Evaluation of Phone and Mail Survey Methods for Estimating Effort in the Oregon Shore and Estuary Boat (SEB) Fishery- A Pilot Study

FY 2016 Proposal

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1. Overview

1.1. Sponsor

Steve Williams, Pacific States Marine Fisheries Commission, RecFIN

1.2. Focus Group

Survey Design and Evaluation

1.3. Background

Marine finfish catch from Oregon bays, estuaries, and shores have not been sampled since 2005, when a shore and estuary boat survey (SEBS) ended due to lack of funding. The SEBS program replaced the shore and estuary component of the Marine Recreational Fishery Statistics Survey (MRFSS) of the National Marine Fisheries Service in 2003. Fishing effort and status of some fish stocks may have changed for shore and estuary fisheries since 2005. This possibility led to the Oregon Department of Fish and Wildlife's (ODFW) decision to evaluate whether to re-initiate the SEBS program.

The ODFW currently conducts the Ocean Recreational Boat Survey (ORBS) to provide recreational catch estimates for finfish in open-ocean waters by sampling nearly the entire universe of private and charter recreational ocean fishing trips. For private vessels, real time bar crossing counts, digital video bar crossing counts, and in person trailer/slip counts are conducted daily from 4:15 am to 8:15 pm for the limited number of ports suitable for safe ocean access. Adjustments are made for "night" counts based on ratios of departure times in the dockside survey. Total effort for recreational charter vessels is collected by contacting charter offices directly for a count of their trips and trip types. Sampling or observing nearly all fishing trips to enumerate effort is not practical for a SEBS program, because there are nearly unlimited access points for shore anglers and numerous launches for estuary boats. A phone or mail survey is thus necessary for estimating recreational fishing effort in a SEBS program.

The National Research Council showed the inefficiency of telephone surveys and demonstrated bias of these surveys due to limited land based telephone numbers (NRC 2006). The 2003-2005 Oregon SEBS phone survey, which relied on an angling license frame, showed that approximately 30% of the potential subjects in the sample frame lacked phone numbers (Joyce Revlett, CIC Research, personal communication). That survey also showed a 53-58 percent response rate for samples with phone numbers. California and Washington also saw approximately 50% response rates for phone interviews during 2003-2005, but those rates have fallen to 30% for California and 25% for Washington in recent years (Joyce Revlett, CIC Research, personal communication). Similar reductions in phone response rates have been described for East coast phone surveys. The NRC review (2006) demonstrated a decline in landlines with a corresponding increase in cell phone use. This inverse relationship between landline use and cell phone use has continued since that publication: Blumberg and Luke (2014) showed that adults with only wireless service (and no landline service) increased from approximately 15% in 2006 to 37% in 2012. They also demonstrated numerous demographic differences for wireless-only users, which may cause increased demographic bias of phone surveys to estimate effort relative to what was observed during the previous SEBS program.

Though recent studies funded by the Marine Recreational Information Program (MRIP) indicate that mail surveys (a) have become more cost-effective, (b) may produce significantly different and possibly more accurate effort estimates, and (c) may result in higher response rates than phone surveys (e.g., Andrews et al. 2014), substantial directional differences in effort between the phone and mail surveys indicate that one or both could be biased. Prior to conducting a long-term SEBS survey, the ODFW proposes a pilot study described herein to determine the most statistically valid method for estimating effort in the shore and estuary boat fisheries (see Methods). If this pilot study corroborates the results of Andrews et al. (2014), which indicated that mail surveys may now be more accurate than phone surveys, then simultaneously conducting both types of surveys may be necessary to develop adjustment factors to link the 2003-2005 SEBS results to the outcome of this pilot study and future SEBS results.

The proposed surveys (hereafter referred to as Oregon Marine Phone and Mail Surveys) will identify ocean boat, estuary boat, and shore fishing subsamples. The proposed survey design will allow ODFW to ground-truth phone and mail survey results for ocean boat effort against the estimates produced by ORBS. The survey method that most closely matches the estimates of ORBS for ocean boats would presumably be better suited for long-term shore and estuary effort estimates, and any potential biases could be further investigated with survey design changes or adjusted with scaling factors.

