Implementation of Probability Based Sampling methods for Southeast Region Headboat Survey Intercept Sampling Program

FY 2010 Proposal

Kenneth Brennan
Created: 05/13/2015

1. Overview

1.1. Sponsor

1.2. Focus Group

Survey Design and Evaluation

1.3. Background

The National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) is required to collect statistics on marine recreational fishing. The NMFS uses numerous data collection programs, including surveys and census techniques, to gather information on marine recreational fishing effort and catch. One of the longest running programs used to collect marine recreational fishing statistics is the Southeast Region Headboat Survey (SRHS), operated by the NMFS Beaufort Laboratory since 1972. This survey currently operates from North Carolina through Texas and collects fishing statistics from headboats (large for-hire fishing vessels licensed to carry more than six passengers).The SRHS consists of two complementary components: dockside bioprofile sampling by trained port agents, and paper logbooks (daily trip reports) collected from the vessel personnel for each trip. Improvement to the logbook program is the focus of a separate proposal to the MRIP Operations Team. This proposal focuses on an area identified by the For Hire Review Panel's recent report, needed improvements in the design of the SRHS dockside intercept survey.The purpose of the intercept survey is to get length measurements and weights from harvested fish for the generation of average weights by species, stratified by time and area. These average weights are multiplied by the numbers of fish landed (estimated from the logbook portion of the survey) to calculate an estimated overall catch. Additionally, the SRHS intercept survey includes the collection of biological materials such as otoliths and gonads for the estimation of life history parameters of important species. The SRHS collections have served as the basis for multiple age-growth studies that have provided critical age-frequency distributions for use in the SEDAR stock assessment process in recent years.Port agents in the SRHS are responsible for a specific geographic area (e.g., Florida Keys). For vessel selection, agents are instructed to systematically sample vessels in their area of responsibility on a rotational schedule in order to sample all vessels as equally as possible. Some vessels run more often than others and thus are likely to be sampled more frequently. Typically, once agents have sampled a frequently running vessel, they concentrate on getting samples from vessels that run infrequently. When deciding which vessels to sample, they note who they have and have not sampled already that month. They are instructed to try to sample all vessels once, and then start over.Samplers have considerable freedom in devising their sampling agenda.

1.4. Project Description

Once a vessel has been identified for sampling, anglers are selected when a headboat unloads and the crew starts passing out fish. A port agent approaches an angler and asks to measure and weigh the catch, explaining that this is part of a fish survey to obtain biological information. Most anglers willingly cooperate with the sampling. Port agents are instructed to select anglers whose stringers contain less common species. The assumption is that stringers with less common fish will also contain the more common fishes caught by anglers on the trip, and thus port agents will obtain a sample of the catch consisting of both common and uncommon species.Port agents are instructed to sample all fish on the initial stringer. Once ten measurements are taken from a species, sampling that species from subsequent stringers is omitted, allowing the port agent more time to choose species for which they have fewer than 10 measurements.In reviewing these procedures, the For-Hire Review Panel noted in its recent report about the SRHS intercept survey that:"On site vessel selection appears to be very opportunistic with few details listed as to how vessels are sampled, except on a convenience basis? The instructions advise interviewers to systematically sample vessels in their area of responsibility on a rotational schedule in order to sample all vessels as equally as possible; but no details are provided as to specific procedures used to accomplish that? Oversampling of frequently running vessels is acknowledged. Anglers on a selected boat are a population. The current selection of anglers departing the boat is a convenience sample, with no procedures in place to assure randomness."The Review Panel recommended:-Anglers on a selected boat are a population. The current selection of anglers departing the boat is a convenience sample, with no procedures in place to assure randomness.-A more structured and randomized sampling procedure for selecting boats should be implemented and adhered to.-A random selection process for choosing anglers to inspect upon arrival at the dock should be implemented, to support a probability sampling approach.The reviewers were unanimous in their conclusion that the current SRHS intercept sampling procedure puts entirely too much choice in the hands of the sampler to be defensible statistically and allow for the proper estimation of variances. They recommended, as shown above, the development of probability sampling methods used to select the sample at all stages of sample selection.To that end, we (project PIs/SRHS supervisory staff) proposed and were funded in the first year to hire a consultant to develop a probability based intercept sampling program for the SRHS. We met with two consultants from RTI, Inc., a consulting firm based in Research Triangle Park near Raleigh NC. Based on this meeting, we put together materials requested by the consultants to aid them in designing an intercept survey. We have had several email exchanges with the primary consultant, providing her with additional information, and she is in the final stages of creating a preliminary field design for the survey to implement.For the FY2010 MRIP funding cycle we propose to implement the new probability based intercept design protocols in the SRHS. We plan full implementation throughout the range of the survey, North Carolina through Texas (11 field samplers). Protocols (changes in current sampling procedures) will be initially discussed with all samplers in a conference call, followed by a visit by SRHS staff to each sampler to ensure that new procedures are being properly implemented.Project funds will be used for project PIs (Beaufort SRHS supervisory staff) to travel to RTI to meet with

