MARINE RECREATIONAL INFORMATION PROGRAM

Oregon Shore & Estuary-Boat Survey (SEBS): Survey Design Review

FY12 Final Project Report

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1 Project Description

1.1 Background

The Shore and Estuary Boat Survey (SEBS), conducted by the Oregon Department of Fish and Wildlife (ODFW), is a state survey designed to estimate catch and effort of Oregon's non-anadromous marine recreational fisheries from shore and from estuary boats. SEBS was conducted from July 2003 through June 2005.

During the period in which SEBS occurred, catch and effort estimates were derived from two complementary surveys: (1) an intercept survey to determine catch-per-unit-effort and average weight by species; and (2) a telephone survey of angling licensees to generate an estimate of angler trips. Results from both surveys were combined to generate catch estimates in numbers of fish and by weight.

The ocean shore and estuary-boat recreational fisheries in Oregon have not been sampled since 2005 because of a lack of funding. Because the levels of catch and effort in the shore and estuary-boat components of Oregon's recreational marine fisheries are very small compared to those in the ocean-boat component, lack of recent survey data is not expected to have a significant impact on overall recreational harvest estimates for non-anadromous marine species (hence the relatively low priority assigned to conducting the SEBS when resources are limited). However, periodic implementation of the SEBS would provide data that could be used to verify or modify current assumptions about catch and effort level in the shore and estuary-boat fisheries. The Marine Recreational Information Program (MRIP) provided funding for a review of the design by experts in statistical survey design familiar with recreational fishery data collection.

1.2 Project Objectives

The project objectives were to review and update the Oregon Shore and Estuary-Boat Survey design and expansion procedures in accordance with current MRIP reviews for this type of sampling, to ensure the SEBS design meet current expectations for scientific validity and cost-effectiveness.

2 Methods

ODFW recreational fisheries staff collaborated with several consultants with expertise in statistical survey design to review and update the SEBS methodology.

1. ODFW fishery management staff identified current and anticipated future data needs regarding catch and effort in the ocean shore and estuary-boat sectors of Oregon's recreational fishery.
2. Documentation of the past (2003-2005) SEBS program was provided to the consultants for review. The data needs (including elements such as the timeframe in which the data must be received by fishery managers and other end users) identified in step 1 were also provided to the consultants.

3. The consultants reviewed the materials provided and made recommendations on modifications to the past SEBS design in order to provide the required data in a cost-effective and logistically simple manner.
4. ODFW staff reviewed the consultants' recommendations. Responses to several are included below.

3 Results

The consultants provided a report (attached) documenting their assessment of the Shore and Estuary-Boat Survey design and estimation approach. The report contained several recommendations specific to SEBS. In addition, they found that the overall approach is similar to the Marine Recreational Fisheries Statistical Survey (MRFSS), and noted that the findings and recommendations in the report, "A Pilot Study of a New Sampling Design for the Access Point Angler Intercept Survey", which documented a project in North Carolina and was submitted to the MRIP Design and Analysis Workgroup in 2012, will apply to SEBS.

4 Discussion

The consultants made the following recommendations specific to SEBS. Recommendations from the North Carolina pilot study report are not included here due to length, but a copy of that report is attached:

1. Reduce sampler discretion and potential selection bias by formalizing sampling design and instructions as described in the North Carolina pilot study report.
    a. ODFW comment: Some areas that the consultants identified as unclear in their final report are covered in specific details in the SEBS sampler instruction manual, which we failed to provide to the consultants. Opportunities to reduce the potential for bias by further formalizing the design and instructions exist and will be explored.
2. Determine whether including private sites and night fishing in the SEBS coverage would be valuable.
    a. ODFW comment: The number of private sites in Oregon is minimal. A question on timeframe of fishing could be incorporated into the effort survey, and responses used to inform a decision about the value of night sampling.
3. Ensure that newer estimation procedures that take into account design elements including clusters (site-days) and unequal probabilities, which were developed for MRIP and implemented as part of the North Carolina pilot, are used here.
4. Periodically review the allocation of effort across three geographic regions in the license frame telephone survey used to collect data on angling effort, to ensure the allocation remains appropriate.

   a. ODFW comment: We will also consider use of an annual or semi-annual mail survey to estimate effort, instead of a telephone survey. A mail survey could be conducted at a much lower cost, and as estimates from these sectors are not needed for real-time fishery management, annual estimates developed after the end of a fishing year would satisfy timing requirements.

