

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

**1. State:** California

**Grant number:** F-119-R-4

**Grant name:** Central Valley Angler Survey

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

**2. Report Period:** July 1, 2008 to June 30, 2009

**Report due date:** September 30, 2009

**Date prepared:** September 1, 2009

**3. Location of work:** Central Valley, California including portions of the Sacramento, Feather, Yuba, American, Mokelumne, Calaveras, and Stanislaus rivers, and portions of the Sacramento-San Joaquin Delta within Congressional Districts 1 – 5, 7, 10 – 11, and 19; Shasta, Tehama, Glenn, Butte, Colusa, Sutter, Yuba, Yolo, Sacramento, San Joaquin, Calaveras, Stanislaus, 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 and its associated tributaries. The survey may ultimately also include the lower Stanislaus River in the lowermost San Joaquin River system, and the central Sacramento-San Joaquin Delta (Delta), either through collaboration with another California Department of Fish and Game (CDFG) project or funding augmentation.

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 where contact with naturally produced Central Valley steelhead is most likely: 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 endeavor to coordinate this survey with the existing 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 achieve greater geographic coverage while meeting co-equal 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

Phased field implementation of the Central Valley Angler Survey continued during the reporting period (Tables 1 and 2). Section 9 was added in September 2008, to extend the survey on the American River from the Capitol City Freeway (Business 80) bridge to the mouth. In all, 242 survey months were expended from July 2008 through June 2009 (Table 2).

**Table 1.** Survey section numbers and descriptions for river sections surveyed by the Central Valley Angler Survey, July 2008 through June 2009.

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 Capitol City Freeway (Business 80) Bridge
10	Capitol City Freeway 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 Chamanche 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 2008 through June 2009. 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	NS	X	X	X	X	X	X	X	X	X	X	X	X
August	X	X	X	X	X	X	X	X	X	NS	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	X	NS	NS
December	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	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	X	NS	NS
May	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	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	10	12	12	12	12	12	12	12	12	12	12	8	8

## Job 1. Angler Survey – Field Component

### Statistical Design

A stratified random sample design, based on the design used by the Sacramento River System Sport Fish Inventory (Wixom 1995) and Upper Sacramento River Sport Fishery (Smith 1950) 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 (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), an increase of one survey section as compared to the 2007-2008 reporting period. 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.

Each survey section was surveyed on eight randomly selected days per month: four weekdays and four weekend days. Weekdays and weekend days were placed in separate strata because more angling effort is commonly associated with weekend

days.

Each survey section was surveyed by kayak or power boat, 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 field data sets 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 proportion of the whole represented by the survey day angler count. Development of updated effort distribution models for the current survey is incomplete; instead, we used analogous data sets of hourly angler counts for each month and survey section developed by Wixom (1995). Preliminary effort-distribution models indicate that effort has not changed significantly over the past 15 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 through 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 sport-fish 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, carp, catfish (all species), sunfish (all species), and black bass (all species).

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 1,755 survey days was conducted during the current reporting period, although the overall allocation of survey effort by survey section and month varied given the phased start dates for each section and for fishery closures (Table 3). An average of 7.3 survey days was expended in each survey section and month, thus nearly achieving the monthly target of 8 survey days per section. The cumulative survey effort resulted in an estimated 2,428,803 angler hours (Table 4), for an average of 10,162 angler hours per survey section and month.

#### Chinook Salmon Fishery

During the current reporting period, most of the Central Valley Chinook salmon recreational fishery was closed due to an unprecedented decline in the Sacramento River fall-run Chinook population. Angling for other species continued, however, as did *de facto* catch-and-release angling of fall-run Chinook salmon (including some illegal effort and harvest). As a result, the Central Valley Angler Survey followed its normal schedule throughout the survey area (Table 2).

An estimated 3,785 angler hours targeted fall-run Chinook salmon, resulting in an estimated fall-run harvest of 36 salmon, and the catch-and-release of 5,363 salmon (Appendix Table 2). Thus, 0.7% of fall-run Chinook salmon caught was harvested. The overall catch-per-unit-effort (CPUE) for fall-run Chinook salmon was very low: about 0.03 / hr. The CPUE was slightly higher, 0.04 / hour, based only on effort targeting fall-

run Chinook salmon. The fall-run Chinook salmon fishery accounted for less than 0.02% of the total fishing effort in the survey area (Table 5).

A limited late-fall-run Chinook salmon fishery was allowed on the Sacramento River between Knights Landing and the Red Bluff Diversion Dam during November and December 2008. Effort expended in this fishery totaled 89,127 hours, and resulted in an estimated harvest of 1,734 Chinook salmon. Only 86 Chinook salmon were released resulting in a retention rate of 95.3%. CPUE for the late-fall-run Chinook fishery was 0.02 / hr.

