

# Characterizing Discards on Headboats

FY 2008 Proposal

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# 1. Overview

## 1.1. Sponsor

## 1.2. Focus Group

Survey Design and Evaluation

## 1.3. Background

In their Review of Recreational Fisheries Survey Methods (2006), the National Research Council (NRC) concluded that better methods are needed to estimate the number, size distribution and disposition of released fish. Furthermore, the review stated that exiting intercept surveys may not provide enough detail to estimate mortality of released or discarded catch. While the NRC did not recommend alternatives to existing methodologies, the review did provide the following insight about the difficulties associated with collecting accurate discard data: • Released fish cannot be inspected in an onsite survey, • Rounding errors may be common, • Exaggeration or under reporting may be a problem, • Species identification errors may occur, • Size and age distribution may be different than kept fish.

## 1.4. Project Description

Currently, two survey methodologies are used to collect information about released catch. For shore-based and private boat fishing, catch data are collected by onsite interviewers at the conclusion of angler fishing trips. Because interviewers are unable to directly observe discarded catch, this methodology relies on unverifiable angler reports about the species composition, numbers and disposition (condition) of released catch. The amount of detail collected about the location, gear type and depth of catch vary by region and survey program. Because this methodology relies on angler reports, it is particularly susceptible to the issues identified by the NRC panel. For for-hire fishing, two methodologies are used to collect discard data. The first is identical to the approach described above for shore and private boat fishing; field samplers conduct dockside interviews with anglers at the conclusion of for-hire trips. The second involves at-sea sampling of headboat anglers. This trained field personnel during for-hire fishing trips. This project will consist of several components. The first component will consist of a thorough review of existing literature to identify similar studies. Surveys often rely on respondent recall, so it is anticipated that a wealth of relevant information exists in the survey and/or natural resource literature. In the second component, self-reported data collected from dockside headboat interviews will be compared to data collected by at-sea observers to quantify differences in catch rates and species composition between the two approaches. This analysis will provide a measurable assessment of anglers' ability to accurately provide discard data by comparing self-reported data to observer data. Comparisons will also be made to assess differences in size distribution between released catch and kept catch. The results of these comparisons will help to identify and quantify differences resulting from the issues described in the NRC review. Exploratory analyses of data collected through the California Recreational Fisheries Survey (CRFS) suggest differences between angler-reported and observed data. This project will build upon that study and include additional geographic areas. The following data collection programs will be included in the analysis: 1. Atlantic Coast FHS 2. Gulf Coast FHS 3. California Recreational Fisheries Survey. Additional data collection programs utilize logbooks to collect catch data from for-hire vessel operators or crew. This data will not be included in the initial analyses as the intent of the project is to directly compare self-reported angler data to observer data. Future studies, or concurrent studies proposed by other work groups (e.g. the for-hire work group), may include comparisons of logbooks or census programs. The third component will include development and subsequent testing of alternative methodologies for collecting recreational discard data. Project team members will work with experts in survey design to identify alternative methodological approaches and develop pilot studies to assess the effectiveness of these approaches in collecting recreational fishing discard data. The final component will be an assessment of the level of detail needed by stock assessment scientists and fishery managers to accurately estimate discard mortality. The assessment will be limited to data that can be practically and accurately collected by field personnel during the course of angler interviews. This project will not assess the need for tagging or caging studies. This component will build upon work being conducted by the Data Management and Standards Work Group to inventory and document existing data collection programs. Results of that effort will be used to identify the various data elements collected by field interviewers, and data users will be queried to identify data elements that are useful for estimating discard mortality (e.g. area fished, depth, water temperature, gear type, hook type, disposition, etc.). This project will result in the following: 1. A report documenting results of comparisons between alternative procedures for collecting discard data in the headboat mode. 2. A formalized plan to conduct pilot studies to test alternative approaches for collecting and analyzing recreational fishing discard data. This will include identification of alternative data collection approaches, development of pilot studies to assess the effectiveness of these approaches, and a project plan to implement pilot studies. 3. An assessment of the need to collect more detailed data to support stock assessment.

## 1.5. Public Description

## 1.6. Objectives

The objectives of this project are to 1) utilize existing data to assess potential biases associated with the methodologies currently used to estimate discarded catch, 2) identify alternative methodologies to collect information about discarded catch and develop pilot studies to assess the effectiveness of those methodologies, and 3) assess the need to collect more detailed information that could be used for estimating discard mortality.

