

Research and Monitoring Needs for Southeast Fisheries

Report by request to the SEDAR Steering Committee

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INTRODUCTION

In August 2005 the SEDAR Steering Committee requested an investigation of research and monitoring needs for Southeast fisheries resources, with attention to those species scheduled for assessments through SEDAR in the near future. The goal of the project is to identify likely data deficiencies and begin addressing them to improve future assessments.

The objective of this report is to summarize previous research recommendations and identify those items common to previous assessments and therefore likely to present difficulties for future assessments. Much of this effort was accomplished by tabulating information in the document *Consolidated SEDAR Research Recommendations for Research, Monitoring, and SEDAR Procedures*. Because many research recommendations address the need for adequate biological sampling, available length and age structure samples were tabulated from the TIP, MRFSS, and headboat programs.

A rough, initial estimate of the sampling workforce in the region and the total sampling effort that the workforce currently provides is included to focus efforts to improve monitoring. This is intended to serve as a starting point in determining the amount of resources available and the increased resources required to meet the basic sampling needs of Southeast fisheries resources.

Staff initially assigned to this task included John Poffenberger, NMFS SEFSC; John Merriner, NMFS SEFSC; and John Carmichael, SEDAR Coordinator. John Merriner and John Poffenberger both retired during the Winter after, however, helping to develop a framework for this report and contributing to the needs analysis. Information on TIP sampling intensity (length and age samples) was provided by David Gloeckner, SEFSC.

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1. Recommendations of SEDAR Panels

Each SEDAR workshop is charged with providing research recommendations, thus for each species assessed there are 3 opportunities for scientific experts to develop a laundry list of research and monitoring tasks. Data Workshops tend to address basic data needs, such as catch statistics, biological characterization data, and life history. Assessment Workshops tend to echo these needs, and add specific modeling requirements or enhancements, and additional information areas such as abundance surveys. Review Workshops often add process and procedural needs to the list.

SEDAR research recommendations are extracted from each workshop report and combined into a single document titled *Consolidated SEDAR Workshop Recommendations for Research, Monitoring, and SEDAR Procedures*. As this document is 70 pages with recommendations through SEDAR 9 included, a more concise summarization is needed to identify common needs for this report.

Research needs were grouped into 5 primary categories: life history, fishery information, abundance information, modeling issues, and process and procedures. Specific research needs were identified within each of these categories and the number of assessments citing each need was tabulated. The percentage of assessments citing each item was calculated to provide a means of rating the importance of each listed need.

1.1. Data and Monitoring

Overview

Table 1 provides the tabulation of needs for the first 3 groups (life history, fishery information, and abundance information) which address the primary data areas.

Life history needs are primarily related to age and reproduction. Many assessments (74%) have cited a need for various improvements in ageing programs, including age validation and quality assurance and control of ageing methods. Many assessments have also cited a need for basic reproductive or fecundity information (63%). Better understanding of the effects of protogony is cited as an important need in all assessments of protogonous species. Another area of need is stock identification.

Basic fishery information needs are notably consistent, with recommendations repeatedly suggesting improvements in basic landings information, catch statistics by species, discards and bycatch, basic observer data, and catch characteristics (age (79%), length (42%), and sex samples 21%). Thirty-seven percent of the assessments raised questions about the adequacy and reliability of the MRFSS program. Nearly every assessment noted concerns with either MRFSS in particular or recreational statistics in general. Although only 11% of assessments specifically cite historical catch statistics as a research need, most assessments are limited by available data to a fairly short time-series of catch statistics and therefore note that longer time-series may improve population estimates.

Improved discard estimates are needed for all assessments. Commercial discard is cited as a specific need in 68% of the assessments; recreational discard is cited in 63%. Though not

specifically listed as a ‘need’, all assessments require considerable assumptions to determine the fate or mortality rate as well as the size and age composition of discarded fish. Assessments which do not cite specific discard-related research needs are typically those for which past and current discarding is presumed inconsequential. However, discarding in these fisheries may become more important in the future as regulations to stop overfishing are imposed.

Reliability and accuracy of many SEDAR assessments suffer due to inadequate measures of population abundance. Fishery-independent measures of abundance are totally lacking for several species in the South Atlantic, and the spatial and temporal coverage of those surveys which do exist is often questioned. Most assessments must therefore rely upon fishery-dependent surveys and carry forward all the well-known caveats and assumptions related to such sources of information. While fishery-independent surveys are more prevalent in the gulf (largely provided through the SEAMAP program), recommendations for improvement remain. Gulf assessments also supplement abundance measures with fishery-dependent survey information. The lack of survey data is especially problematic in the Caribbean area, where surveys have typically been short-lived and of narrow geographic range. Furthermore, the lack of adequate reporting of landings and effort inhibits development of fishery-dependent surveys for most Caribbean platforms.

Seventy-nine percent of the assessments cited a need for independent survey data. Forty-seven percent called for major improvements in or development of fishery-dependent abundance surveys. Specific areas cited include developing logbook indices, improving recreational (MRFSS and Headboat) indices, and providing recruitment indices. Assessments increasingly cite the need for spatial information, a need which is can often be carried over into the fishery statistics category as well.

Improving bycatch information has only been specifically cited in the assessments for Gulf of Mexico red snapper and gray triggerfish. It is nonetheless a critical issue for red snapper.

Recommendations to Address Future Needs

From this review, likely data deficiencies for future assessments include inadequate age samples and imprecise age assignments, inadequate and incomplete commercial landings, incomplete and imprecise private recreational landings and characterization information, inadequate abundance survey information, and inadequate discard information. Some can be met over the short term while others will require a long term investment of resources.

There are many species under the jurisdiction of the Southeast Region Councils. However, many of these contribute only marginally to landings and are unlikely to be assessed in a species-specific, quantitative manner. Given that resources are not infinite, research and monitoring efforts should be addressed toward those species supporting primary fisheries. The Councils and Regional Office should identify primary or ‘indicator’ species.

Ageing. Address ageing issues early in the process, ideally several months prior to convening data workshops. Ageing methodologies are increasingly standardized. Quality assurance/quality control (QA/QC) standards should be developed for ageing programs so that problems such as lack of validation or inconsistent structure interpretation between agers and ageing programs are not issues for future assessments. Most age labs take such concerns seriously and have devoted considerable effort in recent years to developing QA/QC and training

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programs. Many of the state agencies and interstate commissions have worked to develop training programs, standardize methods, and facilitate structure exchange.

