through June 2010.

**CENTRAL VALLEY ANGLER SURVEY**

2009 - 2010 Angler Survey Effort Estimate Summary

**TOTAL NUMBER OF ANGLER-HOURS TARGETING STRIPED BASS**

River	Sacramento								American				Feather			Yuba		Mokelumne	Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	10,402	669	15,789	10,877	5,687	6,681	3,832	0	0	3,683	13,786	906	2,209	4,110	0	190	115	795	0	0	0
August	23,358	1,700	22,067	10,991	10,839	8,406	7,882	0	0	3,953	12,224	2,198	3,174	1,158	14	0	54	624	0	0	0
September	17,429	4,623	13,899	6,436	6,402	3,344	4,154	0	0	1,496	6,756	4,304	2,048	1,584	544	177	96	561	0	0	0
October	45,669	12,416	19,128	5,380	4,987	1,938	799	0	0	122	2,610	892	1,874	325	204	179	0	0	0	0	0
November	51,055	12,408	15,664	3,822	1,294	365	232	0	0	44	1,417	321	1,522	0	0	0	0	0	0	-	-
December	22,198	2,878	5,316	909	315	147	0	0	0	93	252	0	43	0	0	0	0	0	0	-	-
January	12,893	1,130	2,158	1,276	216	348	0	0	0	6	286	0	311	280	0	0	0	0	0	0	0
February	6,717	1,168	6,181	2,081	164	125	224	0	0	651	18	0	4,105	16	67	0	0	0	0	0	0
March	12,566	3,571	30,031	15,212	9,261	1,008	108	0	0	1,774	3,175	0	21,606	669	114	526	93	0	0	0	0
April	26,216	2,824	76,268	33,823	37,724	17,049	157	0	0	1,087	2,625	87	25,306	550	9	0	0	50	0	-	-
May	10,539	141	37,082	38,378	93,613	29,121	903	33	0	986	2,996	0	7,983	1,479	0	0	92	23	0	-	-
June	2,390	0	28,058	15,981	22,986	13,745	904	18	0	2,422	3,896	1,462	9,268	1,016	0	0	162	335	0	0	0
TOTAL:	241,433	43,527	271,640	145,165	193,489	82,278	19,193	50	0	16,317	50,042	10,170	79,449	11,186	952	1,073	613	2,387	0	0	0

**TOTAL KEPT STRIPED BASS**

River	Sacramento								American				Feather			Yuba		Mokelumne	Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	192	53	308	86	152	149	46	0	0	40	61	0	36	84	0	0	0	94	0	0	0
August	1,066	229	635	220	254	359	241	0	0	34	188	38	141	0	0	0	0	0	0	0	0
September	591	528	93	0	222	84	32	0	0	35	0	0	86	0	0	0	0	0	0	0	0
October	2,896	1,263	554	69	56	21	13	0	0	0	0	43	42	0	0	0	0	0	0	0	0
November	4,220	1,106	359	0	30	25	0	0	0	0	30	27	57	0	0	0	0	0	0	-	-
December	1,754	144	122	0	13	12	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
January	819	83	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
February	573	110	189	33	0	0	0	0	0	0	0	0	127	0	0	0	0	0	0	0	0
March	681	290	1,875	451	251	54	0	0	0	38	0	0	727	0	0	0	0	0	0	0	0
April	1,138	195	3,314	1,590	3,141	922	0	0	0	15	26	0	806	30	0	0	0	0	0	-	-
May	762	0	1,711	2,433	9,526	1,922	24	0	0	0	57	0	116	0	0	0	0	0	0	-	-
June	0	0	801	770	1,682	1,025	37	0	0	36	34	93	368	0	0	0	0	0	0	0	0
TOTAL:	14,692	4,003	10,000	5,653	15,326	4,573	393	0	0	198	365	201	2,506	114	0	0	0	94	0	0	0

