

**SUPPORTING STATEMENT
CENTRAL VALLEY ANGLER SURVEY
OMB CONTROL NO. 0648-XXXX**

B. COLLECTIONS OF INFORMATION EMPLOYING STATISTICAL METHODS

1. Describe (including a numerical estimate) the potential respondent universe and any sampling or other respondent selection method to be used. Data on the number of entities (e.g., establishments, State and local governmental units, households, or persons) in the universe and the corresponding sample are to be provided in tabular form. The tabulation must also include expected response rates for the collection as a whole. If the collection has been conducted before, provide the actual response rate achieved.

Potential respondent universe

The potential respondent universe consists of anglers who fish on California's Sacramento River system. Of these individuals, those who are 18 years and older and participated in Sacramento River fishing at least once in the previous 12 months are eligible to participate in this survey.

The California Department of Fish and Wildlife (CDFW) conducts an annual creel survey on the Sacramento River system (including major tributaries). Results of the creel survey indicate that 663,607 angler trips were made on the Sacramento River system in the 2011-12 season. The number of anglers who made these trips is not known and will be determined as part of this survey.

Sample frame

According to the 2011-12 CDFW creel survey, 76% of fishing effort on the Sacramento River system is attributable to anglers residing in the following 14 counties: Amador, Butte, Colusa, El Dorado, Glenn, Nevada, Placer, Sacramento, Shasta, Solano, Sutter, Tehama, Yolo and Yuba. This 14-county area coincides closely with the area covered by the creel survey and suggests the strong influence of residential proximity on fishery participation. California residents who live outside the 14-county area and out-of-state residents account for 22% and 2%, respectively, of anglers encountered in the creel.

CDFW has a computerized Automated License Data System (ALDS) that includes names, addresses and telephone numbers of all resident and non-resident anglers who purchase fishing licenses in California. Resident and non-resident anglers in the ALDS who purchase their license in the 14-county area encompassing the Sacramento River system will serve as the sample frame for this survey.

A sample frame that encompassed the entire ALDS database (e.g., included license sales in all of California's 58 counties) would also include Sacramento River anglers who purchased their license anywhere in California. However a statewide frame was deemed cost-prohibitive, as much more extensive telephone screening would be required to identify Sacramento River

anglers from this larger frame. Most license sales outside the 14-county area occur in counties that are adjacent to the Pacific Ocean or San Francisco Bay and/or are far from the Sacramento River (e.g., southern California); anglers who purchase their license in these counties are much more likely to be saltwater anglers than Sacramento River anglers.

Sampling or other respondent selection methods

To identify potential respondents for the proposed survey, a random sample of anglers from the sample frame will be called and asked if they fished on the Sacramento River system in the past year. Those who answer 'yes' will then be asked (a) how many days they fished on the Sacramento River system, and (b) whether they would be willing to complete a follow-up mail survey.

Expected response rate and comparison with previous studies

Due to the prevalence of caller ID and call screening, 16% (11,447) of the 71,544 license holders called are expected to be successfully contacted for a phone interview. About 63% (7,212) of the phone interviewees are expected to be Sacramento River anglers. Of these anglers, 80% (5,769) are expected to be willing to complete the follow-up mail survey, and 26% (1,500) are expected to return the survey. The 16% telephone response rate, the 80% mail survey volunteer rate, and the 26% mail response rate are based on the NOAA Fisheries contractor's prior experience with saltwater angler surveys involving random telephone interviews with a mail follow-up. It is assumed here that these rates would be similar for the proposed Central Valley angler survey.

The 63% Sacramento River participation rate is based on results of NOAA Fisheries' 2004 salmon/steelhead angler survey indicating that 63% of license holders residing in the 14-county Sacramento River area fished on the Sacramento River system. As noted above, the sample frame for the proposed survey consists of anglers who purchase a California fishing license in this same 14-county area. The reason for basing the frame on county of purchase was to increase the probability of encountering anglers who fish on the Sacramento River system. Anglers in the frame can be categorized as follows:

- Anglers who purchase their license in the 14-county area and also live in that area: The 63% Sacramento River participation rate pertains to all respondents to the 2004 survey who lived in the 14-county area (including those who purchased their license outside the area, perhaps while fishing elsewhere). Thus the Sacramento River participation rate for residents of the 14-county area who also purchase their license in that same area is likely higher than 63%.
- Anglers who purchase their license in the 14-county area but live elsewhere in California: Given the tendency of California residents to purchase their fishing license in or near their county of residence (where most of them do at least some of their fishing), it was deemed reasonable to assume that a sizeable proportion of resident anglers who live outside the 14-county area but purchase their license in that area do so because the Sacramento River is their fishing destination.
- Anglers who purchase their license in the 14-county area but live out of state: Given the tendency of out-of-state anglers to purchase their license near their fishing destination, it was deemed reasonable to assume that a sizeable proportion of out-of-state anglers who

purchase their license in the 14-county area do so because the Sacramento River is their fishing destination.