**Table 3.** Total number of sample days by survey section and month, as determined by the Central Valley Angler Survey, July 2008 through June 2009. 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	7	8	7	7	8	8	8	8	8	N/S	8	8	6	6	8	8	8	8	8	5	5
August	4	4	6	6	6	8	8	8	8	N/S	6	6	6	6	8	8	7	8	8	6	6
September	6	6	8	7	6	8	8	8	8	6	8	8	5	5	8	8	8	8	8	6	6
October	6	6	8	8	6	8	8	8	8	6	8	8	6	6	8	8	6	8	8	5	5
November	8	7	9	8	10	10	10	8	8	7	8	8	8	7	8	8	2	7	7	N/S	N/S
December	6	7	8	7	9	10	10	8	7	6	8	8	5	4	6	6	N/S	6	6	N/S	N/S
January	7	7	8	7	8	8	8	8	8	8	5	5	6	6	8	8	N/S	8	8	8	8
February	6	6	8	6	8	7	8	8	8	6	7	7	6	6	8	8	N/S	7	7	8	8
March	7	7	8	8	8	8	8	8	8	6	7	7	6	5	8	8	8	8	8	8	8
April	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	N/S	N/S
May	7	7	8	8	8	8	8	8	8	8	8	8	8	7	8	8	8	8	8	N/S	N/S
June	8	6	8	7	7	8	8	8	8	7	8	8	7	7	8	8	7	8	8	5	5
TOTALS:	80	79	94	87	92	99	100	96	95	69	89	89	77	73	94	94	62	92	92	51	51

**Table 4.** Expanded estimates of total angler hours by river and month, as determined by the Central Valley Angler Survey, July 2008 through June 2009. \* = one or more river sections were not surveyed; \*\* = 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	53,414	35,202	9,291	25,632*	3,377	5,741	4,034	262
August	59,140	36,076	9,071	16,398*	9,434	3,541	1,141	152
September	63,387	28,674	11,943	14,420	10,266	5,077	605	664
October	126,988	18,608	16,776	11,062	12,691	6,279	1,793	383
November	133,407	74,714	10,234	12,929	7,488	3,068	**	**
December	85,527	36,314	3,907	12,354	1,250	4,900	**	**
January	77,077	14,295	9,275	21,934	5,777	5,106	1,717	336
February	74,855	10,162	4,737	17,344	7,772	3,189	897	433
March	125,306	32,786	9,429	13,028	14,946	3,524	2,770	824
April	197,450	99,765	10,355	8,466	35,923	2,479	**	**
May	226,368	97,100	9,973	20,163	24,818	3,576	**	**
June	109,346	40,090	8,958	47,485	16,282	8,963	4,034	73
TOTAL:	1,332,26	523,78	113,94	221,21	150,02	55,44	16,991	3,127

**Table 5.** Expanded estimates of angler hours by survey section and species, as determined by the Central Valley Angler Survey, July 2008 through June 2009.

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	142,187	84,284	15,519	397	20,255	18,402	2,051	1,250	28
Chinook Salmon	92,912	650	89,127	0	2,520	616	0	0	0
Steelhead	133,123	729	13,441	4,117	69,789	24,338	16,213	4,060	436
Rainbow Trout	231,152	137	68,477	108,812	5,814	5,514	28,555	11,178	2,664
Striped Bass	1,155,934	791,933	238,213	0	60,653	63,834	1,301	0	0
Sturgeon	319,988	271,435	47,424	0	230	899	0	0	0
American Shad	201,928	93,256	37,293	0	50,744	13,353	7,281	0	0
Sacramento Splittail	33,865	29,361	14	0	191	4,299	0	0	0
Other	117,714	60,479	14,276	622	11,019	30,775	41	503	0
TOTAL:	2,428,803	1,332,265	523,785	113,949	221,215	162,029	55,442	16,991	3,127

### Steelhead Fishery

The majority (70.7%) of the sport angling effort estimated for steelhead during the current reporting period was expended on the American and Feather rivers (Table 5). The percent of overall estimated effort on the Sacramento, Yuba, Mokelumne and Calaveras rivers were 13.7%, 12.2%, 3.0%, and 0.3%, respectively. An estimated total of 133,123 angler hours targeted steelhead (Table 5), resulting in an estimated harvest of 1,881 fish, and a release of 64,949 fish (Appendix Table 3). Thus, only about 2.8% of the catch was harvested. The overall CPUE for steelhead was 0.50 / hr.

### 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 characterized by the length criteria described in Job 1 above.

The entire rainbow trout fishery was surveyed on the Sacramento, Yuba, Mokelumne, and Calaveras rivers (Table 2). No surveys were conducted on the Calaveras and Mokelumne rivers during the closures to all fishing that occurred during October through December 2008 and again during April and May 2009.