5. Consider calibrating (or post-stratifying) the estimates to known license or population information, or to site-day level information such as weather or tide information.
   a. ODFW comment: Site-specific weather and tide information is not currently available for all sites, but could be developed, perhaps to a larger geographic scale (county or site-group rather than site) with some effort.
6. Consider combining SEBS with Oregon's Ocean Recreational Boat Survey (ORBS), which produced effort and catch estimates for the ocean boat component of Oregon's marine sport fisheries, in order to achieve operational efficiencies and reduce the potential for confusion among interviewed anglers.
   a. ODFW comment: Angler-intercept interviews could be made more consistent between the two projects, and periodically adding additional seasonal sampling staff to the ORBS project to conduct SEBS interviews can be considered. Combining ocean-boat and estuary-boat sampling would eliminate situations where one boat is intercepted by two different ODFW samplers (inefficient, and confusing for the anglers). Effort estimation is the major point of difference between SEBS and ORBS (the latter benefits from the limited number of ocean access points and the implementation of video monitoring to obtain boat counts, whereas shore and estuary-boat angler access points are too numerous to use on-site effort counts).

5 Conclusions

The review of Oregon's Shore and Estuary-Boat Survey and recommendations contained in the consultants' report on this project and on the North Carolina pilot project will be used to ensure that SEBS meets the current standards for this type of survey, and is cost-effective while doing so. No major changes were recommended, but a number of potential areas of improvement were identified. In addition, ODFW will continue to explore the possibility of replacing the telephone survey with a mail survey to collect effort data, in order to further reduce the overall cost of SEBS, which will improve the likelihood of its future implementation.

Review of Oregon Shore & Estuary Boat Survey

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July 3, 2013

We have been asked to review the design and estimation approach of the Oregon Shore and Estuary Boat Survey (SEBS), based on a set of 2006 materials that describe the survey as it was last conducted in 2003-2005 and scheduled to be conducted in 2008. Broadly speaking, the approach parallels that of the MRFSS design and estimation as currently still conducted along the East Coast, with an on-site survey of anglers to estimate catch per trip and a telephone survey to estimate the total number of trips. Unlike in MRFSS, the latter survey uses a frame of angling licenses rather than a general telephone number (RDD) frame. Because the overall approach is similar to MRFSS, the survey is subject to many of the same strengths and weaknesses as MRFSS as well, and the findings and recommendations of the North Carolina pilot will apply to SEBS. We further discuss some of the specific aspects of SEBS in the rest of this document.

On-site Intercept Survey

The data for the catch/trip estimation is collected through on-site intercepts. The sites are sampled from a site list, and the sampling design is stratified PPS (probability proportional to angling pressure), with stratification done by wave, mode and kind-of-day. This follows the MRFSS approach closely and is an appropriate design for this type of survey. As for the MRFSS, however, the sampling design has a number of aspects that are not fully formalized and hence can introduce selection bias, because they allow the samplers a lot of latitude of how to select when and where to sample:

- it is not clear whether specific site-days are selected, or only a number of times a site has to be visited in a stratum,
- alternate sites are allowed, for which selection probabilities cannot be computed,
- start and end times of assignments are not predetermined,
- sampling of anglers at the sites appears to be fairly informal; from page 7, "Samplers interview as many eligible anglers as possible during their work day", with no specific methods for random selection of eligible anglers if the sampler cannot interview everyone. Similarly, "If an angler has more than 10 individuals of a species, then a subsample of 10 is measured," with no specifics as to how this subsample should be selected.

Private sites and night fishing are explicitly excluded from consideration in SEBS, for practical considerations. The document indicates that those are likely to be minor components of the overall fishing, and this undercoverage might be indeed unavoidable.

An important aspect of the North Carolina pilot project was to formalize the sampling procedures and remove sampler discretion as much as possible. We recommend that the procedures developed there be considered for SEBS to the extent possible.
The estimation procedure for the intercept survey data is not described in the document. Because the design involves clusters (the site-days) and unequal probabilities, it is important that these aspects be included in the estimation. That was not the case for MRFSS, so the newer estimation procedures developed for MRIP and implemented as part of the North Carolina pilot should also be used here.