The effort estimates obtained by this proposed project will be used to generate catch estimates using catch-per-angler data that will be collected by ODFW using funds provided by the Saltonstall-Kennedy (SK) grants program. These funds were obtained by Pacific States Marine Fisheries Commission (PSMFC) Recreational Fisheries Information Network (RecFIN). The SK funded pilot study will be designed to test and evaluate methods for an intercept survey of shore and estuary anglers. The SK grant will fully cover the angler intercept pilot study, which will be reduced spatially (e.g., central-Oregon coast only) and temporally (e.g., May – October) relative to a full-scale program. The angler intercept study design will implement changes that were recommended by an independent consulting group (see Breidt et al., 2013) relative to the 2003-2005 Oregon SEBS program. Those recommended changes will likely result in marked improvements for the angler intercept survey relative to the 2003-2005 program.

The benefits of this proposed comparative study will be far greater than simply initiating a new SEBS program in Oregon or for providing effort estimates for the angler intercept pilot study. First, historic estimates of catch produced by the MRFSS and SEBS phone surveys could be calibrated with information obtained from this pilot study to improve stock assessments in Oregon (and possibly other states that previously used phone surveys). Furthermore, the comparisons made in this proposed study may be useful for determining the most precise and accurate method for future MRIP effort estimations. More accurate effort estimations could increase the confidence of anglers, fishery managers, and stock assessors in the reliability of catch estimates produced by SEBS programs.

The budget shown in this proposal is higher than the budget shown in the preproposal. Details regarding budget increases can be found in the Methods and in Appendix B and Appendix C. The reviewers and MRIP may decide which budget (preproposal vs. proposal), or combinations of budgets, is necessary for the successful conduct of this study.

1.4. Project Description

This pilot study will compare recreational fishing effort estimates created with phone and mail surveys. Fishing effort will be estimated for (a) ocean boat, (b) estuary and bay boat, and (c) shore (including man-made structures). Effort estimates for ocean boat recreational fisheries will also be compared between (a) the phone survey and ORBS and (b) the mail survey and ORBS to evaluate potential bias relative to ORBS and to develop scaling factors. The ORBS effort estimate is based on sampling nearly the entire universe of private and charter recreational ocean fishing trips, and is therefore assumed to be mostly unbiased. The ORBS estimate of ocean boat effort and catch will not be changed as a result of this pilot study and will continue to be used for ocean boat effort estimates after the completion of this study.

Shore and estuary effort estimates will be applied to catch-per-angler estimates provided by a separate SK funded angler intercept survey. Scaling factors are needed to adjust for bias and to provide a link between catch estimates provided by this pilot study and catch estimates derived from the 2003-2005 SEBS. In addition, this project will (a) evaluate potential gatekeeper effects (e.g., Parsons et al. 1993; Andrews et al. 2014), and (b) provide a better understanding of potential biases associated with non-responses for mail surveys.

1.5. Public Description

1.6. Objectives

1. Design mail and phone surveys to estimate recreational fishing effort by (a) boats fishing in the ocean, (b) bank and shore fishermen in marine waters, and (c) boat fishing in bays and estuaries.

2. Compare ocean recreational boat fishing effort estimates between (a) phone survey and ORBS, (b) mail survey and ORBS, and (c) mail and phone surveys.

3. Assess potential bias of phone and mail surveys relative to effort estimates derived by ORBS; provide adjustment factors.

4. Determine whether demographic bias exists for the phone and mail surveys.

5. Evaluate differences in response rates between phone and mail surveys.

6. Provide catch estimates and variance by method for selected species and compare these catch estimates to 2003-2005 SEBS.

7. Describe fishing behavior across various dimensions (e.g., day vs. night, respondent demographics).

8. Identify reasons for nonresponse in the mail survey and test for nonresponse demographic bias.

1.7. References

Andrews, R., J. M. Brick, and N.A. Mathiowetz. 2014. Development and testing of recreational fishing effort surveys – testing a mail survey design. Final Report. Marine Recreational Information Program. July 31, 2014.

Andrews, R., J.M. Brick, N. A. Mathiowezt, and L. Stokes. 2010. Pilot test of a dual frame two-phase mail survey of anglers in North Carolina. Final Report. Marine Recreational Information Program. November, 2010.

