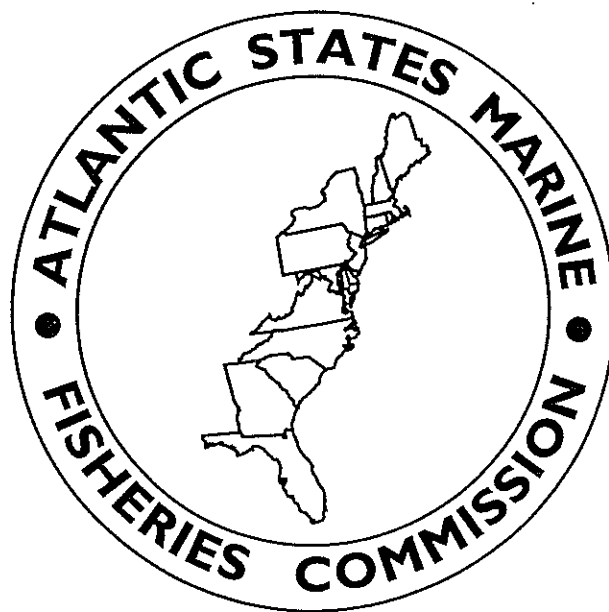


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**ATLANTIC STATES  
MARINE FISHERIES  
COMMISSION**



Proceedings of the Workshop on the  
Design of a Charter and Headboat Sampling  
Program for the Atlantic Coast  
Part II

March 1996

**Proceedings of the  
Workshop on the Design of a Charter  
and Headboat Sampling Program  
for the Atlantic Coast**

**Part II**

**Edited by**

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## **List of Tables**

Table 1.	Attributes that determine choice of methodology . . . . .	15
Table 2.	Potential for errors among survey methodologies . . . . .	16
Table 3.	Ability to collect data items and reliability of the data method . . . . .	17
Table 4.	Evaluations of current MRF charter and headboat sampling programs . . . . .	22

## Introduction

The Atlantic States Marine Fisheries Commission's (ASMFC) Marine Recreational Fisheries Statistics (MRFS) Committee was tasked to address concerns regarding recreational fisheries statistics issues for the Atlantic coast. One of the major concerns was the lack of data on charter and headboat fisheries on the Atlantic coast. The lack of a consistent, coastwide data collection system for collection of catch, effort, participation, and social and economic data for Atlantic coast charter and headboat fisheries was identified as a priority issue. Specific concerns focused on the lack of standard definitions for charter and headboat fisheries utilized by the various state and federal collection programs, the lack of regional and coastal coverage of the surveys, the relatively small sample sizes and high variances about some survey estimates, and the lack of a comprehensive sampling frame for Atlantic coast charter and headboat fisheries to assist in the development of regional and/or coastal surveys (Kline 1994).

Similar problems have been identified in the Gulf region through a workshop conducted by the Gulf States Marine Fisheries Commission in 1989 (GSMFC 1992). This workshop recommended standard definitions for guide/charter and headboats, described Gulf of Mexico for-hire fisheries, evaluated various survey methodologies, and recommended specific survey programs for collection of data on Gulf of Mexico guide/charter and headboat fisheries. A facilitated session held in September 1995 provided a forum to develop recommendations regarding recreational data collection which would be used to guide the program for the next five years. Recommendations were prioritized by the RecFIN(SE) Committee and high priority issues were identified to be addressed or finished in FY1996.

The ASMFC Workshop on the Design of a Charter and Headboat Sampling Program for the Atlantic Coast - Part I held in 1994 addressed several objectives: 1) to describe charter and headboat fisheries for the Atlantic coast; 2) to define and classify charter and headboat fisheries on the Atlantic coast based on common definitions; 3) to evaluate various survey methodologies and their application to charter and headboat fisheries; and 4) to provide recommendations for designing and implementing a comprehensive Atlantic coast sampling program. Due to time constraints, workshop participants could not finalize their recommendations for designing a coastwide survey sampling program for the Atlantic coast. The MRFS Committee recommended that a second workshop be held in 1995 to continue their work.