An estimated 231,153 angler hours targeted rainbow trout (Table 5), resulting in an estimated harvest of 778 fish, and the catch and release of an estimated 77,178 fish (Appendix Table 4), and thus a retention rate of 1%. Effort for rainbow trout in survey sections 6, 7 and 8 on the Sacramento River comprised the majority (76.8%) of the overall effort for rainbow trout throughout the survey area (Appendix Table 4). Effort on the Yuba River accounted for 12.4% of the total rainbow trout effort. The overall CPUE for rainbow trout was 0.33 / hr.

#### Striped Bass Fishery

An estimated total of 1,155,934 angler hours targeted striped bass (Table 5). About 89% of that effort occurred on the Sacramento River from the Carquinez Bridge to the Red Bluff Diversion Dam, 5.5% on the Feather River, and 5.2% on the lower American River (Table 5), accounting for 99.7% of all striped bass angling effort in the survey area. Total angler effort resulted in an estimated striped bass harvest of 49,784 fish, and a catch and release of 330,490 fish (Appendix Table 5). About 15% of striped bass caught were harvested. The overall CPUE for striped bass was 0.29 / hr. The striped bass fishery was the most popular fishery in the survey and accounted for 48% of total angling effort.

#### Sturgeon Fishery

An estimated 319,116 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 the estimated harvest of 2,427 white sturgeon and the catch and release of 11,677 white sturgeon (Appendix Table 6), for a harvest rate of about 17%. No green sturgeon were reported kept and an estimated 575 were released (Appendix Table 7). Reported green sturgeon catch occurred in Suisun Bay and in section 6 (Hamilton City to Red Bluff Diversion Dam) on the Sacramento River. Anglers had reportedly differentiated between white and green sturgeon for 99% of sturgeon released; among those fish, 94.4% were identified as white sturgeon and 4.6% as green sturgeon (Appendix Tables 6–8). The overall CPUE for sturgeon was low: about 0.05 / hr.

#### American Shad Fishery

With the exclusion of surveys conducted in July 2009, much of the Central Valley American shad fishery for 2009 was surveyed during the current reporting period. An



estimated 201,928 angler hours targeted American shad (Table 5). About 65% of this effort occurred on the Sacramento River from Rio Vista to the Red Bluff Diversion Dam, 25% on the lower American River, 7% on the Feather River, and 4% on the Yuba River. This effort resulted in an estimated harvest of 107,088 shad, and the catch and release of 98,737 shad (Appendix Table 9), for a harvest rate of about 52%. The American shad fishery was very successful as reflected in an overall CPUE of 1.0 / hr, the highest catch rate among the fisheries monitored in the angler survey. The American shad fishery, which accounted for 8.3% 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 82.7% 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 17.1% and 0.2% was on the Feather River from Verona to Shanghai Rapids and the Sacramento River from Knights Landing to Colusa, respectively. At an estimated total effort of 33,865 angler hours, the Sacramento splittail fishery was the smallest fishery targeted in the angler survey (Table 5). However, with an estimated harvest of 8,550 splittail and a catch and release of only 254 splittail (Appendix Table 10), this fishery had the highest harvest rate of 97%. The overall CPUE for splittail was 0.26 / 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 of the production of fall-run Chinook salmon (currently 25%) 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 227 Chinook salmon observed in the catch during the current reporting period, 161, or 71%, had an adipose fin clip and were thus identified as being of hatchery origin. Anglers surrendered the head from 156 (97%) of clipped salmon and tags were recovered and read from 147 (94%) of heads collected. The proportionate breakdown of coded-wire-tag recoveries was 99% late-fall-run Chinook salmon from Coleman National Fish Hatchery, and 1% winter-run Chinook salmon from Livingston Stone National Fish Hatchery. Estimates of age structure of the Chinook salmon catch for the current report period are underway.

#### Age Structure of Adult Steelhead

A total of 467 scale samples was collected from adult steelhead at Feather River, Nimbus, and Mokelumne River hatcheries. Of those, 138 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 pending.

**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 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.

Titus, R. 2009. A world under the surface: life of the Pacific salmon. Outdoor California July-August 2009 Issue:20–27.

**9. Name, title, phone number, and e-mail address of person(s) compiling this report**

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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 2008 through June 2009.