Effort Survey

Data on angling effort (number of trips) is collected through a telephone survey of license holders, conducted each wave. Compared to a general population sample from an RDD frame, sampling from a license frame results in a significant increase in efficiency since a larger fraction of sampled households participate in angling. But the license frame increases the potential biases due to undercoverage, as acknowledged in the reviewed documents. The license frame is stratified in three geographic regions and the allocation is adjusted to increase the precision of the estimates, which is certainly recommended given the expected differences in angling frequency among the regions. This allocation should be reviewed periodically to ensure it remains appropriate. Sampling of individual license holders within the strata is done by simple random sampling of telephone numbers.

This sampling approach is certainly appropriate for this survey. One possible approach to remove the undercoverage of the license frame while retaining much of its efficiency is to conduct a dual-frame survey. However, that might be too expensive to be practical on an on-going basis. Alternatively, as appears to be done in the SEBS, the on-site survey can be used to obtain an adjustment factor for the fraction of trips not covered by the license frame. This is also the approach used in the MRFSS to account for non-telephone anglers and for anglers not residing in a coastal county (and hence not captured by the RDD frame). An important issue in using a license frame is the quality of the contact information, with the report noting that 30% of the licenses did not have a telephone number. Reducing this number would ensure that the data are of high quality.

Given the relatively simple design of this survey, the estimates can be computed using standard formulas, which are described in the reviewed documents. Potential improvements to consider are to calibrate (or post-stratify) the estimates to known license or population information, or to site-day level information such as weather or tide information. In the latter case, it is important that this information be collected for all sites and all days, not only on the site-days visited by the interviewer.

Other Issues

One topic that might be worth some consideration is whether it is necessary or desirable to have a survey for estuaries and, to a lesser extent, shores, that is separate from the ORBS. One of the difficulties with having two separate surveys is to define their

respective scopes, which is mentioned in a number of places in the reviewed documents. For instance in the current SEBS, both on-site and on the telephone, the interviewers are supposed to determine the targeted species of each trip, which is both cumbersome and leads to some missed recreational catch (of marine fish caught during trips targeting anadromous fish). Similarly, there might be confusion in the mind of telephone respondents to determine whether a trip is within the SEBS scope (fresh-water vs. estuary vs. ocean). Having a single survey might also result in operational efficiencies, with a single design, a single set of interviewers and similar or coordinated questionnaires.

https://www.st.nmfs.noaa.gov/mdms/public/finalReport.jsp?ReportID=672

A Pilot Study of a New Sampling Design for the Access Point Angler Intercept Survey

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This 2009 report is 222 pages long. The Table of Contents and Executive Summary are included here for reference. The full report is availalbe at: https://www.st.nmfs.noaa.gov/mdms/public/finalReport.jsp?ReportID=672

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1. Executive Summary

An expert review conducted by the National Research Council (2006) identified problems in the Access Point Angler Intercept Survey (APAIS, or "intercept survey") that the NOAA Fisheries Service has conducted for many years as a component of the Marine Recreational Fisheries Statistics Survey (MRFSS). The survey estimators and measures of precision were not accounting for the complex sampling design, the data collection protocols were combining formal randomization with subjective decision-making in ways that make it difficult to develop statistically valid estimators, and the spatiotemporal sampling frame was not providing coverage of fishing trips ending on private property or at night.

The Marine Recreational Information Program's Design and Analysis Work Group (DAWG) initiated work in 2008 to address these concerns with the help of expert consultants. A first project completed in 2011 produced a new weighted estimation method that appropriately accounts for the MRFSS sampling design (Breidt et al., 2011). The NOAA Fisheries Service subsequently applied this method to produce design-unbiased annual estimates of 2004-2011 total finfish catches for the Atlantic and Gulf of Mexico. A second project initiated in 2009 focused on developing a new sampling design for the intercept survey that would address additional NRC concerns about the data collection protocols and temporal coverage of sampling, as well as specific recommendations provided by Breidt et al. (2011) to further improve its statistical validity and accuracy. This report describes the results of a 2010 pilot study conducted in North Carolina that tested the feasibility of implementing this new sampling design and assessed its effects on various measures of survey performance through side-by-side comparisons with the ongoing MRFSS APAIS sampling. This study did not aim to evaluate the relative merits of the two designs for the purpose of determining which one is better to use in future years, but rather it focused on developing a better understanding of how the changes to the new design would potentially affect sampling efficiency, statistical accuracy, and statistical precision going forward. This information is needed for assessing any possible needs for further modification that would ensure efficient and effective coastwide implementation of the new sampling design.

This report is 222 pages long. The full report is availalbe at:
https://www.st.nmfs.noaa.gov/mdms/public/finalReport.jsp?ReportID=672