For purposes of the proposed survey, the same 63% Sacramento River participation rate is assumed to apply to all anglers who purchase their license in the 14-county area (regardless of where they live). Given the behavioral tendencies of resident and non-resident anglers with regard to where they purchase their license relative to where they fish, the fact that the Sacramento River is the most likely place in the 14-county area to fish (being by far the largest river system in the area), and the conservative nature of the 63% participation rate for anglers residing in the 14-county area, it seems reasonable to assume that the same participation rate would apply to anglers who purchase their license in the same area but live elsewhere.

Number of entities to be sampled

Table B-1 describes the number of telephone screening interviews and survey mail-outs that will be needed to obtain 1,500 completed surveys.

Table B-1. Expected sample size requirements for proposed survey						
<i>Area of residence</i>	<i>Sample frame¹</i>	<i># license holders called²</i>	<i># telephone responses³</i>	<i># SacRiver anglers⁴</i>	<i># survey mail-outs⁵</i>	<i># returned surveys⁶</i>
14-county	315,323	60,634	9,701	6,112	4,889	1,271
Other CA	39,176	7,534	1,205	759	608	158
Out-of-state	17,564	3,377	540	340	272	71
TOTAL	372,063	71,544	11,447	7,212	5,769	1,500

¹ Number of anglers in 2013 ALDS database that purchased license in 14-county Sacramento River area, categorized by area of residence.
² Number of license holders from 14-county area that will need to be called to achieve 1,500 returned surveys
³ Assuming that 16% of license holders called will participate in telephone screener.
⁴ Assuming that 63% of telephone respondents will be Sacramento River anglers.
⁵ Assuming that 80% of Sacramento River anglers will be willing to complete survey.
⁶ Assuming that 26% of Sacramento River anglers who are willing to complete the survey actually return the survey.

2. Describe the procedures for the collection, including: the statistical methodology for stratification and sample selection; the estimation procedure; the degree of accuracy needed for the purpose described in the justification; any unusual problems requiring specialized sampling procedures; and any use of periodic (less frequent than annual) data collection cycles to reduce burden.

Statistical methodology for stratification and sample selection

As indicated in Table B-1, the number of anglers in the sample frame is 372,063 – based on the number of resident and non-resident licenses sold in the 14-county Sacramento River area in 2013. These anglers are distributed by area of residence as follows: 85% from the 14-county area, 10% from other California counties, and 5% from out-of-state. Because survey respondents will be selected from the sample frame using a simple random sampling protocol, representation of the three areas of residence in the telephone and mail survey is expected to be proportional to their representation in the frame.

Estimation procedure

The sample frame includes all resident and non-resident anglers who purchased their fishing license in the 14-county Sacramento River area. The population of Sacramento River anglers will be estimated by multiplying the proportion of anglers in the sample frame who fish on the Sacramento River (as estimated from the telephone survey) by the number of anglers in the frame.

Mail survey data will be analyzed using statistics such as means, standard deviations, and ranges. Mail survey responses will be expanded to the population of Sacramento River anglers, based on the population estimate derived from the telephone survey.

If fishing avidity (number of angler days on the Sacramento River in the past year) differs significantly between telephone survey respondents and the subset of telephone respondents who complete the mail survey, mail survey responses will be weighted as needed to correct for non-response bias. This is based on the expectation that more avid anglers will be more likely to return the mail survey than less avid anglers.

Degree of accuracy - precision analysis

The target sample size for the mail survey (n=1500) is based on the level of precision desired for (1) the responses to categorical questions, and (2) the trip expenditure estimate.

(1) Categorical responses

The vast majority of questions in the mail survey are categorical in nature – i.e., require the angler to ‘check off’ one or more of the alternative responses provided rather than enter a number. Given the diversity of these questions and limited prior knowledge regarding how anglers will respond to them, sample size determinations for categorical questions were based on a wide range of possible outcomes regarding the proportion of anglers who ‘check off’ a particular response to a question. For purposes of this survey, a margin of error of ±10% to ±20% was deemed acceptable for estimating proportions. Table B-2 illustrates what several margins of error within this range (±10%, ±15%, ±20%) imply for a wide range of proportions $0.10 \leq p \leq 0.90$.

