

Estimating Recreational Fishing Effort from Onsite Survey Data

FY 2014 Proposal

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1. Overview

1.1. Sponsor

Rob Andrews

1.2. Focus Group

Survey Design and Evaluation

1.3. Background

The current Marine Recreational Information Program (MRIP) Access Point Angler Intercept Survey (APAIS) is an onsite survey designed primarily for estimating catch rate. The current method for estimating effort depends on data collected by telephone or mail survey. With catch rate estimated from onsite survey and effort from telephone or mail survey, catch is estimated as the product of catch rate and effort. Onsite survey has several advantages over telephone or mail survey. These advantages include more instant results, higher response rate, and no recall errors. However, onsite survey often suffers from the problem of undercoverage that arises when some anglers are not included in the sampling frame and therefore have no probability of being sampled. Also, onsite survey usually costs more per interview than telephone or mail survey. In addition to conducting interviews with eligible anglers the current APAIS includes counting all anglers and fishing boats that exit the site during the sampling period at each site visited. The counts of anglers and fishing boats obtained from the current APAIS provide a means of estimating effort. It may be possible to use the effort estimate from the current APAIS together with the effort estimate from the telephone or mail survey to obtain more accurate and/or precise effort estimate. A combination of the APAIS with the current telephone or mail survey will likely be able to overcome the disadvantages of independent surveys. Whether the effort estimate from the current APAIS can be used to improve the accuracy and/or precision of the effort estimate from the current telephone or mail survey, or vice versa, depends on whether the current APAIS design is adequate for estimating effort. Several issues concerning the adequacy of the current APAIS design for effort estimation remain to be resolved. Firstly, the sampling frame for the current APAIS is incomplete because it contains mainly public sites. A method for estimating effort that accounts for private sites needs to be developed. Secondly, the current APAIS records the number of anglers who completed their fishing trip in randomly selected time intervals within 6-hour time blocks. The number of angler-trips within a 6-hour time block is then estimated by expanding the average observed counts within these randomly selected time intervals by 6 hours. Questions concerning the validity of this approach remain to be answered. For examples, is counting only anglers who completed their trip during the selected time intervals an appropriate method for estimating angler-trips? This time interval counting approach assumes that anglers' exit time from the site is homogeneously or uniformly distributed within each 6-hour time block. Is this assumption valid? If not, how does violation of this assumption affect the effort estimate? Finally, some of the observed trips may not be confirmed as recreational fishing trips due to, for example, there is not enough time to intercept all anglers to confirm their trips. How do unconfirmed trips affect effort estimate? Moreover, effort can be estimated using instantaneous or progressive angler count data collected from creel surveys (Hoenig et al 1993). Effort estimated using instantaneous count is expressed normally in angler-hours or sometimes in angler-days. Using instantaneous count directly as an estimator of angler-trips in the day causes angler-trips to be underestimated (Hoenig et al 1993). However, whether and how instantaneous angler count data can help improve accuracy and/or precision of angler-trip estimate is a question of interest.

1.4. Project Description

To pave a way for investigating further the possibility of obtaining more accurate and/or precise effort estimate from the combination of the telephone or mail survey and the APAIS, we will first address several issues concerning the current APAIS. We will investigate the issue of incomplete sampling frame for the current APAIS with the assistance of the data collected by the current Coastal Household Telephone Survey (CHTS). The CHTS has collected data relevant to effort estimation for both public and private sites. Analyzing the proportion of the effort from public sites to the effort from private sites may provide a means to assess the degree of sampling frame undercoverage for the current APAIS. We will compare the effort estimate based on data from the current APAIS with that based on data from the telephone or mail survey. This comparison may help with the evaluation of the potential bias in these effort estimates. In addition, we plan to conduct simulation studies to evaluate the current APAIS design. Questions to be investigated by the simulation studies include: Is the current APAIS design appropriate for estimating effort and, if not, what improvements are needed? How does violation of the assumption for a uniform distribution of anglers' exit time from the site affect angler-trip estimate? How do the unconfirmed trips affect the accuracy of angler-trip estimate? We'll test approaches for improving the current APAIS for effort estimation. We'll also explore the use of instantaneous count data for improving accuracy and/or precision of angler-trip estimate. Furthermore, we will examine alternative approaches for obtaining expanded angler counts for 6-hour time blocks based on the 2013 APAIS count data and evaluate these alternative approaches using simulations and/or with the assistance of data from the CHTS and/or the for-hire telephone survey (FHTS). We may also consider a limited survey to collect counts at a random sample of sites over full 6-hour intervals. This limited survey would enable us to compare the expanded counts generated using the various methods to an observed count. It also informs trip end-time distributions for the proposed simulation studies and, if sample is sufficient, gives us another method for generating a design-based effort estimate for sites covered by the APAIS sampling frame.