<b>CENTRAL VALLEY ANGLER SURVEY</b>																				
<b>2008 - 2009 Angler Survey Effort Estimate Summary</b>																				
<b>TOTAL NUMBER OF ANGLER-HOURS</b>																				
River	Sacramento								American				Feather				Yuba		Mokelumne	
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
July	10,996	2,688	30,442	9,288	6,997	8,147	9,553	10,505	9,291	-	20,878	4,754	5,318	730	2,277	369	508	449	5,292	4,034
August	18,542	1,543	27,824	11,231	8,107	9,320	10,158	8,491	9,071	-	12,954	3,444	4,421	2,173	2,534	307	776	982	2,559	1,141
September	18,745	4,071	28,082	12,488	8,559	3,986	5,251	10,877	11,943	2,199	9,132	3,088	6,214	1,898	1,766	387	586	237	4,840	605
October	72,964	19,588	24,743	9,693	4,653	2,324	3,973	7,657	16,776	1,540	6,581	2,940	3,595	5,380	3,435	281	484	1,044	5,235	1,793
November	79,214	17,728	28,293	8,173	35,623	18,596	11,792	8,703	10,234	683	6,049	6,197	3,381	820	3,287	0	0	375	2,694	-
December	52,280	15,593	10,887	6,766	16,837	8,060	8,126	3,291	3,907	338	4,341	7,674	333	264	653	0	-	54	4,846	-
January	31,001	16,685	12,980	16,411	6,736	810	1,216	5,533	9,275	850	12,780	8,304	1,355	206	4,154	63	-	396	4,710	1,717
February	25,960	12,793	24,834	11,267	6,737	1,318	1,257	849	4,737	468	11,703	5,173	5,179	336	2,173	84	-	152	3,037	897
March	28,729	16,935	51,722	27,921	20,518	8,428	1,168	2,672	9,429	1,099	9,793	2,137	10,951	731	3,224	40	321	181	3,343	2,770
April	38,445	12,577	99,054	47,374	81,622	13,427	1,295	3,421	10,355	2,035	5,874	556	27,232	4,566	4,097	28	1,118	281	2,198	-
May	52,859	10,848	101,492	61,169	47,452	34,980	9,443	5,226	9,973	3,169	16,245	749	19,543	3,160	1,883	231	1,134	1,985	1,591	-
June	24,072	7,134	45,997	32,143	14,337	14,015	8,682	3,056	8,958	4,186	39,146	4,153	10,622	2,585	2,034	1,041	1,760	6,485	2,478	4,034
TOTAL:	453,807	138,184	486,349	253,925	258,179	123,411	71,914	70,282	113,949	16,568	155,477	49,170	98,144	22,849	31,516	2,832	6,687	12,621	42,821	16,991
CI 80%	36,389	14,784	25,935	18,120	23,071	10,167	8,084	7,291	13,132	1,714	13,545	3,765	11,227	3,937	2,954	837	1,125	2,603	5,188	3,501
<b>TOTAL NUMBER OF ANGLER-HOURS BY SPECIES</b>																				
River	Sacramento								American				Feather				Yuba		Mokelumne	
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
ANY	25,519	3,752	32,626	22,388	6,546	3,461	3,338	2,175	397	2,234	13,447	4,574	6,699	6,045	2,597	1,053	2,008	1,938	113	1,250
CHINOOK SALMON	294	0	320	35	46,704	25,485	16,938	0	0	0	96	2,424	0	28	340	248	0	0	0	0
STEELHEAD	0	0	652	77	120	2,597	3,650	7,073	4,117	31	37,913	31,845	789	670	21,539	629	711	1,057	15,156	4,060
RAINBOW TROUT	0	0	108	29	9	416	8,569	59,483	108,812	1,030	3,137	1,648	0	8	5,461	0	45	1,039	27,516	11,178
STRIPED BASS	316,583	54,278	283,403	137,668	164,009	54,791	19,413	0	0	9,673	47,084	3,896	56,737	5,723	0	284	1,089	1,265	36	0
STURGEON	108,835	80,153	56,446	26,001	31,227	12,208	3,989	0	0	146	84	0	899	0	0	0	0	0	0	0
AMERICAN SHAD	0	0	63,317	29,940	2,751	20,212	14,331	0	0	1,154	44,946	4,645	12,802	142	18	324	66	7,281	0	0
SPLITTAIL	0	0	11,840	17,521	14	0	0	0	0	152	39	0	4,299	0	0	0	0	0	0	0
other	2,576	0	37,637	20,266	6,798	4,240	1,687	1,550	622	2,148	8,732	139	15,920	10,233	1,561	293	2,769	41	0	503
TOTAL:	453,807	138,184	486,349	253,925	258,179	123,411	71,914	70,282	113,949	16,568	155,477	49,170	98,144	22,849	31,516	2,832	6,687	12,621	42,821	16,991

**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 2008 through June 2009.

**CENTRAL VALLEY ANGLER SURVEY**

2008 - 2009 Angler Survey Effort Estimate Summary

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

River	Sacramento									American				Feather			Yuba		Mokelumne		
	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
July	0	0	0	0	0	0	0	0	0	0	0	643	0	0	340	0	0	0	0	0	0
August	0	0	0	0	59	0	0	0	0	0	0	1,353	0	28	0	0	0	0	0	0	0
September	0	0	320	0	326	0	317	0	0	0	18	197	0	0	0	248	0	0	0	0	0
October	0	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0
November	294	0	0	15	32,285	17,730	9,997	0	0	0	78	156	0	0	0	0	0	0	0	0	-
December	0	0	0	20	14,034	7,755	6,624	0	0	0	0	32	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	17	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	-
May	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
<b>TOTAL:</b>	<b>294</b>	<b>0</b>	<b>320</b>	<b>35</b>	<b>46,704</b>	<b>25,485</b>	<b>16,938</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>96</b>	<b>2,424</b>	<b>0</b>	<b>28</b>	<b>340</b>	<b>248</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**TOTAL KEPT CHINOOK SALMON**