Table B-2. Margins of error for $0.10 \leq p \leq 0.90$, calculated as 10%, 15% and 20% of p			
Proportion (p)	Margin of error (m) ¹		
	±10%	±15%	±20%
0.10	±0.0100	±0.0150	±0.0200
0.15	±0.0150	±0.0225	±0.0300
0.20	±0.0200	±0.0300	±0.0400
0.25	±0.0250	±0.0375	±0.0500
0.30	±0.0300	±0.0450	±0.0600
0.35	±0.0350	±0.0525	±0.0700
0.40	±0.0400	±0.0600	±0.0800
0.45	±0.0450	±0.0675	±0.0900
0.50	±0.0500	±0.0750	±0.1000
0.55	±0.0550	±0.0825	±0.1100

0.60	±0.0600	±0.0900	±0.1200
0.65	±0.0650	±0.0975	±0.1300
0.70	±0.0700	±0.1050	±0.1400
0.75	±0.0750	±0.1125	±0.1500
0.80	±0.0800	±0.1200	±0.1600
0.85	±0.0850	±0.1275	±0.1700
0.90	±0.0900	±0.1350	±0.1800

¹Margin of error defined here as 10%, 15% and 20% of p rather than as absolute difference from p . (e.g., for $p = 0.25$, a margin of error of 15% is not 0.25 ± 0.15 but rather 0.25 ± 0.0375 , where $0.0375 = 0.25 * 0.15$).

For purposes of interpreting responses to many of the categorical questions in the mail survey, it will be important to distinguish salmon anglers from non-salmon anglers. Based on results from the CDFW creel survey indicating that 36% of fishing trips on the Sacramento River system are targeted at salmon, it is assumed that about 36% (540) of the 1,500 mail surveys will be completed by salmon anglers and 64% (960) by non-salmon anglers. Figure B-1 depicts the number of salmon and non-salmon anglers expected to respond to the mail survey and the sample sizes needed to estimate proportions in the range $0.10 \leq p \leq 0.90$ with margins of error $\pm 10\%$, $\pm 15\%$ and $\pm 20\%$ at a 95% confidence level.¹