A second workshop was held on November 14, 1995 in Annapolis, Maryland to review and evaluate survey methodologies for charter and headboat fisheries. The ASMFC Workshop on the Design of a Charter and Headboat Sampling Program for the Atlantic Coast - Part II was designed to address several objectives: 1) to further examine various survey methodologies for the collection of catch and effort data from charter and headboat fisheries; 2) to obtain industry input on the development of an Atlantic coast sampling program for the collection of data on charter and headboat fisheries; and 3) to develop recommendations for the implementation of an Atlantic coast sampling program for the collection of data on charter and headboat fisheries.

Gulf States Marine Fisheries Commission. 1992. Proceedings: Workshop on marine "for-hire" recreational fisheries survey methodology. M. Osborn, ed. Sept. 1992, 30 pp.

## **CHAPTER I**

### **Industry Input**

In Maine, until the Maine Department of Marine resources showed up, data collection among the headboats involved was looked upon by the industry as being heavily biased. The reasoning behind this feeling was clear:

1. The dockside interviewer favored only certain boats for interviews and would avoid others presumably because the other's catch was smaller.
2. Rarely did you find an interviewer that liked his job or even knew his job. A couple of those people were a little lost on species identification.
3. Many times when my vessel docked after completing a trip, while the interviewer was waiting there, the interviewer would allow those people that didn't catch anything (seasick individuals, neophytes etc.) and thus had no fish to wait around for, to pass him, get in their respective vehicles and drive off. The interviewer would then descend upon those that were left, the best and most productive anglers, to interview them. There was even one interviewer who would have the questionnaire filled out with one of my regular's name and address that the interviewer expected to see before we even met the interviewer at the dock.
4. We found interviewers unschooled in approach and questioning methodology and appeared to be receiving very little follow-up from their superiors.

There were a couple of other things that, combined with poor data collection dockside, added to the overall bias in data collection. These facts are as follows:

1. Most of our anglers are from out of state. Most are not familiar with and can't remember the species they catch. Therefore, questions related to species received biased answers that became part of the interviewer's questionnaire.
2. Most anglers can't remember how many fish they catch never mind how many fish they had to release. This is evident when an angler comes back to collect his fillets at the end of the day. Usually, the angler thinks that he or she caught more fish than what he or she received as fillets. Anglers in general overestimate the quantity of fish they land which would directly effect the results of a dockside survey.

I believe that sea sampling done in-house by a trained and interested professional, as completed many times by Mr. Bruce Joule from Maine's Department of Marine Resources, to be the only way to get true headboat data. Mr. Joule's system works like this:

1. I would greet Mr. Joule and an assistant at the boat an hour before departure.
2. I would introduce Mr. Joule during the orientation/departure speech to my passengers at a time when they would likely be paying the most attention.

- Factors that are enhancing or inhibiting the catch rate (For example bluefish tend to drive the baitfish and diminish the groundfish bite while the absence of bluefish and the presence of baitfish enhances the groundfish bite).
  - Resident or school (recruitment) populations.
2. I can envision this as a forum or platform for other types of scientific studies or activities.
- a. Tagging studies.
  - b. Morphological or physiological studies that might apply.



E. Time consumption and cost of reports.

1. Speaking for the headboat industry, we find the reports are too long.  
It takes six (6) minutes to complete the form.
2. The postage is at least \$3.00 per monthly mailing.
3. The threats to a fisherman if a report is not filed on time have made NOAA policy into a Gestapo mentality. (Personally, I have dropped three boats from reporting because of the time, the threatening letters, the costs - approximately \$3.00 per vessel, and the telephone surveys).

II. What are some suggestions that I would propose to help solve some of the problems that these commissions have created?

- A. Lack of communication could be remedied by either combining the commissions to make one commission or to obliterate one commission entirely. Thus the data would be consolidated.
- B. Making regulations coastwide would make it possible for headboat operations to compete with other state's businesses on equal footing.
- C. Correction of the definitions is a must.
- D. Inaccuracies in the noted pages of the ASMFC Workshop Proceedings (Part I) need to be corrected.
- E. The costs of government printing and of our mailing of at least 31 or more reports per month can be reduced down to 10 or less reports. I submit that the enclosed monthly report with one sheet per species would be more economically feasible.
- F. In closing, I recognize the need for regulations to preserve any species.  
But I also recognize the need for responsible decisions by the commission to protect the people whose livelihood is directly affected by your regulations.

Open for questions?

## Party-Charterboat Data Collection Problems

Submitted by:  
Professor Anthony D. DiLernia

Problem: Industry does not trust managers. Managers are perceived as bureaucrats only looking to preserve their own jobs and not the industry associated with the resource.