Recent SEDAR assessments have shown considerable progress in this area. State and federal ageing programs convened an ad-hoc ageing workshop prior to the gag grouper data workshop and were able to address many ageing concerns. Similar work was done prior to the red porgy assessment update. Such efforts are critical to successful assessments, as ageing is an important but time consuming step in data preparation. Travel funding poses a challenge to those willing to hold age data workshop prior to SEDAR data workshops.

Reproductive Studies. Much of the reproductive information now available is provided through state and federal agency scientists. To increase capabilities, additional reproductive studies could be commissioned through University researchers and cooperative grant programs for species that will be assessed 3-5 years from now. Most studies of this nature require several years for data collection and at least one additional year for preparation and analysis. Potential changes in reproductive parameters must also be addressed, perhaps by implementing a regular data collection program for managed species.

Commercial Catch Statistics. Considerable effort has been devoted to improving catch statistics, with many states in the Region now requiring trip level reporting by fishermen or dealers. Such programs should be fully funded. Basic, 'common sense' requirements should be imposed to ensure that the data collected are useful to assessments and fishermen should be trained to appreciate the importance of accurate reporting. Problem areas that continue to add needless uncertainty to assessments include inaccurate reporting of fishing area, gears, and species. Some landings are still reported in aggregated species categories. Informative assessments of Caribbean species are prohibited due to the lack of reporting 'to species'.

Private Recreational Catch Statistics (MRFSS). Support improvements to the MRFSS survey. The adequacy and reliability of private recreational catch estimates is often questioned. For the historical records of many species this has not been a major concern, as commercial fisheries dominated landings. However, as recreational effort increases recreational landings become more important to assessment results. The last 5 SEDAR assessments included improving the MRFSS survey as a specific recommendation.

Catch Characteristics. Population estimates are greatly improved when accurate length and age composition data are available. For many species it is also important to collect sex composition. Although the number of length and age samples has increased considerably (see appendix tables) in recent years, there is still room for improvement. Moreover, many species which appear to have adequate samples based on gross examination suffer under closer scrutiny from both spatial and temporal mismatching between sampling effort and fishery effort. Finally, there is a growing awareness of the importance of spatial information for landings. Models are available to increase the spatial resolution of population estimates, but adequate data to assign landings to appropriate geographic area categories is often lacking.

Biological sampling of commercial and recreational catches should be increased. Current sampling resources should be directed to those species and fisheries which comprise the bulk of landings.

Sampling programs should be designed and monitored in a manner consistent with the nature of the fisheries. For example, sampling allocation plans are commonly predicated upon

species-based sampling and include targets developed for individual species. Such approaches are not appropriate for multi-species fisheries such as those for the snapper-grouper complexes.

Sampling for age composition is especially problematic. Many species in the Southeast region cannot be reliably assigned to age class through the classic age-length key approach that works well in other regions because length is not informative of age. Therefore, direct assignment of ages is necessary. Direct age assignment requires require representative, random sampling for age structures. In this situation, the number of age samples is just as critical as the number of length samples, and reliable information is not obtained from age 'sub-sampling'. A recent paper presented to the SEDAR 10 Data Workshop (Chih 2006) clearly illustrated that small sample sizes invariably result in biased age compositions. Sampling targets for age structures should be increased.

Independent Surveys. Comprehensive independent surveys of abundance should be developed for the South Atlantic and Caribbean areas. Improvements should be made to independent surveys in the Gulf to optimize information content. Spatial and age composition information should be enhanced for existing surveys. Independent surveys are especially critical to evaluating the status of species for which harvest is prohibited or severely restricted, such as Goliath grouper, Warsaw grouper, and speckled hind.

These recommendations could involve expanding and modifying the MARMAP and SEAMAP programs as well as initiating new programs. New programs that take advantage of cooperative research opportunities should be considered. Fishermen involved in SEDAR workshops have expressed considerable interest in cooperative research programs.

Dependent Surveys. The precision of fishery-dependent information should be increased to improve the information available from fishery-dependent surveys. Trip level reporting is adequate to determine landings, but generally insufficient in terms of the fine-scale resolution of catch and effort desired for developing abundance indices. An observer program is the typical solution to this problem, though this may be impractical for the many small vessels used in the Southeast. Various electronic programs, such as electronic logbooks or video systems, have been developed and should be considered for developing a comprehensive program to provide set-specific catch and effort information.

Discards and Discard Mortality. Discard information should be increased. Information is necessary on the magnitude, fate, and biological characteristics of discarded fish for both recreational and commercial fisheries. The relation between depth and release mortality is gaining awareness, leading to a need for information to characterize discards by depth. The commercial logbook program has proven useful in recent assessments, and therefore should be continued. The program should be expanded through observer coverage or electronic methods to provide critical characterization information.

Recreational discard characterization information is needed. Some areas have used 'angler diaries' or other cooperative programs in which recreational anglers record their effort and the sizes of fish they discard.

Programs implemented to collect discard characterization information in the Southeast may require different strategies than similar programs in other areas. A primary concern is the fact that for many species fish length is not informative of fish age, thus length measurements of discarded fish may not be adequate to reliably characterize discards by age.

Bycatch. Estimates of red snapper bycatch by the Gulf of Mexico shrimp fishery should be improved.

Comprehensive bycatch monitoring in the Gulf and South Atlantic would help determine whether bycatch is a potential problem for other species.

Summary of Specific Recommendations

- Recommend pre-SEDAR Data Workshop ageing workshops.
- Request reproductive studies for scheduled species through cooperative research programs.
- Implement regular collection of reproductive samples from managed species
- Eliminate aggregated species catch categories
- Provide accurate and complete catch statistics for managed species: Develop ‘to species’ reporting programs or adequate sampling ‘to species’ in the Caribbean
- Educate fishermen in the importance of accurate trip reports
- Increase biological sampling, with attention to proper design and evaluation
- Identify primary species to focus sampling and research efforts
- Improve age sampling; eliminate sub-sampling when age-length keys are ineffective
- Increase fishery-independent survey efforts & consider cooperative research opportunities.
- Develop a comprehensive observer program & consider electronic approaches
- Improve estimates of discards and discard characteristics, including depth
- Continue and consider expanding the commercial logbook survey
- Conduct release mortality studies
- Develop ‘cooperative angler’ or diary programs to provide recreational discard characterizations information
- Improve shrimp fishery bycatch estimates

1.2. Procedures and Methods

Overview

Table 2 provides a tabulation of recommendations relative to modeling approaches and the SEDAR process in general. The tabulation is not complete with regard to SEDAR 10, gag grouper. Only recommendations through the assessment workshop are included. Additional recommendations related to both modeling methods and process and procedure are expected from the review.