Blumberg, S.J. and J.V. Luke. 2013. Wireless substitution: Early release of estimates from the National Health Interview Survey, July–December 2012, National Center for Health Statistics. Available: www.cdc.gov/nchs/nhis.htm

Breidt, J., Ginny Lesser, and J.Opsomer. 2013. Review of Oregon shore and estuary boat survey. Colorado State University and Oregon State University. July 3, 2013.

Brick, M., W.R. Andrews, and N. A. Mathiowetz. 2012. A comparison of recreational fishing effort survey designs. Marine Recreational Information Program. February, 2012.

NRC (National Research Council). 2006. Review of recreational fisheries survey methods. National Academies Press, Washington DC.

Parsons, J.A., T.P. Johnson, R.B. Warnecke, and A. Kaluzny. 1993. The effect of interviewer characteristics on gatekeeper resistance in surveys of elite populations. Evaluation Review 17:131-143.

Pollock K.H., C.M. Jones, and T.L. Brown. 1994. Angler survey methods and their applications in fisheries management. American Fisheries Society Special Publication Series No. 25.

2. Methodology

2.1. Methodology

Phone, mail, and visual (near-complete count) surveys will be used to evaluate potential variance and bias of the different estimates for recreational marine fishing effort. ODFW will implement concurrent phone and mail surveys designed to estimate Oregon recreational fishing effort for boats fishing in the ocean, boats fishing in bays and estuaries, and individuals fishing from the shore or man-made structures. These survey instruments will include variables derived from recent MRIP studies (e.g. Andrews et al. 2010, 2014; Brick et al. 2013) and from further discussions with internal and external experts.

Oregon Phone and Mail Survey Design: The survey designs will initially be based on the 2003-2005 Oregon SEBS program. The questionnaire used in the 2005 phone survey will be used as our starting point (Appendix A). Modifications will be made to the questionnaire based on recommendations by Breidt et al. (2013), (b) team members and external experts, and (c) proposal reviewers. Potential modifications include (a) simplification of the questions, (b) form design, and (c) adding demographic and other variables (e.g., to determine the percentage of anglers fishing without licenses). Questionnaires recently used in other surveys (e.g., Andrews et al., 2010, 2014; Brick et al., 2013) will be evaluated to improve the instruments used during this pilot study.

The 2003-2005 SEBS questionnaire (Appendix A) did not allow for comprehensive comparison between respondent groups. We intend to add demographic variables to the questionnaire to allow investigation of nonresponse bias. For example, nonresponse may be skewed by gender, age, angling experience (avidity), household income, or ZIP code.

Data Frame and Associated Bias: Primary interviews will use the Oregon Angling License database to obtain phone numbers, addresses, and other pertinent data. A certain percentage of anglers fish without a license (e.g., youth; see Andrews et al. 2010) which could bias a sample design derived from license data. Although this bias could be addressed using a dual frame method (e.g., Andrews et al. 2010, 2014), ODFW will evaluate the potential bias using data from the SK-funded angler intercept survey which will contain questions to determine if anglers have a license. This bias will also be evaluated by modifying phone and mail survey questions. This approach was recommended by Breidt et al. (2013), and can be used to calculate a scaling factor to adjust for potential bias. In addition, direct comparison of effort in the ocean recreational boat fishery between ORBS estimates and estimates from the Oregon mail and phone surveys for ocean effort will provide additional inference regarding this potential sampling bias caused by using the license database (see below).

Temporal and Spatial Scope: This study is designed to compare results to those of the 2003-2005 SEBS. As such, some aspects of the current project design should emulate the 2003-2005 SEBS design. Similar to 2003-2005 SEBS, these phone and mail surveys will be conducted in waves. This 2016 pilot study will be conducted during May-June, July-August, and September-October. Effort produced by these phone and mail surveys will be stratified by region: northern, central, and southern Oregon. The SK-funded angler intercept study will only be conducted in central Oregon. Hence, catch estimates will only be provided for the central Oregon region for comparison of catch between this pilot study and the 2003-2005 SEBS.