River	Sacramento									American				Feather			Yuba		Mokelumne		
	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
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	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	21	0	0	0	467	489	78	0	0	0	0	0	0	0	0	0	0	0	0	0	-
December	0	0	0	0	302	261	136	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	0	-
May	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
<b>TOTAL:</b>	<b>21</b>	<b>0</b>	<b>15</b>	<b>0</b>	<b>769</b>	<b>750</b>	<b>215</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**TOTAL RELEASED CHINOOK SALMON**

River	Sacramento									American				Feather			Yuba		Mokelumne		
	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
July	0	0	0	0	0	0	0	0	0	0	0	165	0	0	0	72	0	0	0	0	0
August	0	0	0	0	0	0	27	0	0	0	0	295	0	0	73	58	0	0	0	0	0
September	0	0	21	0	0	0	26	19	19	0	0	432	0	0	378	186	0	0	0	0	0
October	0	0	29	22	0	0	0	11	0	0	33	278	0	0	48	0	0	0	0	0	0
November	0	14	24	0	0	14	7	123	22	0	0	1,678	0	0	15	0	0	0	0	0	-
December	0	0	0	0	6	49	10	0	0	0	0	592	0	0	0	0	0	0	0	0	-
January	0	0	0	29	5	0	0	16	0	0	71	380	0	0	19	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0	0	21	46	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	8	0	0	30	0	0	0	0	0	19	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	-
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
June	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36
<b>TOTAL:</b>	<b>23</b>	<b>14</b>	<b>75</b>	<b>51</b>	<b>10</b>	<b>70</b>	<b>70</b>	<b>170</b>	<b>72</b>	<b>0</b>	<b>124</b>	<b>3,865</b>	<b>0</b>	<b>0</b>	<b>552</b>	<b>316</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>36</b>

**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 2008 through June 2009.

**CENTRAL VALLEY ANGLER SURVEY**

2008 - 2009 Angler Survey Effort Estimate Summary

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

River	Sacramento									American				Feather				Yuba		Mokelumne
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
July	0	0	0	0	0	0	238	831	105	-	606	585	0	0	838	369	46	0	1,334	0
August	0	0	0	0	0	0	437	371	0	-	366	123	0	0	1,571	38	0	0	1,444	98
September	0	0	0	0	0	342	416	399	0	0	1,266	1,557	22	0	751	124	164	0	0	0
October	0	0	0	0	0	1,183	911	300	0	0	1,598	1,827	584	576	3,285	0	484	573	1,851	764
November	0	0	167	0	65	387	697	1,474	2,843	0	3,902	5,528	183	94	2,686	0	0	306	349	-
December	0	0	3	0	49	269	368	1,175	0	0	2,926	7,582	0	0	653	0	-	0	3,572	-
January	0	0	0	77	7	229	171	1,137	217	0	10,828	8,129	0	0	3,688	0	-	178	288	859
February	0	0	0	0	0	188	380	7	0	31	9,264	4,945	0	0	1,875	58	-	0	555	713
March	0	0	483	0	0	0	0	250	59	0	5,302	1,553	0	0	2,077	40	0	0	2,044	1,599
April	0	0	0	0	0	0	0	0	842	0	1,276	16	0	0	1,880	0	17	0	1,594	-
May	0	0	0	0	0	0	0	1,129	0	0	213	0	0	0	847	0	0	0	1,205	-
June	0	0	0	0	0	0	32	0	50	0	366	0	0	0	1,388	0	0	0	920	27
TOTAL:	0	0	652	77	120	2,597	3,650	7,073	4,117	31	37,913	31,845	789	670	21,539	629	711	1,057	15,156	4,060

**TOTAL KEPT STEELHEAD**

River	Sacramento									American				Feather				Yuba		Mokelumne
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
July	0	0	0	0	0	0	35	69	0	-	0	0	0	0	45	0	0	0	0	0
August	0	0	0	0	0	0	27	49	0	-	0	0	0	0	0	0	0	0	41	33
September	0	0	0	0	0	0	0	19	0	0	0	0	0	0	25	0	0	30	0	0
October	0	0	15	0	0	44	0	11	16	0	0	35	0	0	0	0	0	0	0	0
November	0	0	0	0	7	28	20	61	33	0	0	71	18	0	0	0	0	0	0	-
December	0	0	0	0	0	12	19	8	47	0	0	32	0	0	0	0	-	0	0	-
January	0	0	0	0	0	0	0	33	0	0	47	58	0	0	19	0	-	0	0	0
February	0	0	0	0	0	15	0	7	0	0	21	46	29	0	26	0	-	0	0	0
March	0	0	17	10	0	0	0	0	0	0	138	0	92	0	37	0	0	0	0	0
April	0	0	0	0	23	9	0	0	0	0	55	0	0	0	0	0	0	0	0	-
May	0	0	0	0	0	13	21	23	0	0	24	0	0	0	36	0	0	0	0	-
June	0	0	0	0	0	0	21	39	0	0	39	0	26	0	0	0	0	0	0	0
TOTAL:	0	0	32	10	30	120	144	320	96	0	323	242	166	0	189	0	0	30	41	33