Modeling recommendations tend to be fairly specific to each assessment, and therefore not every recommendation is listed in the tabulated results. Those included in table 2 represent items of general concern considered likely to appear in future assessments. Several such recommendations relate to improving the resolution of population models by incorporating spatial information (37%), sex-specific modeling (26%) and mixed stock models (5%). A number of recommendations address requests for greater details on model methods and outputs, including improving diagnostic measures (37%), improved tables of parameters and equations

(37%), and providing configuration history (11%). Mark-recapture or tag studies have been suggested in numerous instances (37%) as an approach to improve population estimates.

Those developing models for SEDAR assessments have addressed several of these needs and incorporated improvements in recent assessments. To cite a few examples, multiple models are now the norm for benchmark assessments, a spatial model was developed and used for red snapper, a multiple stock model was developed for king mackerel, diagnostic tools were added for the gag assessments, and a trend in fishery catchability was considered for gag. There have been numerous other specific improvements incorporated in the update assessments for black sea bass and red porgy.

It is important to note here that model improvements are only one component of efforts to improve assessment inference. Data are the other major component, and in most instances data availability is the more critical impediment. Methods currently exist to model multiple stocks, multiple species, and multiple areas, but data on catches are lacking at such scales. Commonly fixed parameters such as selectivity and natural mortality could be estimated if adequate data were available. Current models can incorporate historic catches of varying reliability if such records become available.

Process and procedure recommendations provide an important means to improve the overall SEDAR process. Consistency in this category of recommendations is fairly low across assessments, possibly because SEDAR has changed over time in response to previous suggestions. For example, several recommendations from the first and second SEDAR assessments do not appear in many of the following assessments. There is also a tendency for these recommendations to evolve and refine over time. For example, the first few assessments included recommendations to provide greater detail regarding data and analyses. As such recommendations are addressed in later workshops, the recommendations become more specific, suggesting executive summaries of the detail documents or detail maps.

One exception to the progressive improvement in procedural issues in SEDAR 9. A number of recommendations reappear, requesting greater details, complete data, and methods documentation. Also notable for this series are the suggestions for more time and more resources. Such recommendations are not surprising given that this SEDAR cycle addressed 3 species and was further challenged by the devastating 2005 hurricane season. The review panel for SEDAR 9 rightly recognized that omitted details and documentation were the result of a lack of time and resources to complete the assigned task.

The issue of 'more time' is cited for 53% of the assessments. It is cited for all of the recent assessments. An associated recommendation of 'more resources' was added to the SEDAR 9 list. Pleas for more time and more resources arise for all assessments which were scheduled for completion within a 6-month period. Two recent assessments were delayed and required convening the assessment workshop a second time.

Recommendations to Address Identified Needs

Modeling Improvements. Efforts to improve assessment models should continue. Programmers should be encouraged to target specific recommendations of the various workshops, especially those related to improving outputs and diagnostics. Model developers

should be given the resources to complete the necessary documentation and standardization required for inclusion in the NMFS toolbox.

Mark-Recapture and Tag Studies. Consideration should be given to developing tag programs that could support mark-recapture methods of mortality estimation and provide information on movements that is needed for some species. Cooperative research with commercial and recreational fishermen should be considered given the time consuming nature of such programs.

Data currently available from existing and historical tag programs should be analyzed thoroughly, with regard to determining movements, improving stock delineations, and estimating fishing and natural mortality.

Process and Procedures. Efforts should continue to improve and refine the SEDAR process. Each Council is encouraged to solicit suggestions from its members and associated committees to ensure that SEDAR is achieving its objectives and providing the necessary information. Workshop participants appointed by the Councils should be reminded of their role in the process upon being appointed.

Data and Documentation. Each workshop should be reminded of the importance of thorough documentation of data sets and analytical methods.

- All data necessary to complete the assessment should be provided in tables.
- All results should be provided in tables, with figures produced to support critical findings.
- Executive summaries or abstracts should be provided for working papers.
- Minimum required document contents and desired assessment outputs should be identified and communicated to analysts and workshop participants in advance.

Previous Assessments. Previous assessments are not always provided to current participants. Reviewers are always interested in previous assessments efforts, especially with regard to potential changes in conclusions and whether such changes are due to methodological changes or data changes. It is also important to note previous research and monitoring recommendations and identify those addressed or possibly no longer relevant. The SEDAR outlines calls for a review of previous assessments in the introductory section. Lead analysts should be reminded to prepare appropriate text for this section and to provide copies of previous assessment documents.

Time and Resources. Additional time and resources are needed for adequate assessment development. Since it is unlikely that significant additional resources can be obtained, the time allotted to each assessment should be increased.

Several review panels recommended applying a workshop approach to special problems that are known to significantly affect assessment results, such as determination of discard mortality rates, evaluating bycatch estimates, calculation of abundance indices, and developing appropriate methods to incorporate potential changes in fishery catchability. Increasing the time between current SEDAR workshops and assessment cycles will increase the likelihood of accommodating such suggestions.

Table 1. Tabulated SEDAR assessment research recommendations for life history, fishery information, and abundance information categories.

SEDAR	SPECIES	Life History								FISHERY INFO													ABUNDANCE INFO							
		qa/qc ages	M	Protog	STOCK ID	REPRO BIO/FECUND	GROWTH	Density Dependence	conversions	comm land	C discard	C REPORT BY SPP	SPP ID ISSUES	R land	R discard	Sex Samples	Len samples	Rep age samples	OBSERVERS	MRFSS QUESTS	HIST CATCH	BYCATCH	Ind Srvy	Dep Srvy	refine dep surveys/effort	logbook Index	MRFSS NDX	REC NDX	HB INDEX	SPATIAL INFO NEEDED
1	SAFMC Red Porgy	X	X	X						X	X		X		X	X			X				X	X	X	X			X	
2	SAFMC Vermilion Snapper					X					X			X	X			X		X			X	X		X		X	X	
	SAFMC Black Sea Bass	X		X	X	X				X	X				X	X		X					X	X	X	X	X	X	X	X
3	SAFMC Yellowtail snapper	X	X		X					X	X			X	X			X		X			X							
4	SAFMC Snowy Grouper	X		X		X				X	X			X	X	X	X	X					X	X					X	X
	SAFMC (Golden) Tilefish	X				X				X	X			X	X	X	X	X					X	X						X
	CARIB spp	X				X				X	X	X		X	X		X	X					X	X		X				
5	SAFMC & GMFMC King Mackerel					X	X																X			X				X
6	SAFMC & GMFMC Hogfish Snapper					X	X										X						X		X					
	SAFMC & GMFMC Goliath Grouper	X	X			X				X	X			X	X			X				X	X							X
7	GMFMC Red Snapper	X			X			X		X					X			X				X	X	X			X			X
8	CFMC Yellowtail Snapper	X	X			X	X			X	X	X		X	X		X	X					X	X						
	CFMC Spiny Lobster	X			X		X			X	X	X		X			X	X	X				X	X	X			X		
	SAFMC & GMFMC Spiny Lobster		X				X												X				X				X			
9	GMFMC Vermilion Snapper	X																X	X	X										
	GMFMC Greater Amberjack									X		X		X				X		X										X
	GMFMC Gray Triggerfish	X				X												X	X	X		X								X
10	SA Gag	X		X	X	X			X		X	X		X			X	X	X	X		X	X	X			X	X	X	X
	GOM GAG	X		X	X	X						X					X	X		X					X				X	X
	% ASSESSMENTS	74%	26%	26%	32%	63%	26%	5%	5%	47%	68%	16%	21%	42%	63%	21%	42%	79%	32%	37%	11%	16%	79%	47%	26%	26%	11%	32%	32%	53%