Fishing Area and Modes: Reported fishing areas and modes will be similar to data collected during the 2003-2005 SEBS to allow for direct comparisons. Areas fished will be (a) Ocean < 3 miles from shore and (b) inland marine. Fishing modes will be (a) man-made structure, (b) beach/bank, (c) party/charter boat, and (d) private/rental boat.

Operational Effort and Samples: The operational effort will occur in waves to obtain 1,500 telephone interviews and 1,500 mail interviews. Anticipating a 25% response rate (based on recent response rates for California and Washington phone surveys), a random sample of approximately 6,000 subjects will be required for each survey. Based on the 2003-2005 SEBS, these sample sizes should provide the precision needed to satisfy research objectives. Sample size calculations will be conducted to further refine these estimates using population variance from the 2003-2005 SEBS before the project is initiated.

Phone surveys will begin the first week following the end of each wave and will continue for two to three weeks until sample goals are reached, emulating the 2003-2005 SEBS. The timing for mail surveys will be similar to that described in Andrews et al. (2014). Survey packets will be mailed one week prior to the end of each wave. Additional mailings and contacts will be similar to that described by Andrews et al. (2014).

Conduct of Phone and Mail Surveys: Although ODFW staff will develop the instrument design, mail and phone surveys will be conducted by private contractors (e.g., CIC Research Inc.; www.cicresearch.com). ODFW staff will complete statistical analyses and compose the final report. This project proposal only requests MRIP funds for the contracted work. The remaining tasks will be funded by other sources.

$1 or $2 Incentive: A cash incentive will be used to maximize response rates for mail surveys. The preproposal described a $1 incentive that would be included with initial mail survey packets to encourage responses. The budgeted amount in the preproposal for this $1 incentive was $6,000. However, ODFW is requesting that the proposal reviewers consider increasing the budget to allow for $2 response incentives, based on increased response rates shown by Andrews et al. (2014) with this incentive. (See Appendix B for details.)

Assessing Non-response Bias in Mail Survey Component: To identify and adjust for potential nonresponse bias in the mail survey, a follow-up telephone survey will be conducted with a subsample of nonrespondents. This additional task will add $2,150 more to the preproposal budget. (See Appendix B for details.)

Stratification of Samples and Optimal Allocation: Phone and mail surveys will be designed to cover the entire state of Oregon, but will be stratified in a manner similar to that of the 2003-2005 SEBS phone survey. An optimal allocation (as opposed to proportional allocation) will be used to allocate the target sample size among three strata, based on ZIP codes. This license-frame stratification and allocation method, intended to increase precision, was recommended by Breidt et al. (2013). (See Appendix B for details.)

Comparison of ORBS and Oregon Phone and Mail Survey Effort Estimates: The ORBS effort estimates are assumed to be representative of a near complete census (= count) of ocean-boat fishing effort. The proposed Oregon Phone and Mail Survey will provide effort estimates for (a) vessels fishing in the ocean, (b) vessels fishing in estuaries and bays, and (c) individuals fishing from the shore or man-made structures. A three-way comparison of ocean-boat effort will allow ODFW to ground truth phone and mail survey effort estimates for boats fishing in the ocean, and these comparisons will facilitate calculation of scaling factors that may be applied to phone or mail data to adjust for bias. These analyses will also provide scaling factors that will allow for direct comparisons between 2003-2005 SEBS phone-survey results and the proposed mail-survey and phone-survey results. (See Appendix B for more details)

Gatekeeper Effect: To help minimize the gatekeeper effect (Parsons et al. 1993; Andrews et al. 2014), ODFW will emphasize that the unit of analysis will be the individual rather than the household during all mail and phone contact procedures. (See Appendix B for details.)

2.2. Region
Pacific

2.3. Geographic Coverage
The sample design includes the entire state of Oregon as well as nonresidents fishing in Oregon.

2.4. Temporal Coverage
All surveys will cover the same time period as the angler intercept survey (i.e., May–October).

2.5. Frequency
Phone and mail surveys will be conducted at the end of each wave during 2016.

2.6. Unit of Analysis
Angler will be the unit of analysis for the phone and mail surveys.

2.7. Collection Mode
Telephone and mail, using ODFW angling license frames. See Methods for more detailed information.

3. Communication

3.1. Internal Communication
The project team and team sponsor will communicate internally through (a) formal meetings of the entire team as deemed necessary, (b) group email correspondence, and (c) informal meetings and phone calls among selected team members. The team will meet quarterly, at minimum.