Solution: Managers must make an effort to show industry that they are concerned with industry problems. This requires effective listening.. Managers must treat captains as professionals. Structure regulations that address needs of both industry and the resource, i.e. New York striped bass regulations permitting two fish per angler aboard permitted vessels. Private vessels only permitted one per angler.

Problem: Data is usually used to restrict harvest.

Solution: Use data to support increases in bag limits or seasons, i.e. summer flounder regulations.

Problem: Industry believes data will be used to investigate personal finances.

Solution: Guarantee confidentiality of data. Data to be used for fishery purposes only.

Problem: The issuing of fishery permits to a party-charterboat often carries the stipulation that the vessel must participate in data collection. This empowers the state agency and courtesy is then overlooked by the agency responsible for data collection.

Solution: Intercept interviewers should call captains the evening before the intercept and ask permission to conduct interviews. State agency should meet with captains to explain the benefits of data collection. Provide captain with copies of the data collected from his vessel. This develops a pride of ownership in the data by the participating captain. Captains will explain to their passengers the need for data collection and request that passengers cooperate at the dock.

## **CHAPTER II**

### **Evaluation of Charterboat and Headboat Survey Methods**

affect the success of a survey through industry rejection or acceptance of the survey and reporting forms and in reporting compliance. The universe type, number of access point, fishing pressure, and geographic scope are less critical and are more important in determining what type of on-site survey methods are used. Known universe means a list of identified individuals exists.

Costs are always a concern, but managers must be made aware of the possible bias introduced by going the “cheap” route. Issues of the level of risk that can be tolerated, the importance of the fishery, and sensitivity of the fishery to exploitation are all factors that should be involved in determining appropriate methods.

Table 1. Attributes That Determine Choice of Methodology. Adapted from Essig and Holliday (1991) and Pollock et al. (1994). Shaded areas indicate less desirable attributes where applicable.

Attribute	On-Site Methods			Off-Site Methods		
	Roving	Access Point	Aerial	Logbook	Known Phone	Random Phone
Data Source	Direct	Direct	Direct	Self-reported	Self-reported	Self-reported
Universe	Unknown	Unknown	Unknown	Known	Known	Unknown
Access Points	Multiple	Limited	Multiple	Multiple	Multiple	Multiple
Fishing Pressure	Low	High	Low-High	High	Low	High
Geographic Area	Small	Small	Large	Large	Large	Large
Time Frame	Real time	Real time	Real time	Not real time	Real time	Real time
Industry Burden	Low	Low <sup>a</sup>	Low	High	Medium	Low
Reporting	Voluntary	Voluntary	Voluntary	Mandatory	Mandatory	Voluntary
Costs	Medium	Medium <sup>b</sup>	Medium	Low <sup>c</sup>	Low	Low

<sup>a</sup> On-board observers increase the burden on industry; however, headboat captains participating in the workshop indicated support for this method in obtaining the best available data, and did not consider having samplers ride their boats a burden.

<sup>b</sup> Costs for on-board sampling may be high.

<sup>c</sup> Costs can be considered low only if there are no verification and enforcement costs.

Physical-Mental Impediment	L	L		L	L	L
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### Management Data Available By Methodology

The ability to collect reliable catch, effort, social, and economic data is affected by the survey method (Table 3). Data collected can be either self-reported by anglers or "for-hire" captains or crew or it may be directly observed by trained samplers. Directly observed data is more reliable than self-reported data. Any survey that relies strictly on self-reported data should institute periodic and routine processes to ground-truth and validate the data.

Previous studies have shown that, in general, anglers do not report reliably about catch, species identification, or lengths and weights data (Brown 1977; Brown et al. 1977; Chandler 1977; Chandler and Brown 1978; Hiatt and Worrall 1977; Metze 1977). They can report accurately about trips up to a two-month recall period. Angler reported catch and length/weight measurement data are distorted by memory bias, non-standard usage of species local and common names, prestige bias, and as digit bias (tendency to report in numerical units of 5 and 10) ((Brown 1977; Brown et al. 1977; Chandler 1977; Chandler and Brown 1978; Ferguson, M. F., A. W. Green, and G. C. Matlock. 1984; Green, A. W., Matlock, G. C., and M. F. Ferguson. 1984; Green, A. W., Matlock, G. C., and M. O. Ferguson. 1986; Hiatt and Worrall 1977; Metze 1977;).