Table 2. Tabulation of SEDAR assessment research recommendations regarding modeling issues and the SEDAR process.

SEDAR	SPECIES	Modeling Issues														PROCESS AND PROCEDURES																					
		ERROR WTS	AGE ASSIGNMENT	INTERACTION TERMS	historic catch	VARYIN Q	SPATIAL	SEXUAL	M/R, tag STUDIES	MIX STOCK MODEL	MULTIPLE MODS	SIM TESTS METHOD	IMPROVE DIAGNOSTICS	TABLE PARAMS/EQNS	CONFIG HISTORY	MORE TIME	MORE RESOURCES	PRIORITIZE	TECH SUPPORT	IMP CMPRSN W/PREV ASSESS	MORE REVIEWERS	DATA DETAIL	STATE MIN N	HARD COPIES	DW EVALUATIONS	BASIC METHODS (TREND, CURVES)	CLARIFY TASKS	ASSESS DOC	PROVIDED ALL DAT	PREP TIME	HIERARCHY - UPDATE VS BENCH	CONTINUITY IN WKSH PART	EXEC SMRY/ABS FOR DOCS	MAPS	PUSHING DATA/ASSESS	GLOSSARY	
1	SAFMC Red Porgy				X											X	X	X	X	X	X																
2	SAFMC Vermilion Snapper	X																				X	X					X	X								
	SAFMC Black Sea Bass	X			X																	X	X					X	X								
3	SAFMC Yellowtail snapper		X	X		X	X															X	X		X	X	X	X									
4	SAFMC Snowy Grouper							X			X		X	X	X							X	X		X	X		X	X						X		
	SAFMC (Golden) Tilefish							X			X		X	X	X							X	X		X	X		X	X						X		
	CARIB spp																																				
5	SAFMC & GMFMC King Mackerel		X				X		X	X	X		X				X											X			X						
6	SAFMC & GMFMC Hogfish Snapper										X																	X									
	SAFMC & GMFMC Goliath Grouper																																				X
7	GMFMC Red Snapper					X	X		X			X	X				X	X									X				X						
8	CFMC Yellowtail Snapper							X		X					X		X															X	X	X	X	X	X
	CFMC Spiny Lobster							X	X	X							X															X	X	X	X	X	X
	SAFMC & GMFMC Spiny Lobster							X									X																				X
9	GMFMC Vermilion Snapper	X										X	X	X			X					X			X			X	X				X		X	X	
	GMFMC Greater Amberjack	X											X	X			X					X			X	X		X	X				X		X	X	
	GMFMC Gray Triggerfish	X							X				X	X			X	X				X			X		X	X				X		X	X	X	
10	SA Gag				X	X	X	X	X																												
	GOM GAG		X		X	X	X	X																													
53%	100%	26%	16%	5%	21%	21%	37%	26%	37%	5%	21%	11%	37%	37%	11%	0%	53%	21%	11%	5%	5%	5%	42%	21%	5%	32%	21%	11%	47%	37%	5%	5%	11%	26%	21%	32%	32%

2. Data overview for upcoming SEDAR assessments

The number of length, weight, and age structure samples was tabulated from the TIP, MRFSS, and Headboat programs for those species currently on the SEDAR schedule. The purpose of this exercise is to identify any major shortcomings in biological characterization information. It should be noted that this simple tabulation of sampling intensity does not guarantee that the available samples are adequate for catch characterization as it does not attempt to compare the geographic, seasonal, or gear specific information of the catch with that from the available samples. However, it will identify species having low numbers of samples and provide a relative indication of whether sampling intensity is improving in recent years.

Complete details of available samples are provided in excel spreadsheets that will be distributed with this report. The spreadsheets are organized according to the SEDAR assessment number. Separate sheets are included for the major data sources - TIP, Headboat, and MRFSS. In some instances landings values are provided. A summary narrative for each species provides an overview of past assessment efforts, known data deficiencies and issues, and availability of other data sources such as indices and life history studies.

The figures in the following section provide an overview for each program. An indication of recent sampling performance is provided by calculating the average number of samples over the last 4 years (2000-2004). 2005 data were not complete at the time these tables were developed.

2.1. SEDAR 12. Gulf of Mexico Red Grouper (2006)

Considerable length samples are available for Gulf of Mexico red grouper (Figure 1). Annual samples in the TIP database range from 747 to over 30,000 between 1984 and 2004. Since the 1990's sampling intensity has been in the tens of thousands, and the average 2000-2004 is nearly 25,000. MRFSS samples are available from 1981-2004, range from 42 - 1601 annually, with a 2000-2004 average of 811. Headboat samples available since 1985 provide range between 3 and 701 annually, with a 2000-2004 average of 130.