Formal meetings will be held in conference rooms and/or as webinars or phone conferences.

3.2. External Communication
The project team will formally communicate with MRIP staff by submitting quarterly project updates. More frequent contact with MRIP staff will be made via phone and email to ensure that this project successfully and efficiently moves forward. A final report will be prepared and submitted to MRIP. Results of this study will be presented at a national or regional conference.

4. Assumptions/Constraints

4.1. New Data Collection
Y

4.2. Is funding needed for this project?
Y

4.3. Funding Vehicle
Funds will be transfered through RecFIN of the Pacific States Marine Fisheries Commission.

4.4. Data Resources
No constraints specific to the phone and mail surveys. Historic data may be reviewed and/or used in identifying potential revisions to the survey. The 2003-2005 SEBS data are available through RecFIN.

The SK-funded angler intercept study will rely on effort estimates provided herein to expand catch-per-angler data into total catch estimates.

4.5. Other Resources
Limited ODFW staff time is available for this project. Some project tasks will be contracted (e.g., CIC Research) or leveraged by the SK-funded pilot study.

4.6. Regulations
None.

4.7. Other
The proposed project will provide new data collections. It will be partially funded by SK through RecFIN. Additional funds are needed from MRIP to complete this work. The funding vehicle will be through RecFIN of the Pacific States Marine Fisheries Commission.

Response rates may not be as high as projected. If this occurs, compensatory options may include increasing the budget (using other funds) or reducing the temporal scale (e.g. reduce to May – August) to maintain projected response rates per wave. Alternately, response rates may be higher than initially predicted, which would result in higher precision than anticipated.

The most critical assumptions are:
a. ORBS ocean-boat effort estimates are representative of a near-complete count of all ocean-boat effort (i.e., near complete census).
b. Proportional differences between ORBS, phone-survey, and mail-survey ocean boats effort estimates will be equivalent to the proportional differences for other fishing modes. Adjustment factors calculated from the ocean-boat comparisons will thus be applied to estuary boat and shore effort estimates.

5. Final Deliverables

5.1. Additional Reports
In addition to the Final Report, an interim report written by the contractor will be delivered.

5.2. New Data Set(s)
New SEBS data (effort) will be developed in this study and delivered.

5.3. New System(s)
None.

6. Project Leadership

6.1. Project Leader and Members

First Name	Last Name	Title	Role	Organization	Email	Phone 1	Phone 2
Jason	Edwards	Assistant Project Leader - Ocean Salmon Sampling	Team Member	Oregon Department of Fish and Wildlife, Marine Resources Program	Jason.L.Edwards@state.or.us	541-867-0300 x271	
Daniel	Erickson	Acting Manager - Data and Technical Services	Team Leader	Oregon Department of Fish and Wildlife, Marine Program	daniel.l.erickson@state.or.us	541-867-0300 x229	541-961-2053
Mark	Freeman	Project Leader - Marine Information Project	Team Leader	Oregon Department of Fish and Wildlife, Marine Resources Program	Mark.Freeman@state.or.us	541-265-8306 x229	
Edward	Hibsch	Database Programmer and Analyst	Team Member	Pacific States marine Fisheries Commission, RecFIN	ehibsch@psmfc.org	503-595-3100	
Patrick	Mirick	Acting Project Leader - Commercial Fisheries	Team Member	Oregon Department of Fish and Wildlife, Marine Resources Program	Patrick.P.Mirick@state.or.us	541-867-0300 x226	
Eric	Schindler	Project Leader - Ocean Recreational Boat Survey	Team Member	Oregon Department of Fish and Wildlife, Marine Resources Program	Eric.D.Schindler@state.or.us	541-867-0300 x252	
Maggie	Sommer	Manager - Marine Fisheries Section	Team Member	Oregon Department of Fish and Wildlife, Marine Resources Program	Maggie.Sommer@state.or.us	541-867-0300 x227	
Thomas	Swearingen	Project Leader - Marine Reserves Human Dimension	Team Member	Oregon Department of Fish and Wildlife, Marine Resources Program	thomas.c.swearingen@state.or.us	541-867-7701 x229	541-992-5898