**TOTAL RELEASED STEELHEAD**

River	Sacramento									American				Feather				Yuba		Mokelumne
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
July	0	0	51	16	0	0	176	969	1,785	-	0	0	0	0	317	72	0	0	180	156
August	0	0	0	0	0	17	82	618	2,459	-	0	0	0	0	609	0	0	0	248	98
September	0	0	0	0	20	49	172	2,337	3,979	0	176	25	0	0	303	0	0	0	344	0
October	0	0	0	0	17	199	343	1,349	4,347	22	489	383	0	0	432	0	0	319	1,025	55
November	0	0	0	0	0	83	241	1,320	1,629	0	182	660	0	0	339	0	0	106	0	-
December	0	0	0	0	0	61	224	338	814	0	89	688	0	0	0	0	-	6	392	-
January	10	28	7	0	0	61	494	3,147	2,059	0	684	789	0	0	307	0	-	32	767	107
February	0	0	0	0	0	429	1,647	173	1,340	250	1,441	661	0	0	486	0	-	0	423	19
March	0	0	0	0	0	8	65	400	2,163	0	655	178	31	0	243	0	0	0	366	504
April	0	0	0	17	0	0	15	773	2,190	12	519	0	0	0	390	0	0	0	170	-
May	0	0	0	0	0	0	126	507	3,150	0	24	0	0	0	324	0	0	0	55	-
June	0	0	25	124	0	0	64	682	3,459	74	39	0	0	0	276	0	0	0	279	216
TOTAL:	10	28	83	157	37	907	3,650	12,614	29,374	358	4,298	3,384	31	0	4,028	72	0	463	4,249	1,155

\* 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 2008 through June 2009.

**CENTRAL VALLEY ANGLER SURVEY**

2008 - 2009 Angler Survey Effort Estimate Summary

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

River Section No.	Sacramento								American					Feather			Yuba		Mokelumne	
	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
July	0	0	0	0	0	0	1,415	9,271	8,956	-	157	0	0	0	963	0	0	0	3,922	3,891
August	0	0	0	0	0	9	1,461	6,762	9,071	-	348	0	0	0	12	0	0	213	1,114	864
September	0	0	0	0	0	0	1,032	10,454	11,938	82	369	578	0	8	681	0	0	193	4,820	403
October	0	0	88	0	0	44	670	7,231	16,771	0	171	461	0	6	0	0	0	276	3,290	601
November	0	0	0	0	0	0	502	7,122	7,391	0	156	107	0	0	594	0	0	5	2,345	-
December	0	0	0	0	0	0	551	1,852	3,907	28	0	0	0	0	0	0	-	54	1,274	-
January	0	0	0	29	9	122	586	3,735	9,053	0	24	0	0	0	245	0	-	194	4,422	859
February	0	0	0	0	0	61	644	632	4,433	187	460	0	0	0	112	0	-	76	2,483	165
March	0	0	0	0	0	18	338	2,415	9,208	0	603	374	0	0	342	0	34	0	1,299	1,171
April	0	0	20	0	0	35	222	3,309	9,496	24	327	127	0	0	1,836	0	0	0	604	-
May	0	0	0	0	0	126	448	3,693	9,898	62	367	0	0	0	568	0	11	29	386	-
June	0	0	0	0	0	0	700	3,008	8,690	645	154	0	0	0	103	0	0	0	1,557	3,225
TOTAL:	0	0	108	29	9	416	8,569	59,484	108,812	1,030	3,137	1,648	0	8	5,461	0	45	1,039	27,516	11,178

**TOTAL KEPT RAINBOW TROUT**

River Section No.	Sacramento								American					Feather			Yuba		Mokelumne	
	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
July	0	0	0	0	0	0	35	208	21	-	0	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	27	124	0	-	0	0	0	0	0	0	0	0	41	0
September	0	0	0	0	0	0	0	19	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
November	0	0	0	0	0	0	7	0	20	0	0	0	0	0	0	0	0	0	0	-
December	0	0	0	0	0	0	0	16	21	0	0	0	0	0	0	0	-	0	0	-
January	0	0	0	0	0	0	0	49	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
March	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	25	0	0	0	0	0	0	0	0	0	0	0	-
May	0	0	0	0	0	0	0	46	0	0	0	0	0	0	0	0	0	0	0	-
June	0	0	0	0	0	0	21	19	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	0	0	0	0	0	0	90	506	61	0	0	0	0	0	0	0	0	0	41	0