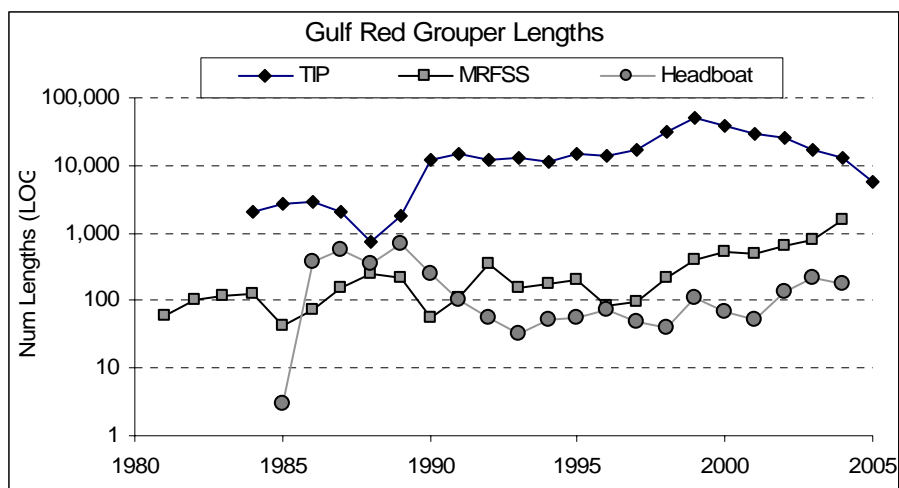


Figure 1. Length samples of Gulf red grouper

Otolith samples are primarily available from TIP (Figure 2). TIP samples are reported since 1986. Sampling intensity has generally increased over time, ranging from 3 to 2960 per year with a 2000-2004 average of 2043. No samples are available from MRFSS. Headboat samples are considerably fewer, ranging from 0 to 45 per year and averaging 15 from 2000-2004. No samples are available from several recent years.

TIP sampling intensity has increased from 10's of trips in the 80's to 100's of trips recently. From 2000-2004 an average of 480 trips were sampled per year, representing about 7% of reported trips.

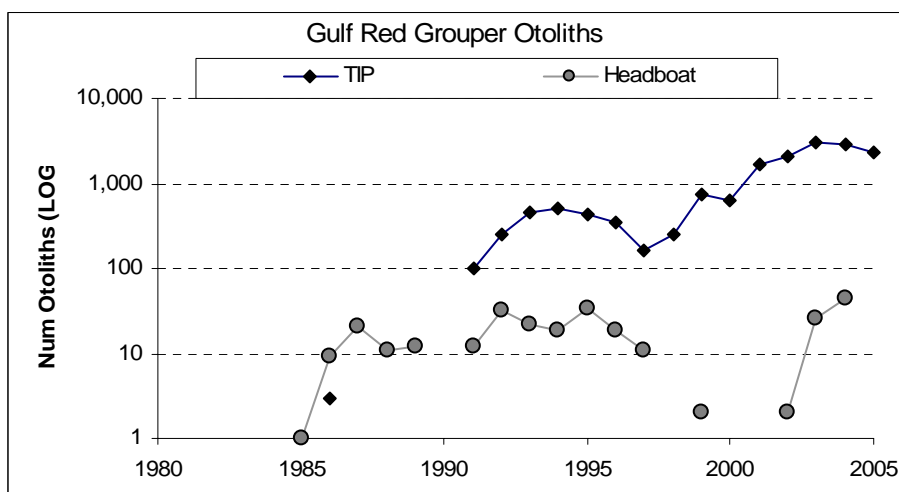


Figure 2. Otolith samples of Gulf red grouper.

2.2. SEDAR 14. Caribbean Mutton Snapper, Yellowfin Grouper, and Queen Conch (2007)

Some length data are available for mutton snapper, with samples from Puerto Rico more consistent but still generally low (Figure 3). There are very few length observations available in the TIP program for Queen conch and yellowfin grouper (Figure 4, Figure 5). The 2000-2004 average is around 400 mutton lengths per year. The utility of these data will depend greatly on the pattern of landings.

Some length observations for mutton snapper are available from MRFSS, though not presented in tables due to the overall scarcity. Between 2000 and 2004 105 lengths are available from MRFSS, with annual samples ranging from 9 to 35. No MRFSS samples for queen conch are available. Yellowfin grouper are represented with 1 fish in 2001 and 4 in 2003.

No age structures are reported in TIP for any of these species.

Species identification of commercial landings is a concern for the USVI data, where species are landed as either aggregates such as ‘snapper’ or ‘snapper/grouper’ or in some instances as ‘fish’ by gear type. Puerto Rico landings are ‘by species’.