It is not known whether "for-hire" captains report more accurately than anglers. Studies of voluntary and mandatory logbook programs on the Pacific Coast found that charter and head boat operators reported only half the trips and half the passengers, while they doubled their actual catch rate (Osborn 1992). The Maine pilot survey described in this proceedings is showing some differences between data collected from anglers and captains. Captains remember more of the species caught, especially fish that are caught and then used for bait; however, the captain interviews also show some digit bias.

Table 3. Ability to Collect Data Items and Reliability of the Data by Method. Adapted from Osborn (1992). O=Observed by trained samplers, S=Self-Reported, blank=unable to collect. Shading indicates self-reported data.

Data Item	Roving and Access	Onboard Observer	Aerial	Logbook	Known Phone	Random Phone
Effort Data						
Area Landed	S	O		S	S	S

Number Landed	O	O		S	S	S
Species ID	O	O		S	S	S
Sex	O	O				
Biological Data	O	O				
Tag Returns	O	O		S	S	S
Weight	O	O				
Length	O	O				
Social and Economic - "For-Hire" Operators						
Zip Code	S	S		S		O
Boat ID	O	O		S		O
# Seasonal Trips	S	S		S		S
Motivation	S	S		S		S
Satisfaction	S	S		S		S
Experience (years)	S	S		S		S
Target Species	S	O		S		S
Revenues						S
Fixed Costs						S
Variable Costs	S	S		S		S
Social and Economic - "For-Hire" Clients						
Zip Code	S	S		S	O	O
Party Size	S	O		S	S	S
# Fishing	S	O		S	S	S
For-Hire Avidity	S	S		S	S	S

interview. Maine already had a complete sampling frame of 24 boat captains and cooperation was very good. If sampling frames had to be compiled, or if refusal rates were much higher, the costs would be slightly higher. Very large sampling frames would also raise total costs.

*Random Digit Dialing Telephone Survey:* Estimates from the MRFSS indicate costs of \$3-6 per interview. These costs are slightly higher than those using a known sampling frame because of the need to create bimonthly sampling frames of phone numbers, and the high number of contacts with no fishing activity. The use of a Computer Assisted Telephone Interviewing (CATI) system may require an initially large investment in equipment, but in the long term it decreases other costs such as data entry. It also ensure timeliness and quality control.

*Roving Counts:* Based on Maine's costs-per-hour for state personnel and mileage costs, this is estimated to be \$10-15 per hour roved.

*Mark-Recapture for Fleet Size Estimates:* Based on the Large Pelagics Survey and the MRFSS intercept interviews, the cost per interview ranges from \$33 to \$106. These are for all fishing modes combined. Information on a finer level is not available at this time.

## **Catch Data**

The costs of collecting catch data vary greatly by season and area. For example, the highest costs occur in winter months in more northern states while the lowest costs occur during the summer in southern states. Costs can also be related to type of coast line, distribution of the coastal population, and the locations of sites. A coast line like Maine or Louisiana with many indentations increases driving time and costs. More rural coastal population areas and widely dispersed sites also increase costs because it takes more time to find anglers to interview. Some of the costs below include overhead costs such as drawing a sample and distributing it to interviewers, recruiting and training, data entry, sample management throughout a wave, and quality control efforts like validation and data cleaning. These hidden and un-estimated costs may vary according to different situations and who is conducting portions of the survey.

## **Access-Point Surveys:**

1. Based on the MRFSS intercept interviews, the cost per interview ranges from \$33 to \$106. These are for all fishing modes combined and include administrative costs. Information on a finer level is not available at this time.

2. Based on Beaufort Southeast United States Headboat Survey data, dockside interviews may be as high as \$102 per vessel contact. This was based on a budget of \$216,000 for seven and a half port samplers (interviewers), adjusted downward 10 percent for other duties, \$10,000 annually for fuel, with 200 vessel contacts per year. These costs can not be compared directly with angler interview costs, because the objective of these vessel contacts is to collect biological data on the catch. If one assumed that 20 interviews were obtained with each vessel contact, then the cost per interview would be about \$5.