**TOTAL RELEASED RAINBOW TROUT**

River Section No.	Sacramento								American					Feather			Yuba		Mokelumne	
	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
July	0	0	0	0	0	0	176	2,631	2,157	-	0	0	0	0	0	0	0	0	469	1,510
August	0	0	0	0	0	0	273	1,853	3,295	-	0	0	0	0	0	0	0	61	619	33
September	0	0	0	0	0	12	79	3,382	5,193	0	0	0	0	0	0	0	0	0	306	605
October	0	0	0	0	0	0	474	3,510	7,020	22	0	0	0	0	0	0	0	348	1,255	1,329
November	0	0	0	0	0	0	209	2,916	2,507	0	0	0	0	0	0	0	0	0	61	-
December	0	0	0	0	0	12	200	462	852	0	0	0	0	0	0	0	-	36	573	-
January	0	0	0	0	0	12	13	669	2,785	0	0	0	0	0	0	0	-	32	274	353
February	0	0	0	0	0	0	107	166	1,125	250	0	0	0	0	0	0	-	0	132	291
March	0	0	0	0	0	0	0	1,226	2,526	0	0	0	0	0	0	0	0	0	287	453
April	0	0	0	0	0	0	30	1,484	3,410	12	0	0	0	0	0	0	0	0	222	-
May	0	0	0	0	0	38	126	1,198	5,369	0	0	0	0	0	0	0	0	0	248	-
June	0	0	0	0	0	0	128	1,579	3,361	74	0	0	0	0	0	0	0	17	592	1,401
TOTAL:	0	0	0	0	0	75	1,815	21,076	39,601	358	0	0	0	0	0	0	0	494	5,038	5,974

\* 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 2008 through June 2009.

**CENTRAL VALLEY ANGLER SURVEY**

2008 - 2009 Angler Survey Effort Estimate Summary

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

River	Sacramento								American				Feather			Yuba		Mokelumne		
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
July	7,625	748	18,870	6,399	6,509	7,323	5,894	0	0	-	13,739	1,887	2,409	0	0	0	0	199	36	0
August	11,274	1,175	19,653	5,501	4,244	8,972	8,220	0	0	-	7,905	246	1,994	84	0	269	51	647	0	0
September	12,993	2,700	21,122	8,998	7,369	3,534	1,514	0	0	1,885	5,863	210	3,451	619	0	15	0	0	0	0
October	60,617	16,922	20,903	6,051	4,111	866	445	0	0	650	3,580	139	871	615	0	0	0	0	0	0
November	68,422	12,242	22,431	3,926	1,730	213	236	0	0	374	1,151	187	1,213	47	0	0	0	0	0	-
December	35,732	7,547	5,760	2,546	274	18	19	0	0	141	39	44	0	0	0	0	-	0	0	-
January	16,867	3,640	4,883	3,240	246	119	73	0	0	292	360	0	836	0	0	0	-	0	0	0
February	8,883	1,252	3,362	894	610	103	89	0	0	125	110	34	1,087	0	0	0	-	0	0	0
March	12,793	2,310	18,820	11,384	5,888	1,310	0	0	0	699	1,448	0	7,863	130	0	0	17	0	0	0
April	25,809	1,990	68,515	33,577	77,305	5,570	361	0	0	1,201	3,350	95	22,092	2,414	0	0	0	0	0	-
May	40,542	3,228	56,328	38,388	43,502	18,292	1,001	0	0	1,675	2,991	585	9,882	886	0	0	589	0	0	-
June	15,027	525	22,755	16,764	12,220	8,471	1,560	0	0	2,631	6,548	468	5,040	928	0	0	432	419	0	0
TOTAL:	316,583	54,278	283,403	137,668	164,009	54,791	19,413	0	0	9,673	47,084	3,896	56,737	5,723	0	284	1,089	1,265	36	0

**TOTAL KEPT STRIPED BASS**

River	Sacramento								American				Feather			Yuba		Mokelumne		
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
July	36	12	279	47	176	299	53	0	0	-	449	66	0	0	0	0	0	0	0	0
August	394	184	358	52	146	522	191	0	0	-	279	0	118	0	0	0	0	61	0	0
September	149	62	384	21	415	111	26	0	0	0	35	0	129	0	0	0	0	0	0	0
October	4,119	1,315	589	33	34	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0
November	5,588	900	929	8	29	21	13	0	0	0	0	0	0	0	0	0	0	0	0	-
December	2,188	551	144	10	0	6	0	0	0	0	0	0	0	0	0	0	-	0	0	-
January	855	197	37	29	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0
February	560	195	64	0	6	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0
March	706	339	440	185	147	33	0	0	0	0	69	0	153	0	0	0	0	0	0	0
April	1,872	173	2,953	946	5,205	131	0	0	0	0	109	0	1,129	0	0	0	0	0	0	-
May	2,392	98	2,286	1,588	2,876	847	21	0	0	21	0	0	259	0	0	0	0	0	0	-
June	233	25	125	149	482	175	21	0	0	74	0	0	26	0	0	0	0	0	0	0
TOTAL:	19,091	4,049	8,589	3,069	9,516	2,144	326	0	0	95	941	66	1,837	0	0	0	0	61	0	0