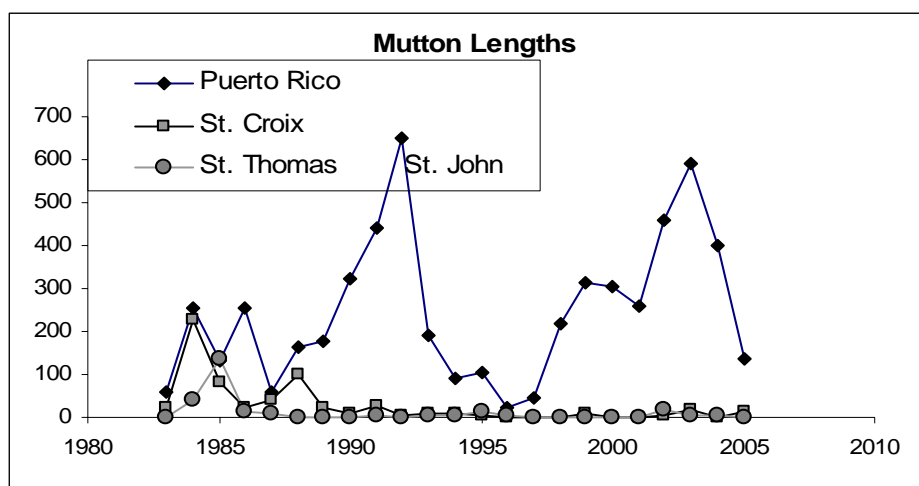


Figure 3. Length samples of Caribbean mutton snapper

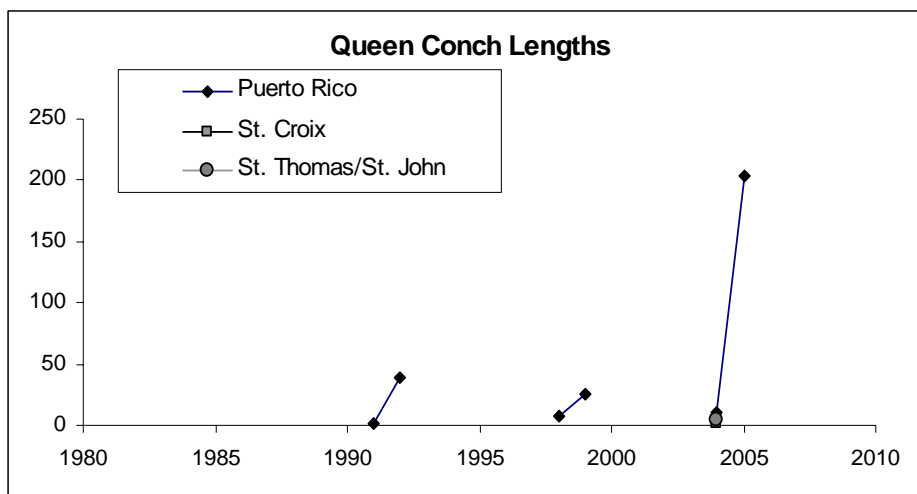


Figure 4. Length samples of Caribbean Queen conch

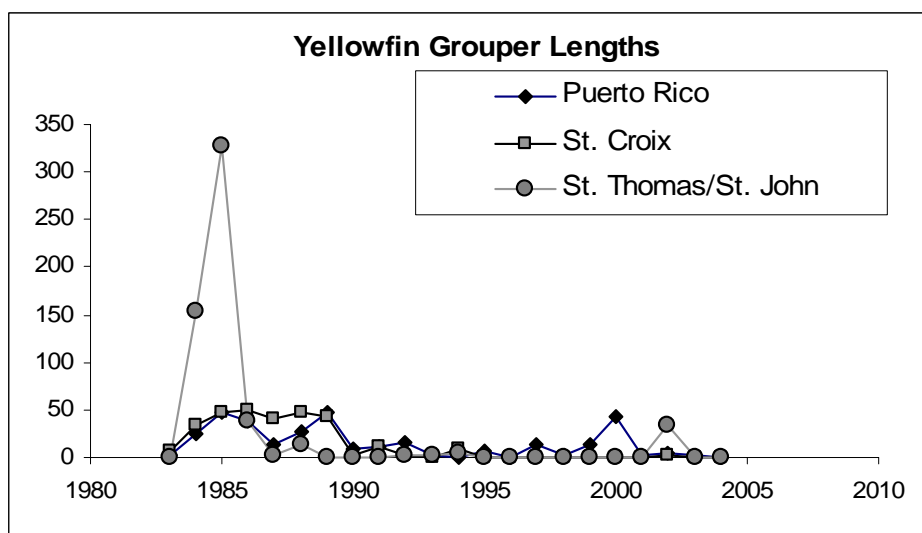


Figure 5. Length samples of Caribbean yellowtail snapper

2.3. SEDAR 15. South Atlantic white grunt and greater amberjack (2007)

South Atlantic Greater Amberjack

Sampling intensity of greater amberjack in the South Atlantic has increased for the TIP program in recent years (Figure 6). Samples range from 1 in 1983 to 1,555 in 2003. The 2000-2004 average is 1,130. MRFSS sampling ranges from 12 in 1982 to 320 in 2003, averaging 186 from 2000 - 2004. Headboat samples are available since 1972, ranging from 3 in 1972 to 278 in 1983 and averaging 100 for 2000-2004.

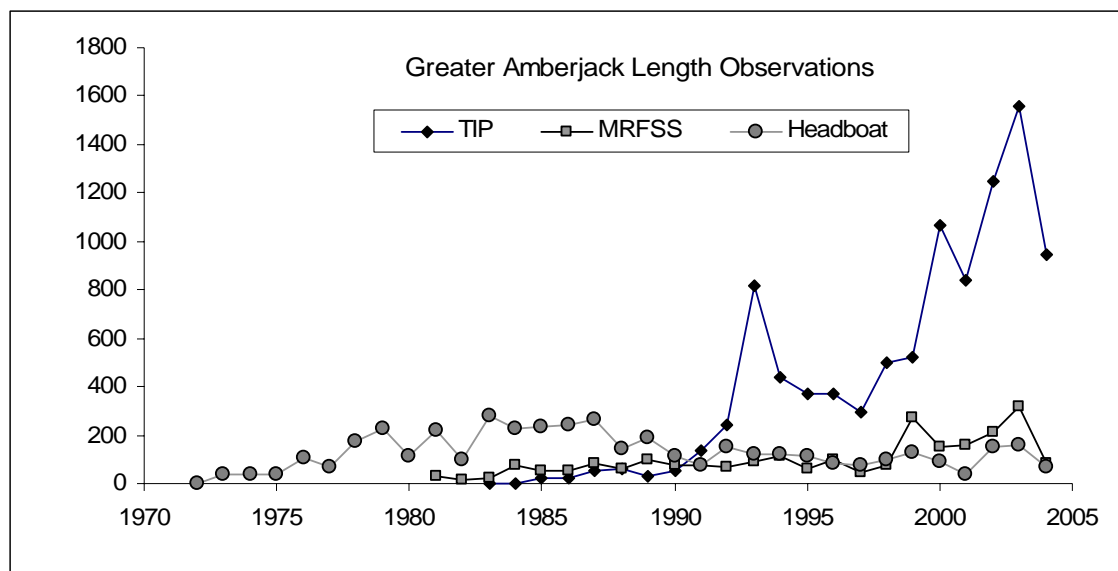


Figure 6. Length samples of South Atlantic greater amberjack.

Otolith observations for greater amberjack are only available in any number in recent years from the TIP program (Figure 7). No samples are available from MRFSS. Headboat samples are few, from 1 to 37 per year and mainly from the early 1990's.

The increase in otolith and length samples available through TIP in recent years follows an increase in the number of trips sampled. The percentage of logbook trips reporting amberjack for which samples are available increased from 3.4% from 1993-1997 to 9.2% from 2000-2004.

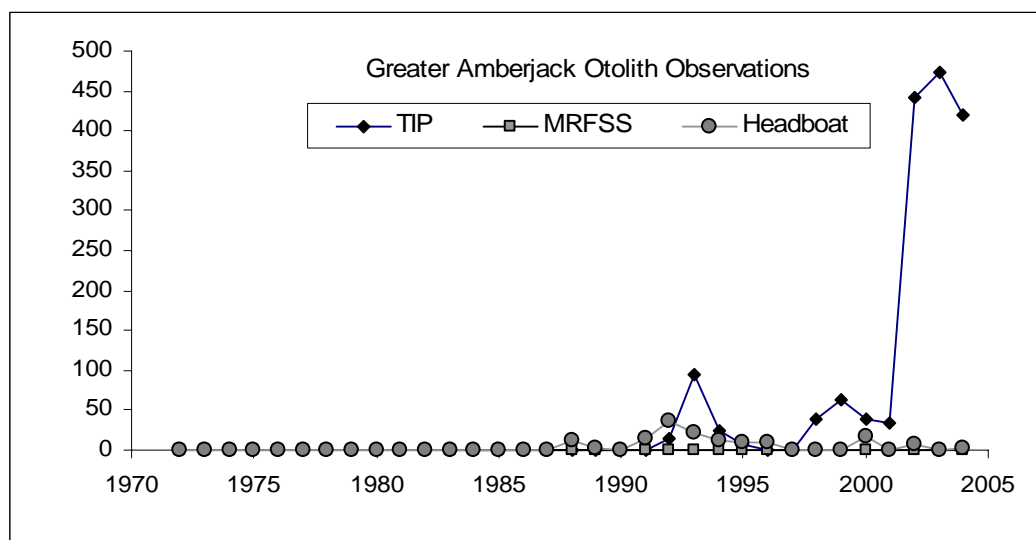


Figure 7. Otolith samples of South Atlantic greater amberjack.