Possible Sources of Bias	Pooling to correct for low telephone contact rate may smooth true differences between years	Some non-reporting (20-30%)  Verification of log book data through on-board sampling	Bias in selection process; towards individuals who are willing to participate
Precision	High variance for some strata due to low telephone contact rate	No variance estimates for data, even though estimates are made for non-reporting	No estimates of total harvest or effort, no variances calculated
Comparability	Statistically comparable throughout the time series	Logbook format has remained the same.  Logbook coverage - - 70-80% of fleet now reporting, voluntary vs mandatory -- has varied over time.	Logbook format has remained the same.
Temporal Scope	Bimonthly estimates (waves)  Long-term survey - 16 years in 1994	Survey began in 1972 and is continuing to date.	March 1982 to present
Geographic Scope	Full coverage in the Northeast Region.  Headboat sampling in SE discontinued 1986.  No Caribbean sampling since 1980.  No sampling in Texas since 1985.	North Carolina to Texas.	North Carolina to Texas



Suitable Uses of the Data	Allocation, stock assessment, formulation of management regulations, and evaluation of effects of regulations	Allocation, stock assessment, formulation of management regulations, and evaluation of effects of regulations	Stock assess., formulation of management regulations, evaluation of effects of regulations
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## CONCLUSION

Method selection is dependant upon many factors, some which can controlled by scientists and administrators, and other factors that can not be influenced. The objectives of a survey and existing situations must be analyzed using all the information outlined above and in more detailed reference books in order to make a rational decision. Finally, consultation between statisticians who can provide advice in developing surveys that produce reliable and precise data, and biologists and technicians who have practical field experience, can contribute greatly to a survey's success.

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## **CHAPTER III**

### **Comparison of Estimates from Maine Pilot Study and MRFSS Survey**

## **CHAPTER IV**

### **An Overview of the Recreational Fisheries Information Network RecFIN(SE)**

surement goals; coordination or integration of existing data collection programs; development of alternate survey designs, when appropriate, to meet special information needs; and development of a comprehensive data management and retrieval system to provide information to managers.

The planning proposal was presented in April 1992 at meetings of the Gulf States Marine Fisheries Commission (GSMFC) and the Atlantic States Marine Fisheries Commission (ASMFC). The proposal emphasized a cooperative program in conjunction with state and federal fishery management agencies, regional fishery management councils, interstate marine fisheries commissions, and other organizations concerned with marine fishery management. In response to the proposal, an interagency Plan Development Team (PDT) was organized to develop a Memorandum of Understanding (MOU) and draft a strategic plan for the RecFIN(SE). The MOU confirmed the intent of the signatory agencies to participate in implementing the RecFIN(SE) and was signed by early 1993.

### **Scope of RecFIN(SE)**

The scope of the RecFIN(SE) includes the Region's recreational fisheries for marine, estuarine, and anadromous species, including shellfish. Constituencies served by the program are state and federal agencies responsible for management of fisheries in the Region. Direct benefits will also accrue to federal fishery management councils, the interstate marine fisheries commissions, the National Park Service, the U.S. Fish and Wildlife Service, and the NOAA Marine Sanctuaries Program. Benefits which accrue to management of fisheries will benefit not only recreational fishermen and the associated recreational fishing industry, but the resources, the states and the nation.

### **Program Mission, Goals, and Objectives**

The mission of the RecFIN(SE) is to cooperatively collect, manage, and disseminate marine recreational fisheries statistical data and information for the conservation and management of fishery resources in the Region, and to support the development and operation of a national program. There are four goals of the RecFIN(SE) and each goal includes a variety of objectives for addressing that goal. The goals of the program are:

- + planning, management, and evaluation of data collection and management activities;
- + implementation of data collection activities;
- + establishment and maintenance of a data management system; and
- + support for the establishment of a national program.

### **Organizational Structure and Administration**

## Future of RecFIN

At the end of September 1995, a facilitated session was planned to develop recommendations regarding recreational data collection and use these recommendations to guide the program into the future. The purpose of the session was to review the status of the RecFIN(SE) strategic plan after its first three years of operation and provided options and recommendations to extend the operations of the RecFIN(SE). The recommendations and discussions from the activity will form the basis for the operations plan for 1996 and provide general guidance for the next five years. During this session, the group generated specific recommendations and then prioritized the recommendations.