**TOTAL RELEASED STRIPED BASS**

River	Sacramento								American				Feather			Yuba		Mokelumne	Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	3,197	306	12,903	7,388	5,117	2,930	514	0	0	2,914	4,540	82	1,401	3,541	0	0	0	748	0	0	0
August	9,618	819	10,749	9,088	5,212	4,050	1,550	0	0	1,250	2,959	0	705	238	0	0	0	57	0	0	0
September	7,976	2,135	5,611	4,390	3,136	1,189	581	0	0	727	294	78	372	228	0	0	0	0	0	0	0
October	18,521	2,805	3,508	2,657	1,393	747	13	0	0	134	234	0	381	0	48	0	0	0	0	0	0
November	15,301	2,776	3,400	640	68	0	0	0	0	0	26	55	0	0	0	0	0	0	0	-	-
December	4,361	775	1,049	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
January	2,877	593	153	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
February	1,212	276	240	50	8	0	0	0	0	0	0	0	255	0	0	0	0	0	0	0	0
March	2,290	411	5,773	1,590	469	47	0	0	0	57	38	0	1,408	0	0	0	0	0	0	0	0
April	3,183	439	15,141	6,997	5,209	1,342	0	0	0	45	0	0	5,333	30	0	0	0	0	0	-	-
May	2,336	113	9,656	15,691	25,335	7,688	120	0	0	503	29	0	2,154	0	0	0	0	0	0	-	-
June	0	0	9,859	9,907	9,879	8,561	271	36	0	825	885	0	5,623	68	0	0	0	86	0	0	0
TOTAL:	70,873	11,449	78,042	58,411	55,826	26,554	3,048	36	0	6,455	9,005	215	17,632	4,105	48	0	0	891	0	0	0

**Appendix Table 6.** Expanded estimates of angler hours targeting sturgeon, and numbers of white sturgeon kept and released, by survey section and month, as determined by the Central Valley Angler Survey, July 2009 through June 2010.

**CENTRAL VALLEY ANGLER SURVEY**

2009 - 2010 Angler Survey Effort Estimate Summary

**TOTAL NUMBER OF ANGLER-HOURS TARGETING STURGEON**

River	Sacramento								American				Feather			Yuba		Mokelumne		Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20	
July	5,162	3,393	0	362	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	3,519	3,376	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	2,417	1,754	140	0	372	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	6,512	2,675	479	161	5	0	361	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	14,093	3,533	1,456	141	45	0	12	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
December	10,047	5,194	3,483	344	560	0	0	0	0	0	134	0	0	0	0	0	0	0	0	-	-	-
January	15,655	15,748	5,626	502	3,062	44	359	0	0	0	51	0	110	0	0	0	0	0	0	0	0	0
February	30,851	11,254	19,488	5,319	9,152	1,098	25	0	0	140	0	0	38	65	0	0	0	0	0	0	0	0
March	13,166	13,178	22,272	6,812	11,133	4,676	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	8,273	6,230	3,413	905	2,548	1,593	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
May	3,644	3,384	122	279	68	50	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
June	0	0	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	113,339	69,718	56,553	14,824	26,946	7,460	757	0	0	140	185	0	148	65	0	0	0	0	0	0	0	0

**TOTAL KEPT WHITE STURGEON**

River	Sacramento								American				Feather			Yuba		Mokelumne		Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20	
July	24	93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	0	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	54	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	95	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	123	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
December	73	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
January	154	107	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
February	154	22	88	17	8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
March	93	145	204	23	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	126	146	30	0	13	16	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
May	25	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
June	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	922	704	352	39	38	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**TOTAL RELEASED WHITE STURGEON**

River	Sacramento								American				Feather			Yuba		Mokelumne		Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20	
July	168	133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	112	152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	121	60	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	495	204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	922	233	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
December	524	243	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
January	532	475	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
February	904	265	164	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
March	526	314	130	23	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	400	391	61	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
May	102	244	31	25	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
June	1,195	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	6,001	2,715	434	73	79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Appendix Table 7.** Expanded estimates of angler hours targeting sturgeon, and numbers of green sturgeon kept and released, by survey section and month, as determined by the Central Valley Angler Survey, July 2009 through June 2010.

**CENTRAL VALLEY ANGLER SURVEY**

2009 - 2010 Angler Survey Effort Estimate Summary

**TOTAL NUMBER OF ANGLER-HOURS TARGETING STURGEON**

River Section No.	Sacramento								American					Feather			Yuba		Mokelumne		Calaveras	
	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20	
July	5,162	3,393	0	362	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
August	3,519	3,376	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
September	2,417	1,754	140	0	372	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
October	6,512	2,675	479	161	5	0	361	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
November	14,093	3,533	1,456	141	45	0	12	0	0	0	0	0	0	0	0	0	0	0	0	-	-	
December	10,047	5,194	3,483	344	560	0	0	0	0	134	0	0	0	0	0	0	0	0	0	-	-	
January	15,655	15,748	5,626	502	3,062	44	359	0	0	51	0	110	0	0	0	0	0	0	0	0	0	
February	30,851	11,254	19,488	5,319	9,152	1,098	25	0	0	140	0	0	38	65	0	0	0	0	0	0	0	
March	13,166	13,178	22,272	6,812	11,133	4,676	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
April	8,273	6,230	3,413	905	2,548	1,593	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	
May	3,644	3,384	122	279	68	50	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	
June	0	0	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL:	113,339	69,718	56,553	14,824	26,946	7,460	757	0	0	140	185	0	148	65	0	0	0	0	0	0	0	