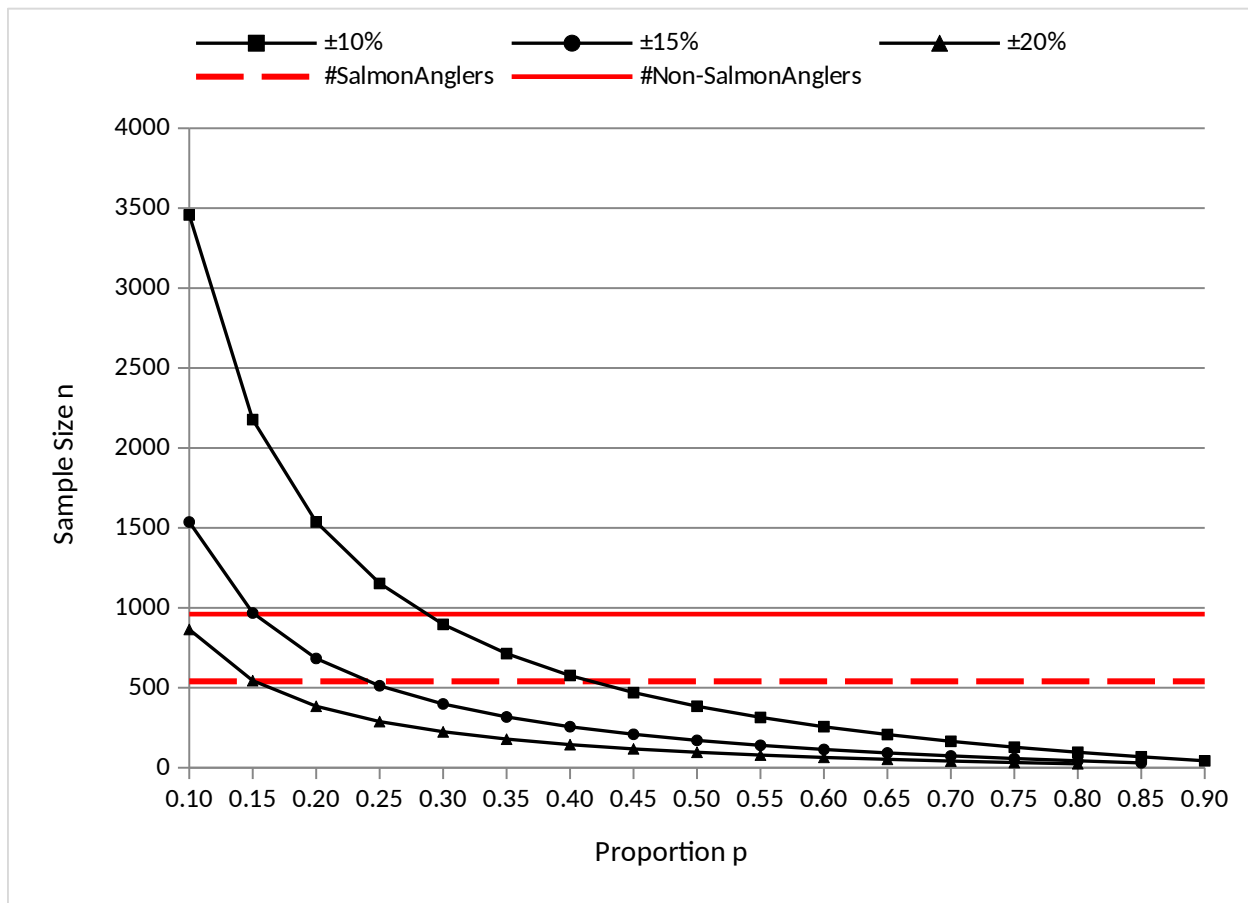


Figure B-1. Sample sizes needed to estimate proportions $0.10 \leq p \leq 0.90$ with 95% confidence when margin of error is $\pm 10\%$, $\pm 15\%$ or $\pm 20\%$.

¹ Sample sizes calculated as $n = (1.96/m)^2 * p * (1 - p)$, where m pertains to the $\pm 10\%$, $\pm 15\%$ and $\pm 20\%$ margins of error shown in Table B-2 for $0.10 \leq p \leq 0.90$.

For salmon anglers (n=540), $\rho \geq 0.40$ can be estimated with $\pm 10\%$ precision, $\rho \geq 0.25$ with $\pm 15\%$ precision, and $\rho \geq 0.15$ with $\pm 20\%$ precision. For non-salmon anglers (n=960), $\rho \geq 0.30$ can be estimated with $\pm 10\%$ precision, $\rho \geq 0.15$ with $\pm 15\%$ precision, and $\rho \geq 0.10$ with $\pm 20\%$ precision. Thus an overall sample size of 1,500 completed surveys is expected to yield responses to categorical variables by salmon and non-salmon anglers that can be estimated within acceptable margins of error $\pm 10\%$ to $\pm 20\%$.

2. Trip expenditures.

For purposes of this survey, a margin of error of $\pm 10\%$ was deemed acceptable for estimating mean expenditures per angler day. Table B-2 provides summary statistics on expenditures per angler day, estimated from trip data for the Sacramento River collected in NOAA Fisheries' 2004 Salmon/Steelhead Angler Survey.

Table B-3. Expenditures per angler day for fishing trips on the Sacramento River ¹		
<i>Mean</i>	<i>Standard deviation</i>	<i>n</i>
73.98	113.37	290
¹ Source: NOAA Fisheries' 2004 salmon/steelhead angler survey		

Assuming that the statistics in Table B-2 are relevant to the proposed survey, a sample size of n=939 is expected to be adequate for estimating mean expenditures per angler day with a $\pm 10\%$ margin of error at a 95% confidence level. Thus the sample size of n=1500 is expected to be more than adequate for estimating mean trip expenditures at the desired level of precision.

Table B-4. Sample size needed to estimate expenditures per angler day		
<i>Confidence level</i>	<i>Tolerable error</i>	<i>Required n¹</i>
95%	$\pm 10\%$ (± 7.4)	939
¹ Required $n = 4 * \text{StandardDeviation}^2 / (\text{Tolerable error}^2)$		

3. Describe the methods used to maximize response rates and to deal with nonresponse. The accuracy and reliability of the information collected must be shown to be adequate for the intended uses. For collections based on sampling, a special justification must be provided if they will not yield "reliable" data that can be generalized to the universe studied.

Several steps will be taken to maximize response rates and address nonresponse bias.