In all, the group developed 46 different recommendations which covered a variety of topics and issues regarding marine recreational fisheries resources. The group then prioritized the recommendations and identified those that should be addressed or completed during FY1996 as high priority. These recommendations will be used to help identify future activities of the program and will contribute to the long term success of the program. The following recommendations were identified as high priority and will be addressed and/or completed during FY1996:

- . Duplicative data collection and management activities should be identified and strategies developed to address them;
- . Puerto Rico and U.S. Virgin Islands should establish MRF licenses with funding dedicated to respective agencies for conservation and management;
- . Encourage the MRFSS program to implement basic socioeconomic data collection and management on a routine basis;
- . Encourage NMFS to evaluate integration of MRFSS and Panama City charter boat data;
- . Charge a work group with comparing the RecFIN quality control document with the NMFS/Panama City and Beaufort documents and integrate, where possible;
- . Charge a work group with determining a distribution list of outside users;
- . Encourage all projects collecting recreational fisheries data to adopt and adhere to RecFIN quality standards;
- . A representative of RecFIN(SE) should participate directly in the Atlantic Coast cooperative statistics program;
- . RecFIN(SE) should participate in and evaluate the results of the ASMFC workshop on Saltwater participation;

## **CHAPTER V**

### **Discussion and Formulation of Recommendations**

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## Discussion and Formulation of Recommendations

Dr. Joseph C. Desfosse  
Atlantic States Marine Fisheries Commission

Recommendations and suggestions to improve data collection in the charter and headboat fisheries, and fisheries management in general, were made by industry representatives. Many of the frustrations experienced in one region were often experienced elsewhere, which led to overlap in ideas and possible solutions. All participants agreed that workshops that include industry participants were a positive step towards better fisheries management and the development of a comprehensive, coastwide data collection program. Issues were categorized in six major topics: 1) increased communication; 2) simplification and improvement; 3) duplication; 4) onboard sampling; 5) management; and 6) miscellaneous topics.

### I. Increased communication

- Feedback
- Better data equals increased support
- Education/Outreach materials
- Provide fish keys
- Update and improve charts

Industry representatives expressed their desire to know what happens to the data once it is collected. They felt that this information was given freely to the interviewers and that they should get some feedback in terms of what happens afterward, and what the data reveals about the fishery resource. Regulations are based on the data collected from their fishery and if there are any inaccuracies or misconceptions, they would like to have the opportunity to input into the process. Better data and better data collection programs would lead to increased support for proper management decisions which would lead to increased economic opportunities.

Educational issues covered a broad spectrum of ideas including educating the boat operators and mates as to the importance of sampling. This would allow them to prepare their customers as to what to expect when they returned to the dock and would provide for better cooperation from the fishing public. Outreach materials describing the sampling programs and what the data are to be used for could also increase cooperation from the industry and public. The publication and dissemination of regional field guides to aid in species identification and updated charts to provide more precise location data were also viewed as important. Misidentification of fish species by out-of-state fishermen along with interviewer misidentifications need to be addressed through education or fish keys.

#### IV. Onboard sampling

- Not viewed as a burden by most
- Insurance issues
- Evaluate mate/captain participation (provide training, forms)
- Use volunteers and/or students
- Pay mates to complete at-sea forms
- Target critical times and areas

In light of the Maine Pilot Study, industry representatives were asked for their opinion as to the feasibility of onboard sampling. Most viewed it as an opportunity to collect data first hand and interact positively with the boat operators and the fishing public. Onboard sampling would be more feasible in the headboat industry as opposed to the charterboat due to the space available. There is usually no space available on charterboats to accommodate a field sampler. One concern that industry representatives brought up was who would be responsible for paying for the extra insurance needed to carry onboard samplers. Various scenarios were suggested such as having the captain and/or mate conduct biological sampling on a volunteer basis or perhaps paying them to collect samples. Another suggestion was to contact local universities and schools with active marine science programs to attract volunteers or to pay students to collect data. As a cost-saving alternative, sampling could be targeted to critical times and areas to provide the most needed data. A priori decisions would need to be made to identify the data necessary to conduct stock assessments for species of utmost importance.