**TOTAL KEPT GREEN STURGEON**

River Section No.	Sacramento								American					Feather			Yuba		Mokelumne		Calaveras	
	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20	
July	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
September	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
October	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
November	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	
December	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	
January	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
February	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
March	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
April	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

**TOTAL RELEASED GREEN STURGEON**

River Section No.	Sacramento								American					Feather			Yuba		Mokelumne		Calaveras	
	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20	
July	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
August	56	0	0	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
September	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
October	19	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
November	82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	
December	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	
January	20	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
February	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
March	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
April	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL:	277	56	30	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

**Appendix Table 8.** Expanded estimates of angler hours targeting sturgeon, and numbers of sturgeon (species not identified) kept and released, by survey section and month, as determined by the Central Valley Angler Survey, July 2009 through June 2010.

**CENTRAL VALLEY ANGLER SURVEY**

2009 - 2010 Angler Survey Effort Estimate Summary

**TOTAL NUMBER OF ANGLER-HOURS TARGETING STURGEON**

River	Sacramento								American				Feather				Yuba		Mokelumne	Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20	
July	5,162	3,393	0	362	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	3,519	3,376	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	2,417	1,754	140	0	372	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	6,512	2,675	479	161	5	0	361	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	14,093	3,533	1,456	141	45	0	12	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
December	10,047	5,194	3,483	344	560	0	0	0	0	0	134	0	0	0	0	0	0	0	0	-	-	-
January	15,655	15,748	5,626	502	3,062	44	359	0	0	0	51	0	110	0	0	0	0	0	0	0	0	0
February	30,851	11,254	19,488	5,319	9,152	1,098	25	0	0	140	0	0	38	65	0	0	0	0	0	0	0	0
March	13,166	13,178	22,272	6,812	11,133	4,676	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	8,273	6,230	3,413	905	2,548	1,593	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
May	3,644	3,384	122	279	68	50	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
June	0	0	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	113,339	69,718	56,553	14,824	26,946	7,460	757	0	0	140	185	0	148	65	0	0	0	0	0	0	0	0

**TOTAL KEPT UNIDENTIFIED STURGEON**

River	Sacramento								American				Feather				Yuba		Mokelumne	Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20	
July	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
December	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	-	-	-
January	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**TOTAL RELEASED UNIDENTIFIED STURGEON**

River	Sacramento								American				Feather				Yuba		Mokelumne	Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20	
July	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
December	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
January	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	0	0	0	0	0	55	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Appendix Table 9.** Expanded estimates of angler hours targeting American shad, and numbers of American shad kept and released, by survey section and month, as determined by the Central Valley Angler Survey, July 2009 through June 2010.

**CENTRAL VALLEY ANGLER SURVEY**

2009 - 2010 Angler Survey Effort Estimate Summary

**TOTAL NUMBER OF ANGLER-HOURS TARGETING AMERICAN SHAD**

River	Sacramento								American					Feather			Yuba		Mokelumne	Calaveras	
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	0	0	424	0	6	46	594	0	0	415	4,222	206	0	0	0	0	0	2,081	0	0	0
August	0	0	0	0	0	0	34	0	0	0	200	284	0	0	0	0	0	198	0	0	0
September	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
December	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
January	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	0	0	1,687	246	0	0	0	0	0	0	422	0	604	0	0	0	0	0	0	-	-
May	0	0	25,347	20,545	2,593	6,541	2,803	0	0	2,139	7,291	153	19,167	909	0	217	0	573	0	-	-
June	0	0	2,600	923	706	2,104	3,890	18	0	0	16,826	1,125	1,431	188	0	55	0	2,860	24	0	0
<b>TOTAL:</b>	<b>0</b>	<b>0</b>	<b>30,059</b>	<b>21,714</b>	<b>3,305</b>	<b>8,691</b>	<b>7,322</b>	<b>18</b>	<b>0</b>	<b>2,554</b>	<b>28,960</b>	<b>1,769</b>	<b>21,203</b>	<b>1,096</b>	<b>0</b>	<b>272</b>	<b>0</b>	<b>5,713</b>	<b>24</b>	<b>0</b>	<b>0</b>