**TOTAL RELEASED STRIPED BASS**

River	Sacramento								American				Feather			Yuba		Mokelumne		
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
July	3,197	294	9,648	2,808	2,947	2,496	547	0	0	-	1,661	0	957	0	0	0	0	0	0	0
August	5,342	737	5,942	2,041	1,493	2,314	683	0	0	-	488	0	1,022	56	0	0	0	0	0	0
September	5,529	780	5,163	2,980	1,936	714	277	0	0	464	387	0	344	33	0	0	0	0	0	0
October	16,262	3,798	4,682	837	654	22	65	0	0	179	261	0	22	0	0	0	0	29	0	0
November	21,132	2,200	4,120	200	137	14	20	0	0	0	26	0	55	0	0	0	0	0	0	-
December	7,709	1,148	546	10	0	0	0	0	0	0	0	16	0	0	0	0	-	0	0	-
January	3,048	1,025	198	15	9	0	0	0	0	0	0	0	28	0	0	0	-	0	0	0
February	2,142	509	299	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0
March	2,629	601	1,474	360	301	25	0	0	0	0	138	0	245	0	0	0	0	0	0	0
April	7,402	184	10,376	3,618	5,503	131	0	0	0	85	136	0	3,116	26	0	0	0	0	0	-
May	14,099	848	17,376	7,842	9,952	4,208	21	0	0	708	95	0	3,388	117	0	0	0	154	0	-
June	4,659	420	13,799	16,137	5,976	3,877	449	0	0	811	1,466	0	2,854	374	0	0	0	33	0	0
TOTAL:	93,150	12,545	73,623	36,845	28,908	13,800	2,061	0	0	2,248	4,657	16	12,031	606	0	0	0	217	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 2008 through June 2009.

**CENTRAL VALLEY ANGLER SURVEY**

2008 - 2009 Angler Survey Effort Estimate Summary

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

River Section No.	Sacramento								American				Feather			Yuba		Mokelumne		
	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
July	0	0	495	0	10	371	1,151	0	0	-	3,491	1,384	703	0	0	0	199	0	0	
August	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	7	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
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
February	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
April	0	0	17,687	2,357	0	135	0	0	0	182	55	0	2,844	0	0	0	0	0	0	-
May	0	0	37,447	18,539	2,053	14,710	7,047	0	0	713	11,658	0	6,354	142	18	132	0	1,195	0	-
June	0	0	7,687	9,044	689	4,996	6,133	0	0	252	29,743	3,261	2,900	0	0	192	66	5,887	0	0
TOTAL:	0	0	63,317	29,940	2,751	20,212	14,331	0	0	1,154	44,946	4,645	12,802	142	18	324	66	7,281	0	0

**TOTAL KEPT AMERICAN SHAD**

River Section No.	Sacramento								American				Feather			Yuba		Mokelumne		
	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
July	0	0	127	0	0	0	71	0	0	-	718	1,714	868	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
September	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
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
February	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0
March	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	0	0	12,859	797	0	0	0	0	0	0	0	0	502	0	0	0	0	0	0	-
May	0	0	47,974	13,086	1,835	63	0	0	0	250	1,040	0	2,891	0	0	0	0	0	0	-
June	0	0	6,000	4,948	529	0	0	0	0	0	7,985	1,414	1,400	0	0	0	0	0	0	0
TOTAL:	0	0	66,976	18,831	2,364	63	71	0	0	250	9,744	3,128	5,661	0	0	0	0	0	0	0

**TOTAL RELEASED AMERICAN SHAD**

River Section No.	Sacramento								American				Feather			Yuba		Mokelumne		
	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
July	0	0	25	0	0	841	511	0	0	-	180	0	389	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
September	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
October	0	0	0	11	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	7	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
March	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
April	0	0	810	116	0	44	0	0	0	0	0	0	3,409	0	0	0	0	0	0	-
May	0	0	7,240	2,345	227	22,267	7,879	0	0	42	11,090	0	2,309	385	0	0	0	3,199	0	-
June	0	0	325	1,790	109	7,106	3,590	0	0	0	11,843	1,449	1,295	0	0	0	0	7,905	0	0
TOTAL:	0	0	8,408	4,262	336	30,258	11,980	0	0	42	23,113	1,449	7,402	385	0	0	0	11,103	0	0