South Atlantic White Grunt

Considerable length observations are available for South Atlantic white grunt (Figure 8). The TIP database includes annual observations since 1983 ranging from 75 to over 3,000, with a

2000-2004 average of 2026. The MRFSS program reports observations since 1981 ranging between 37 and 230 per year with a 2000-2004 average of 159. The headboat program reports observations since 1972 with annual samples ranging from 468 to over 3,000 and a 2000-2004 average of 468.

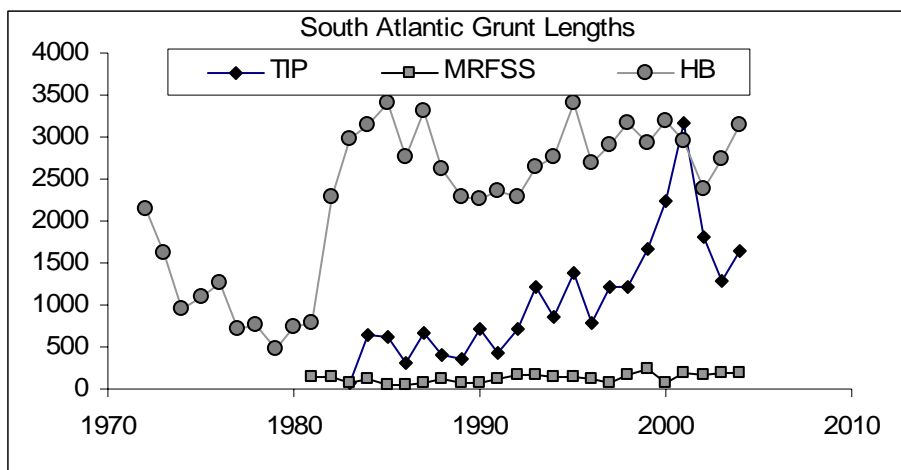


Figure 8. Length samples of South Atlantic white grunt.

Few otoliths samples are available for South Atlantic white grunt (Figure 9). Samples are reported in the TIP database since 1983, ranging from 23 - 312 per year and averaging 98 during 2000-2004. Headboat samples are variable and are most abundant in the late 80's. Samples are available since 1983, ranging from 0 to 677 per year and averaging 94 for 2000-2004. No otoliths are available from MRFSS.

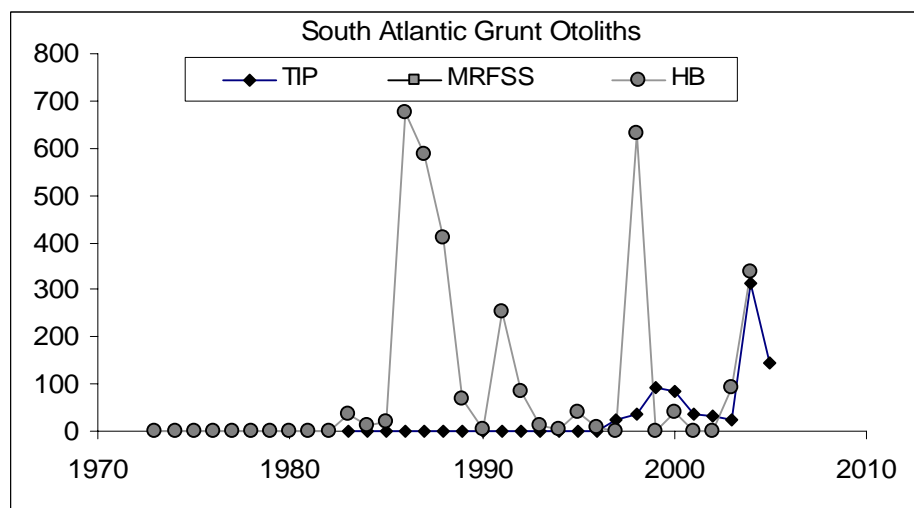


Figure 9. Otolith samples of South Atlantic white grunt.

2.4. SEDAR 16. Gulf of Mexico Yellowedge Grouper and Tilefish (2008)

Yellowedge Grouper

Appreciable length samples for Gulf of Mexico yellowedge grouper are only available from the TIP program (Figure 10). Observations are reported from 1983 onward, ranging from 335 to over 10,000 per year. The average for 2000-2004 is 473. The MRFSS program reports only 29 observations since 1987 with a maximum per year of 5. The headboat program reports only 87 observations since 1986, with most of those occurring between 1986 and 1990. Maximum sample size is only 39.

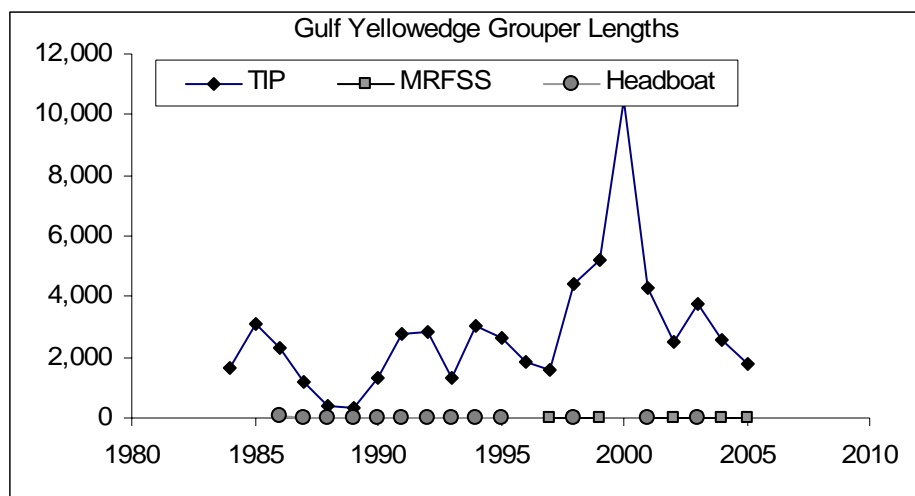


Figure 10. Length samples of GOM yellowedge grouper.