## **1.7. References**

## **2. Methodology**

### **2.1. Methodology**

### **2.2. Region**

Gulf of Mexico, Mid-Atlantic, North Atlantic, Pacific, 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**

### **4.4. Data Resources**

1. It is assumed that adequate data exist to compare dockside survey data to at-sea survey data. Initially, comparisons will be made at the finest level of stratification (state/wave/mode/area/species) with the intent of identifying geographic and temporal differences between angler-reported and observed data for a given species. In some cases, it may be necessary to pool data among strata to achieve adequate sample sizes to conduct meaningful comparisons.

### **4.5. Other Resources**

2. This project will be constrained by the fact that it partially relies upon completion of work conducted by the Data Management and Standards Work Group.

### **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
Rob	Andrews		Team Leader	NOAA Fisheries			

## 7. Project Estimates

### 7.1. Project Schedule

Task #	Schedule Description	Prerequisite	Schedule Start Date	Schedule Finish Date	Milestone
1	Identify relevant surveys and contact persons associated with surveys.		12/01/2007	01/30/2008	
2	Compile survey data for comparisons between angler-reported and observed discard data.	1	02/01/2008	02/28/2008	
8	Develop pilot studies to assess effectiveness of alternative methodologies	7	02/15/2008	05/31/2008	
12	Develop report documenting need for more detailed trip information	11	06/01/2008	06/30/2008	
5	Technical review of report.	4	05/01/2008	05/31/2008	
6	Submit report documenting comparison to OT	5	12/01/2007	06/01/2008	
7	Procure consultant support for development of alternative data collection approaches		01/01/2008	02/15/2008	
9	Develop project plan to implement pilot studies	8	06/01/2008	06/30/2008	

Task #	Schedule Description	Prerequisite	Schedule Start Date	Schedule Finish Date	Milestone
11	Conduct assessment with stock assessment scientists to identify need for more detailed trip info		02/01/2008	06/01/2008	
3	Data analysis and comparison of angler-reported and observed discard data.	2	03/01/2008	03/31/2008	
4	Prepare report documenting comparisons between angler-reported and observed discard data.	3	04/01/2008	04/30/2008	
10	Submit project plan to OT	9	12/01/2007	07/01/2008	
13	Submit report to OT	12	12/01/2007	07/01/2008	

## 7.2. Cost Estimates

Cost Name	Cost Description	Cost Amount	Date Needed
Project-specific Travel	Travel to assess management and stock assessment needs for discard data	\$20000.00	02/15/2008
Consultants	Identify alternative approaches for collecting discard data and develop pilot studies	\$100000.00	02/15/2008
TOTAL COST		\$120000.00	

## 8. Risk

### 8.1. Project Risk

Risk Description	Risk Impact	Risk Probability	Risk Mitigation Approach
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## 9. Supporting Documents

"Final Report", page 1

### **An Analysis of Recall Bias Using Extant Head Boat Data from the Atlantic**

By Eric Newburger

#### **Executive Summary**

Existing MRFSS data from the Atlantic coast give us one way to look at whether anglers systematically misreport discards. An examination of the data provided no support for this hypothesis. The lack of any apparent systematic bias in these somewhat coarse data suggests that if “recall bias” operates in current surveys of discards, then its effects must be subtle.

#### **Introduction**

The NRC in its 2006 report expressed the concern that the present MRFSS methodology may fail to accurately measure discards by recreational anglers. Discards may be a significant source of mortality within some fisheries. To substantively explore the NRC’s concerns requires finding an independent source of discard estimates to compare with discard estimates derived from existing intercept surveys. Data on hand from direct observations of anglers on head boats working the Atlantic coast may provide one such independent data source.

#### **Method**

As part of ongoing MRFSS collections, we send out survey samplers on head boats working the Atlantic coast. Samplers monitor a group of anglers, usually 5-10, and record their kept and discarded catches. At the end of the boat trip, these same samplers conduct MRFSS intercept surveys on those other anglers aboard who went unobserved.