#### V. Management issues

- Simplify regulations
- Uniform regulations across states
- Structure regulations to meet industry needs
- Support representation of industry in management process
- Consolidate Councils/Commissions

Due to the number of regulated species and the number of jurisdictions involved, industry representatives voiced their concern that regulations need to be simplified and streamlined. Confusion as to which regulations are in effect in what area were viewed as detrimental to the industry. Simplifying regulations or making them more uniform across state and federal waters would ease this burden somewhat. Structuring regulations to meet the needs of industry was also viewed as important for keeping boat operators in business. As long as the total mortality allowable on a species is not exceeded, tailoring regulations to meet the needs of all user groups might be possible. Workshop participants agreed that all sectors of the fishing industry, including the general public, should be involved, or have some representation in the management process. Industry representatives should also be involved in the development of a coastwide, comprehensive sampling program for the Atlantic coast.



Workshop participants then discussed technical issues to improve data collection in the charter and headboat fisheries. These recommendations were formulated for each fishery separately and can be categorized as four major topics: 1) methodology; 2) logbooks; 3) outreach; and 4) miscellaneous. The following recommendations address charterboat fisheries.

## I. Methodology

- Stratification

Workshop participants suggested that utilizing a stratified random sampling design might provide for better sampling in the charterboat fishery. Stratification of inshore versus offshore trips might also increase precision in the estimates.

- Sampling frame

A comprehensive, coastwide sampling frame of charterboats should be developed. Those Atlantic coast states lacking a sampling frame of charterboats should develop a means of identifying those vessels which participate in the charter fishery. Workshop participants also suggested that the extent of part-time charterboats should be evaluated.

- Combining survey efforts

Workshop participants suggested that intercept efforts might be combined across some surveys as a cost-saving measure. Individual state surveys and MRFSS intercept interviews could be combined in some cases to eliminate duplication. Combining the NMFS's Large Pelagic Species charter survey and the MRFSS survey should be evaluated.

- Mandatory versus dockside sampling

Current dockside sampling levels should be evaluated as to the precision of the estimates provided and cost effectiveness. Increased sampling may be necessary to provide desired precision levels. The possibility of a mandatory reporting system should be evaluated in each state.

- Dockside sampling plus other methods

Evaluate dockside sampling combined with captain interviews to provide better estimates of effort. Interviews of captains and mates versus angler interviews should be evaluated. Current surveys should continue to get angler data and supplement that with data from captains.

- Telephone interviews

Workshop participants suggested that telephone interviews of captains could be conducted to provide estimates of effort. Evaluation of an IVR system to allow boat captains to call-in for

for each method need to be evaluated also.

- Industry burden

Sampling methodology should be evaluated on the basis of industry burden and steps should be taken to minimize burden.

- Objectives

The specific objectives of current surveys and any future surveys should be identified and made clear to industry as well as managers. Surveys should not be conducted just for the sake of conducting a survey.

- Recall

Workshop participants agreed that recall time in any survey should be kept to a minimum in order to reduce bias.

Workshop participants developed the following recommendations to improve sampling in headboat fisheries.

## I. Methodology

- Stratification

Workshop participants suggested that headboats and charterboats should be stratified into separate modes. The "homogeneous"ness of strata from state to state needs to be evaluated. The utilization of logbooks to further stratify modes should be evaluated.

- Sampling frame

A comprehensive, coastwide sampling frame of headboats should be developed. Those Atlantic coast states lacking a sampling frame of headboats should develop a means of identifying those vessels which participate in the fishery.

- Combining survey efforts

Workshop participants suggested that intercept efforts might be combined across some surveys as a cost-saving measure. Individual state surveys and MRFSS intercept interviews could be combined in some cases to eliminate duplication.

- Improvements to current surveys

### III. Outreach

- Feedback

Workshop participants agreed with industry representatives that information feedback was an important issue and should be addressed. Newsletters, bulletins, or reports could be used to provide summary data to the industry.

- Education

Educational materials and workshops could be provided to industry to inform them about survey methods and the validity of data gathered. Increased confidence from the industry would result in increased cooperation and better data in the long run. An education program or outreach materials should be developed in order to involve industry in the design of a new logbook or system.

- Training

Increased training of data collectors was identified as a concern by industry representatives and could be addressed as better training for interviewing and more knowledgeable in identification of species and local fishing practices and sites.

### IV. Miscellaneous

- Industry burden

Sampling methodology should be evaluated on the basis of industry burden and steps should be taken to minimize burden.

- Cluster effects

Examination of cluster effects, interviewers targeting anglers from one vessel instead of a random sample from all vessels, should be evaluated.

- Other sources of bias

Interviewer bias towards successful anglers should be evaluated.

## Appendix A

## Appendix A

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