the consultants to discuss the new sampling design when it is completed. Additionally we will travel to each port where a sampler is located (10 ports outside of Beaufort NC) to work with them in implementing the new sampling protocol. We anticipate having a new sampling design from the contractor by early spring 2010, and meeting with the contractor shortly after that for initial discussions. We expect to bring the consultant down for several sampling events on the docks in Morehead City so that she may observe angler behavior on the dock and suggest modifications to the survey design if necessary. The timeframe for full implementation of the new sampling protocol for field testing is unknown at this time, as the design is as yet undelivered, but we anticipate design delivery by March 2010 and full implementation by July 2010.We will also examine the utility of using the new intercept sampling design in generating an estimate of total harvest for the headboat fishery. The SRHS currently uses a mandatory logbook system, designed to be a census, combined with sampler estimates of vessel effort, to generate estimates of total landings. A properly designed probability based sampling design for the intercept survey should allow for this estimate. We will generate estimates of total landings by species and area/time strata for comparison with landings estimated from logbooks when those estimates become available in spring 2011. This project is expected to result in a survey design that will improve the accuracy and reduce variability of estimates of sizes and weights of harvest and discards.Regulatory discards are an important component of total fishing mortality in the headboat fishery; however, bio-profile data from discards are currently not incorporated into estimates of total catch in the SRHS. Therefore, a secondary objective of this proposal is to review a separate sampling program for headboats in the south Atlantic that employs at-sea observers to collect detailed data on recreational discards. The Headboat At-Sea Survey has been funded by the Atlantic Coast Cooperative Statistics Program since 2004 as an added fishing mode in the Marine Recreational Fisheries Statistics Survey (MRFSS). While the At-Sea Survey was designed to generate separate estimates of headboat harvest and discards, the SRHS is the official source of catch estimates from this sector of the recreational fishery, and these estimates are used in regional stock assessments and fisheries management. Contract support is requested to review the At-Sea Headboat Survey, including sample selection, field procedures, and data structure to evaluate the potential usefulness of this independent survey for integration into SRHS logbook-generated estimates.

1.5. Public Description

1.6. Objectives

1.7. References

2. Methodology

2.1. Methodology

2.2. Region

Gulf of Mexico, 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

3.2. External Communication

4. Assumptions/Constraints

4.1. New Data Collection

4.2. Is funding needed for this project?

4.3. Funding Vehicle

Transfer to SEFSC (Beaufort)

4.4. Data Resources

One possible constraint could be the reaction of the industry personnel and the fishing public to a change in sampling procedure after being familiar with an opportunistic style for so long. Strong public relations, long a hallmark of the SRHS, should help overcome any short term difficulties on this front. Additionally, we plan to bring the consultant to the dock to witness the real world realities of the new design and offer her the chance to decide if modifications to the design are warranted based on constituent behavior.

4.5. Other Resources

4.6. Regulations

4.7. Other

5. Final Deliverables

5.1. Additional Reports

5.2. New Data Set(s)

5.3. New System(s)

6. Project Leadership

6.1. Project Leader and Members

First Name	Last Name	Title	Role	Organization	Email	Phone 1	Phone 2
Kenneth	Brennan		Team Leader	NOAA/NMFS/SEFSC			
Michael	Burton		Team Member	NOAA/NMFS/SEFSC			

7. Project Estimates

7.1. Project Schedule

Task #	Schedule Description	Prerequisite	Schedule Start Date	Schedule Finish Date	Milestone
2	Procure new intercept survey design from contract consultant.		01/01/2010	03/31/2010	
4	Agency contacts will meet as required with contractor, to answer questions about new survey design		04/01/2010	12/31/2010	

Task #	Schedule Description	Prerequisite	Schedule Start Date	Schedule Finish Date	Milestone
5	Evaluation of project products, methods, and timeframe. Report preparation including recommendations		01/01/2011	04/30/2011	
1	Implementation of a statistical/survey design from the consultant hired in Year 1		01/01/2010	04/30/2011	Y
3	Contract specification,staff task definitions,data processing and production coordination determined		02/01/2010	04/30/2010	
6	Deliverable: Final Report to MRIP Operations Team		04/01/2011	06/30/2011	Y

7.2. Cost Estimates

Cost Name	Cost Description	Cost Amount	Date Needed
Consultant Support	Guidance in using new intercept survey design; modification consultation, if needed	$8000.00	03/10/2010
Consultant Support	Review At-Sea Headboat Survey procedures and data; recommend design changes if necessary	$0.00	06/10/2010
Project-specific Travel	Beaufort SRHS staff travel to train field staff (North Carolina through Texas) in sampling methods	$9000.00	03/01/2010
TOTAL COST		$17000.00	

8. Risk

8.1. Project Risk

Risk Description	Risk Impact	Risk Probability	Risk Mitigation Approach

9. Supporting Documents