We presume that anglers on the same boat will have similar luck on average. Thus, any differences between observed catches and MRFSS intercept survey reported catches (that is, angler reported data) would derive from differences in reporting conditions, rather than fishing conditions. While it is possible anglers may change their fishing behavior when watched, the presence of a single crew directing fishing aboard head boats—choosing when and where to fish for all people aboard, and with what gear—will tend to minimize this difference. We believe that any variance between observed discards and angler reported discards most likely would come from a reporting bias, such as “recall bias”, when anglers at the end of a trip have difficulty remembering the precise number of fish they caught, and so they round up when asked, or simply make up something that feels right.

Building upon work by Rob Andrews, I have used data from 2006 and 2007 to compare observed and angler-reported numbers of discards per trip, by species, on head boats.

This analysis includes only head boats with observes, excluding any intercept surveys of head boat anglers conducted dock-side. Within this universe, Rob's program creates two statistics: the number of discards per angler trip among observed anglers, and discards per angler trip among unobserved anglers. I created a ratio of these two catch-per-unit-effort measures by species:

$$\text{Ratio} = \frac{\text{Mean(angler reported discards per trip)}}{\text{Mean(observed discards per trip)}}$$

When this figure is near one, then angler reports of discards and observed discards nearly match. Departures away from one signify differences between reports and observations.

## Results and Discussion

Of the 88 species reported caught during 2006 and 2007 by head boat anglers, 38 occurred too rarely to include in this analysis. However, the remaining 50 include most species with particularly high value to recreational fisheries on the Atlantic, like summer flounder or striped bass.

On the graphic (next page), the red line indicates the 1:1 axis, the grey lines 0.5 and 1.5. The ratio of reported/observed discards for most species falls between these two arbitrary boundaries. About equal numbers exceed them at both the high and low end. This evenness suggests a random, rather than a biased, distribution of variation. It is very much what we would expect from the interaction of two sets of normally distributed random variables (mean CPUE reported by anglers and mean CPUE observed by samplers) with common central points.

Note that the appearance of a long tail at the high end is merely an artifact of the measure I have used. Since there can be no negative discards, the range for this ratio is from 0 to infinity; values below one are compressed, while those above one telescope out. This will give the appearance of a high-end bias. However, values very close to zero are as much outliers as values approaching infinity. If we were to simply reverse the ratio—switching numerator and denominator—those near zero values would become large, while large values would approach zero.

Thus, the distribution in the graphic really is even. I have done the experiment of flipping the ratio, and the picture is much the same, only in reverse order.