1.5. Public Description

1.6. Objectives

The ultimate goal of this project is to pave a way for investigating further the possibility of improving accuracy and/or precision of effort estimate by combining the effort estimate from the current telephone or mail survey with the effort estimate from the APAIS. However, before attaining this ultimate goal, we will first address several issues concerning the adequacy of the current APAIS design for effort estimation. In particular, we will 1) evaluate the possibility of using the current APAIS to estimate effort, 2) develop proposals for improvement to the current APAIS for effort estimation, 3) explore the use of instantaneous angler count data for improving accuracy and/or precision of effort estimate.

1.7. References

Hoenig J. M., Robson, D. S., Jones, C. M., and Pollock, K. H. 1993. Scheduling counts in the instantaneous and progressive count methods for estimating sportfishing effort. North American Journal of Fishery Management 13: 723-736.

2. Methodology

2.1. Methodology

We will calculate effort from the existing data collected by the current APAIS. The effort estimate based on data from the current APAIS will be compared with the effort estimate based on data from the telephone or mail survey. We will investigate the sampling frame undercoverage issue of the current APAIS with the assistance of data collected by the telephone or mail survey. We will also conduct simulation studies to evaluate the current APAIS design, and test approaches for improving it, for the purpose of effort estimation.

2.2. Region

Gulf of Mexico, Mid-Atlantic, North Atlantic, South Atlantic

2.3. Geographic Coverage

2.4. Temporal Coverage

2.5. Frequency

2.6. Unit of Analysis

2.7. Collection Mode

3. Communication

3.1. Internal Communication

All team members will meet when needed to discuss the plan, progress, and issues identified during the study. The core team members of this study will provide the full team with updates on a monthly basis.

3.2. External Communication

Conference calls and on-site meetings with external statistical reviewers and consultants will be held when needed.

4. Assumptions/Constraints

4.1. New Data Collection

N

4.2. Is funding needed for this project?

Y

4.3. Funding Vehicle

New contract

4.4. Data Resources

Data collected by the current APAIS and telephone or mail survey.

4.5. Other Resources

External statistical reviewers and consultants

4.6. Regulations

4.7. Other

Whether the APAIS data can provide unbiased effort estimate depends on several assumptions. First, a complete sampling frame can be obtained for the APAIS, and if not, an appropriate method accounting for the undercoverage can be developed. Second, the distribution of anglers' exit time from the site within the time period covered by the survey is homogeneous. Third, all observed angler trips can be confirmed or the portion of unconfirmed trips is small enough not to cause significant bias in the angler-trip estimate. Forth, instantaneous angler counts can be used to improve accuracy of the effort estimate from the APAIS.

5. Final Deliverables

5.1. Additional Reports

A final study report will be submitted to the OT.

5.2. New Data Set(s)

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
Rob	Andrews		Team Member	NOAA Fisheries			
John	Foster		Team Member	NOAA Fisheries			
Han-lin	Lai		Team Member	NOAA Fisheries			
Dave	Van Voorhees		Team Leader	NOAA Fisheries			
Shizhen	Wang		Team Member	Contractor			

7. Project Estimates

7.1. Project Schedule

Task #	Schedule Description	Prerequisite	Schedule Start Date	Schedule Finish Date	Milestone
1	Identify sources and evaluate the quality of on-site data required for producing effort estimate		03/03/2014	03/30/2014	
2	Develop and test statistical methods for producing effort estimate from on-site survey data	1	04/01/2014	10/31/2014	Y

Task #	Schedule Description	Prerequisite	Schedule Start Date	Schedule Finish Date	Milestone
3	Develop proposals for improvement to the current APAIS for effort estimation		11/03/2014	12/31/2014	Y
4	Prepare final report that includes description of methods, identified problems, and recommendations		01/01/2015	06/30/2015	

7.2. Cost Estimates

Cost Name	Cost Description	Cost Amount	Date Needed
Consultant support		\$30000.00	04/01/2014
TOTAL COST		\$30000.00	

8. Risk

8.1. Project Risk

Risk Description	Risk Impact	Risk Probability	Risk Mitigation Approach
None identified	None identified	Low	N/A

9. Supporting Documents