Maximizing response rates

Telephone screener

To increase telephone response rates, the survey contractor will make up to 4-6 attempts to call license holders randomly selected from the sample frame, and will vary the calls by time of day and day of week. Anglers who do not answer their phone but later call the contractor's number that shows up on caller ID will hear a recorded message indicating the purpose of the call. By

making them aware that the call was not for marketing purposes, anglers may be more receptive to picking up the phone the next time they get a call from this number. Also, telephone screeners employed by the survey contractor have an average 2-5 years of experience with angler surveys, so are well versed in engaging anglers and soliciting their cooperation.

Mail survey

Developing an appealing and understandable survey instrument is important for achieving high response rates. NOAA Fisheries economists with survey expertise and the survey contractor were consulted extensively regarding the format and wording of the survey. Biologists and managers from CDFW and NOAA Fisheries with expertise on Central Valley fisheries and/or salmon habitat restoration (including fish passage) were also consulted. A GIS analyst produced multiple iterations of the map to improve clarity. Four focus groups were conducted in Sacramento to ensure that key concepts and terms were correctly used and understood, and for evaluating the overall design, format, and length of the questionnaire. A self-addressed, stamped envelope will accompany the questionnaire, to encourage response.

The implementation protocol that will be employed for the mail survey is based on methods suggested by Dillman, et al. (2009), as summarized in Table B-4. Steps 1-3 will apply to anglers who respond to the first survey mailing, and steps 1-5 will apply to all other anglers (including those who subsequently respond to the second mailing or do not respond at all). Based on the NOAA Fisheries contractor’s prior experience with saltwater angler surveys involving random telephone interviews with a mail follow-up, about 70% of anglers who respond to the mail survey are expected to do so after the first mailing.

Table B-5. Steps of mail survey protocol and applicability to anglers who respond to the first survey mailing and other potential respondents		
<i>Steps of mail survey protocol</i>	<i>Anglers who respond to first survey mailing</i>	<i>Other potential respondents¹</i>
1. Once selected through a telephone screener, an <i>advance notice letter</i> will be mailed to notify respondents that a survey will be sent to them in the next few days. This letter will identify the survey as a NOAA Fisheries-sponsored study, will emphasize the voluntary nature of the survey and the importance of their participation.	X	X
2. A few days following the advance notice letter, the <i>survey questionnaire</i> will be mailed to respondents. The survey will include an introductory letter that will explain the purpose of the survey, the sponsor, that participation is voluntary, and the importance of their participation. Surveys will be self-administered.	X	X
3. A <i>thank you postcard</i> will be mailed one week after the survey questionnaire. This postcard will thank respondents who have completed the survey and urge respondents who have completed but not yet mailed it to please do so soon.	X	X
4. A <i>replacement survey</i> will be mailed to non-respondents 3 to 4 weeks after the initial survey was mailed. This mailing will indicate that the initial survey was not received and will urge the respondent to please complete the replacement.		X
5. A <i>final postcard</i> will be mailed approximately 2 to 4 weeks after the replacement survey mailing. Similar to the thank you postcard above, it will thank respondents who have completed the survey, and urge those who have not to please do so and mail it in soon.		X

¹Includes anglers who respond to the second mailing and anglers who do not respond at all to the survey.

All of the letters and postcards that will be sent as part of the Dillman method outlined above are included in this submission.

Nonresponse bias

The telephone screener will include a question regarding angler avidity (number of days fished on the Sacramento River system in the past 12 months). If avidity differs significantly between telephone survey respondents and the subset of telephone respondents who complete the mail survey, mail survey responses will be weighted as needed to correct for non-response bias. This is based on the expectation that more avid anglers will be more likely to return the mail survey than less avid anglers.

4. Describe any tests of procedures or methods to be undertaken. Tests are encouraged as effective means to refine collections, but if ten or more test respondents are involved OMB must give prior approval under the Paperwork Reduction Act.

As indicated above, focus groups were conducted to improve the design of the survey instrument. The material covered in each focus group varied, depending on feedback received from the previous group. No more than nine members of the general public were included in

each focus group. A summary of the notes taken from the focus groups is included in this submission.

5. Provide the name and telephone number of individuals consulted on the statistical aspects of the design, and the name of the agency unit, contractor(s), grantee(s), or other person(s) who will actually collect and/or analyze the information for the agency.

The following individuals were consulted on the statistical aspects of the design and will be responsible for analyzing the data collected:

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Reference

Dillman, D.A., Smyth, J.D., and Christian, L.M., 2009. *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method*, third edition. John Wiley & Sons, Inc.: Hoboken, New Jersey, 499 p.