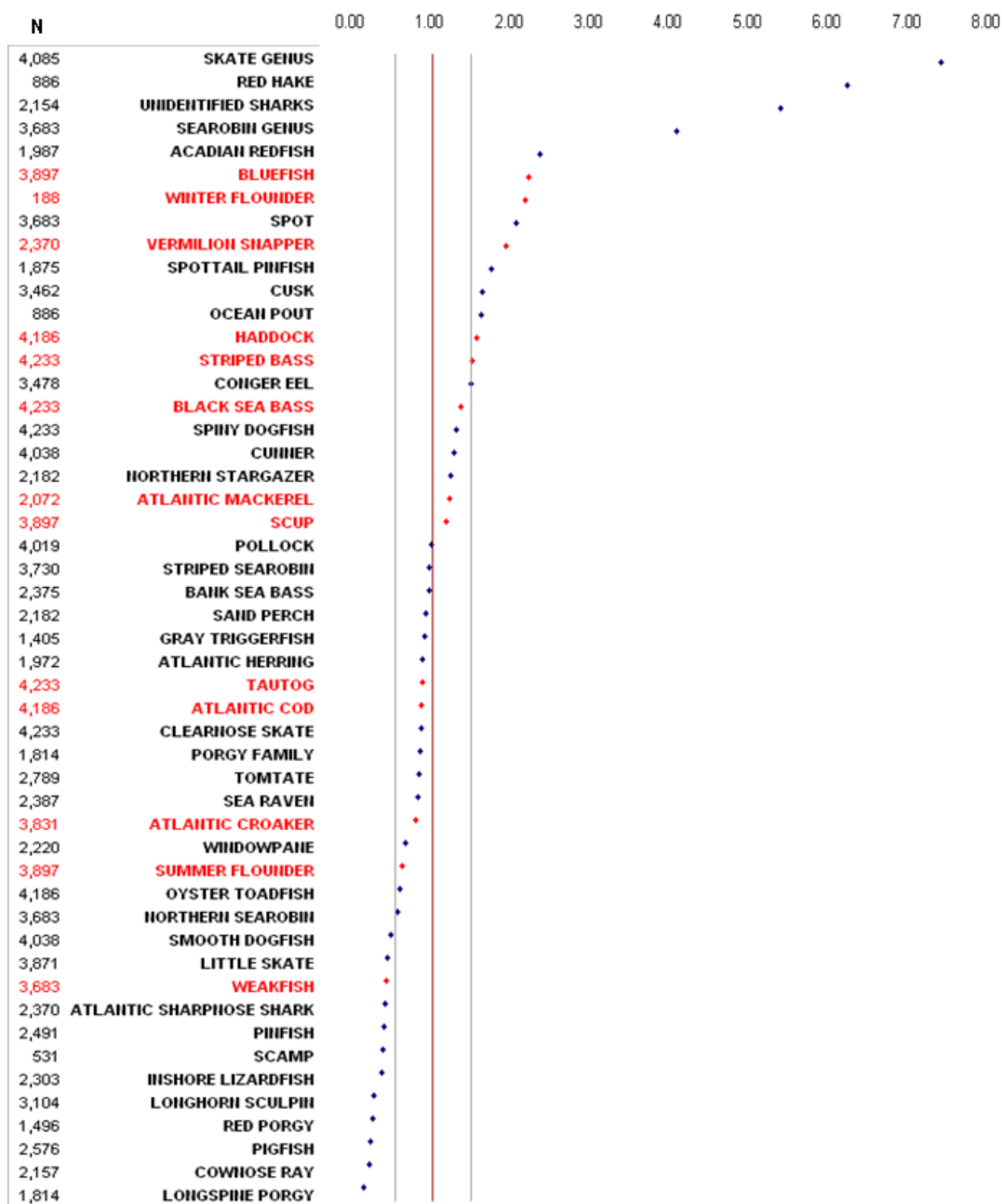
## Species Specific Analysis

It would still be possible for there to be a recall bias problem if some species tended to fall on one side or other of the distribution depending upon, for example, their size or importance to fisheries.

"Final Report", page 3

The species list includes species of similar size both above and below the 1:1 point (summer and winter flounder, or Atlantic cod and haddock, for example).

**Ratio of Angler Reported Discards per trip to Observed Discards per trip,  
by Species, Head Boat mode, 2006 and 2007**



Source: MRFS 2006, 2007, internal data, head boat mode.



To consider whether species of particular importance to fisheries might suffer greater recall bias, I asked a handful of people in ST1 to rate each fish species for their, “importance to recreational fisheries.” I then consolidated the results into a “top fish” list. There was considerable agreement among people I spoke with on species rankings.

Even so, there was nothing rigorous or complete about this survey, and my limiting the inquiry to the fisheries statistics office may have produced a skewed view. Someone from the management side of NOAA Fisheries, for example, might have a very different opinion about what constitutes importance. However, as a quick and dirty measure to detect bias based on the notability of a species, I believe that it will serve.

Eight species of importance have a ratio above 1:1, and five below. If there is a bias based on importance, it is weak at best. Considering the rough nature of my importance measure, evidence for even a weak bias is equivocal.

## Conclusion

I find no strong evidence of a systematic recall bias in the head boat data. While this analysis relies upon rough measures and indirect data, if the effect were strong, I believe this method would have found it. I conclude that the effect of recall or reporting bias is weak or absent from our present MRFSS collections in the head boat mode.

In the future, we should consider expanding this study to include new data now available (2008 data). We also might consider, if we are to make further use of the ‘top species list’, vetting that list through a more authoritative body of experts. I would also recommend analyzing the larger data set on a wave basis, to see whether some small number of species might suffer from consistent under reporting by anglers, while others are always over reported. The cross sectional analysis above can not dispel this possibility. Neither can these aggregate data inform us about possible geographic differences in reporting, or reporting differences resulting from management practices, both of which future research might consider.

We might also find it valuable to perform a more direct test—where we both observe and collect intercept surveys from the same anglers. Such an experiment would better be able to measure any possible subtle reporting biases. Should it find no such biases, that result would strengthen the conclusion of this small study.

If we have the budget to field a more direct study, we could increase its geographic scope by including the Gulf of Mexico in our collections. This would make its results that much more widely applicable, while adding only slightly to study complexity.

We also might want to consider experiments on whether recall bias or reporting bias plays a role in other modes of fishing (shore side, for example).