First Name	Last Name	Title	Role	Organization	Email	Phone 1	Phone 2
Alison	Whitman	Marine Fisheries Analyst	Team Member	Oregon Department of Fish and Wildlife, Marine Resources Program	Alison.D.Whitman@state.or.us	541-867-0300 x284	
Linda	ZumBrunnen	Assistant Project Leader	Team Member	Oregon Department of Fish and Wildlife, Marine Resources Program	Linda.ZumBrunnen@state.or.us	541-867-0300 x260	

7. Project Estimates

7.1. Project Schedule

Task #	Schedule Description	Prerequisite	Schedule Start Date	Schedule Finish Date	Milestone
1	Preliminary Design of Phone and Mail Surveys: Much of the preliminary design will occur during the SK/RecFIN funded study by the project team and other external experts. This will include development of (a) survey questions and form design, (b) sampling methods, and (c) sampling designs. Subtasks are: (a) review historical SEBS documents, and (b) evaluate past SEBS methods, with emphasis on recommendations made by Breidt et al. (2013) to improve the Oregon SEBS program.		12/01/2015	03/31/2016	

Task #	Schedule Description	Prerequisite	Schedule Start Date	Schedule Finish Date	Milestone
2	Finalize phone and mail survey designs. The project team will work with an outside contractor to finalize the survey designs. The SK/RecFIN funding will be used to initiate work with the outside contractor, whereas MRIP funding is needed for most of this phase.	1	04/01/2016	05/31/2016	Y
3	Conduct of phone and mail surveys by an outside contractor. An outside contractor will conduct the phone and mail surveys. The surveys will be conducted immediately before and/or after the end of each wave.	1, 2	06/15/2016	11/30/2016	Y
4	Preparation of report by an outside contractor.	1, 2, 3	12/01/2016	01/31/2016	
5	Data analysis and preparation of the final report by the project team.	1, 2, 3, 4	02/01/2017	07/31/2017	
6	Final report submitted to MRIP.	1, 2, 3, 4, 5	07/31/2017	07/31/2017	Y

7.2. Cost Estimates

Cost Name	Cost Description	Cost Amount	Date Needed
Follow-up Phone Survey	Nonresponses from mail surveys will be sampled via phone surveys to to assess non-response bias.	$2150.00	06/01/2016
Preliminary Phone and Mail Survey Designs	Phone and mail surveys will be initially designed by the project team, under SK/RecFIN funded study	$0.00	06/01/2016

Cost Name	Cost Description	Cost Amount	Date Needed
Telephone Survey	Telephone survey will be conducted by the outside contractor.	$17942.00	06/01/2016
Mail Survey	Mail survey conducted by the outside contractor	$42329.00	06/01/2016
Incentive ($2.00)	Incentive to include within mail surveys ($2 per survey). Increased by $1 relative to preproposal.	$12000.00	06/01/2016
Contractor Report	Analysis and report generated by the outside contractor.	$5295.00	06/01/2016
Final Phone and Mail Survey Designs	Survey designs will be finalized by the outside contractor, in consultation with the project team.	$7829.00	06/01/2016
Indirect Cost (1.43%)	Pass through PSMFC, RecFIN	$1252.00	06/01/2016
TOTAL COST		$88797.00	

8. Risk

8.1. Project Risk

Risk Description	Risk Impact	Risk Probability	Risk Mitigation Approach
Response rates may not be as high as projected, which would result in lower precision than needed.	Inability to provide accurate effort estimates and to provide meaningful comparisons between phone and mail surveys.	Medium	Response rates will be monitored in real time during the first wave. Increased sampling of the angler license database within waves would be required either through (a) securing additional funds or (b) reducing the temporal scope of this project from 3 waves to 2 waves.
Inability to secure an outside contractor to conduct phone and mail surveys for the budgeted amount.	Either the quality of the results would be severely reduced, or the project would be prematurely terminated.	Low	The risk of not securing an outside contractor for the budgeted amount is low. The project sponsor contacted CIC Research prior to writing this proposal. The budget was developed by CIC Research. Hence, the project team understands that the budget is reasonable for securing an outside contractor.

9. Supporting Documents