**TOTAL KEPT AMERICAN SHAD**

River	Sacramento								American					Feather			Yuba		Mokelumne	Calaveras	
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	0	0	0	0	0	0	0	0	0	0	3,753	0	0	0	0	0	0	374	0	0	0
August	0	0	0	0	0	0	0	0	0	0	94	0	0	0	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
December	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
January	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	0	0	274	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
May	0	0	12,406	6,692	1,588	17	0	0	0	336	685	0	7,946	0	0	0	0	0	0	-	-
June	0	0	950	525	450	0	0	0	0	0	3,130	0	797	0	0	0	0	0	0	0	0
<b>TOTAL:</b>	<b>20</b>	<b>0</b>	<b>13,630</b>	<b>7,217</b>	<b>2,038</b>	<b>17</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>336</b>	<b>7,662</b>	<b>0</b>	<b>8,744</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>374</b>	<b>0</b>	<b>0</b>	<b>0</b>

**TOTAL RELEASED AMERICAN SHAD**

River	Sacramento								American					Feather			Yuba		Mokelumne	Calaveras	
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	0	0	26	0	0	11	389	0	0	0	1,090	535	0	0	0	0	0	5,143	0	0	0
August	0	0	41	0	0	0	0	0	0	34	47	190	0	0	0	0	0	227	0	0	0
September	0	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
December	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
January	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	0	0	0
April	0	0	213	721	0	0	0	0	0	0	0	0	1,477	0	0	0	0	0	0	-	-
May	0	0	244	2,357	68	8,169	1,937	0	0	0	2,996	0	6,607	0	0	0	0	434	0	-	-
June	0	0	37	0	60	2,737	2,066	108	0	0	4,764	232	368	0	0	0	0	1,252	0	0	0
<b>TOTAL:</b>	<b>0</b>	<b>0</b>	<b>561</b>	<b>3,078</b>	<b>128</b>	<b>10,917</b>	<b>4,424</b>	<b>108</b>	<b>0</b>	<b>34</b>	<b>8,896</b>	<b>957</b>	<b>8,452</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7,090</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Appendix Table 10.** Expanded estimates of angler hours targeting Sacramento splittail, and numbers of Sacramento splittail kept and released, by survey section and month, as determined by the Central Valley Angler Survey, July 2009 through June 2010.

**CENTRAL VALLEY ANGLER SURVEY**

2009 - 2010 Angler Survey Effort Estimate Summary

**TOTAL NUMBER OF ANGLER-HOURS TARGETING SPLITTAIL**

River	Sacramento								American				Feather			Yuba		Mokelumne	Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0	0	0	0	196	0	0	0	0	0	0	0	0	0	0
October	0	0	0	0	0	0	0	0	0	0	47	0	0	0	0	0	0	0	0	0	0
November	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
December	0	0	2,194	772	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	-	-
January	0	0	6,571	2,808	0	0	0	0	0	0	0	0	1,916	0	0	0	0	0	0	0	0
February	0	0	7,015	4,771	205	0	0	0	0	0	0	0	51	0	0	0	0	0	0	0	0
March	0	0	223	502	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	0	0	0	115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
June	0	0	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	0	19	16,039	8,967	218	0	0	0	0	0	243	0	1,983	0	0	0	0	0	0	0	0

**TOTAL KEPT SPLITTAIL**

River	Sacramento								American				Feather			Yuba		Mokelumne	Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	0	0	12	0	0	0	0	0	0	0	187	0	0	0	0	0	0	0	0	0	0
November	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
December	0	0	259	140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
January	0	0	1,345	697	0	0	0	0	0	0	0	0	268	0	0	0	0	0	0	0	0
February	0	0	2,627	1,286	131	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
March	0	0	74	282	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	0	0	304	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
May	0	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
June	0	0	0	0	0	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	0	19	4,666	2,422	131	39	0	0	0	0	187	0	268	0	0	0	0	0	0	0	0

**TOTAL RELEASED SPLITTAIL**

River	Sacramento								American				Feather			Yuba		Mokelumne	Calaveras		
Section No.	1	1.1	2	3	4	5	6	7	8	9	10	10.1	11.1	11.2	12	12.1	12.2	13	14	19	20
July	48	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	19	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
December	0	0	15	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
January	0	0	0	73	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
February	0	0	51	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	0	0	0	0	13	0	0	0	0	0	0	0	19	0	0	0	0	0	0	-	-
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
June	0	0	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	67	0	140	92	19	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0