Otolith observations for yellowedge grouper are primarily available from recent years and the TIP program (Figure 11). Samples start in 1985, though there are periods of several years in the 1980's and 1990's where no samples are reported. Observations increase in recent years, with samples sizes in the 100's since 2000 and a 2000-2004 average of 439. The headboat program only report 17 observations, mostly from the mid-1980's.

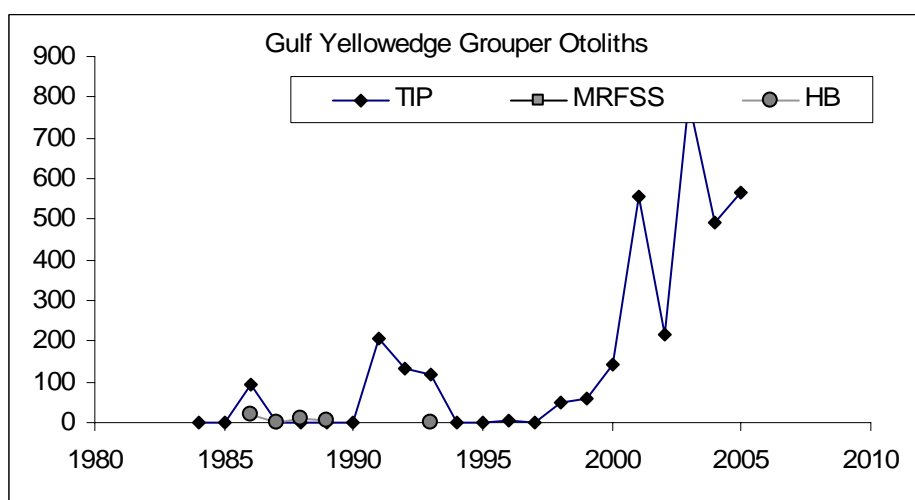


Figure 11. Otolith samples of GOM yellowedge grouper.

Tilefish

Length observations for Gulf of Mexico tilefish are available from TIP since 1984 (Figure 12). The number of samples has steadily increased in recent years, and the 2000-2004 average is 1066. MRFSS reports 27 observations between 1981 and 2001. The headboat program reports 3 observations.

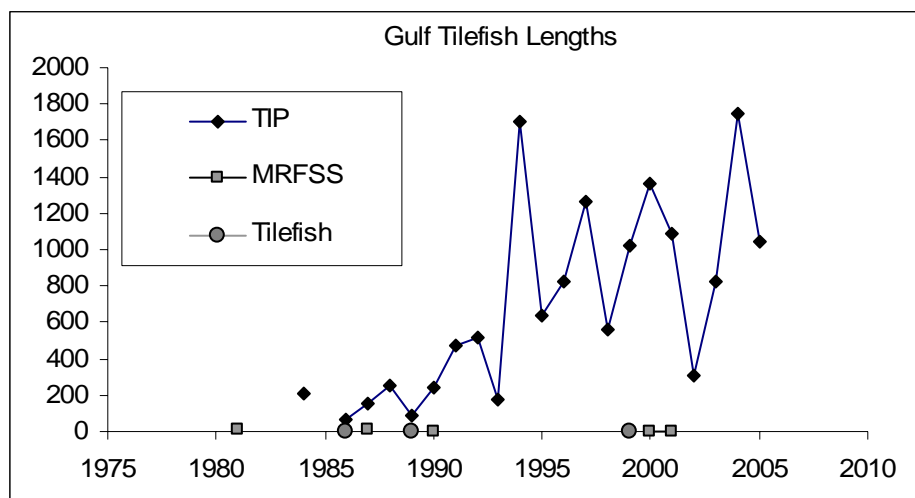


Figure 12. Length samples of GOM tilefish.

Otolith observations for tilefish are only available through TIP (Figure 13). Sample numbers are low, especially in the earlier years. They range from 0 to 448 since 1996, but average 173 per year for 2000-2004. No observations are reported for either MRFSS or TIP.

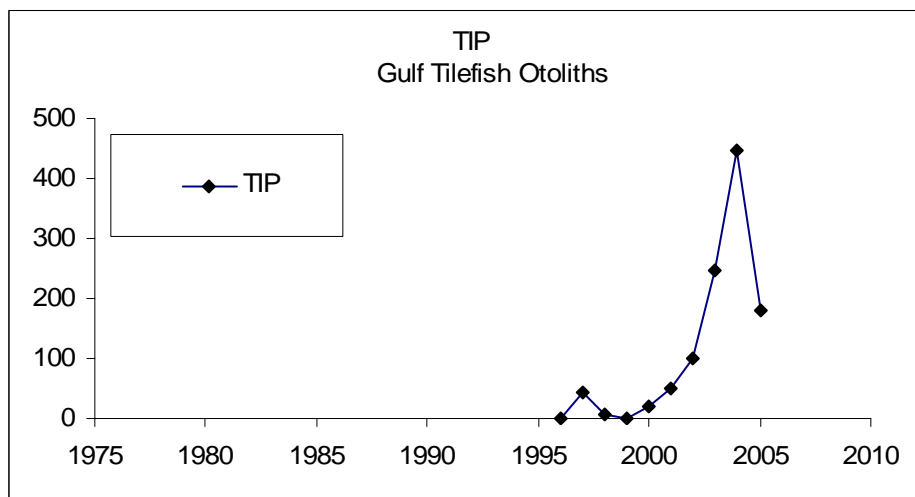


Figure 13. Otolith samples of GOM tilefish.

2.5. Overview for SEDARs 17 - 21.

Complete details of available length and age samples for SEDARs 17 - 21 are available in the spreadsheets. Potential problem areas are noted below.

SEDAR 17. South Atlantic Spanish Mackerel and Black Sea Bass (2008)

Black sea bass were assessed in SEDAR 2. The assessment was recently updated. No major problems are identified with length samples. Some issues exist with age sampling. TIP age samples are reported since 1997, though samples sizes are low through 2003. The MARMAP program has additional age samples that should be made available for this assessment. Some age samples are also available from the headboat program.

Spanish mackerel were assessed fairly regularly in the past (prior to SEDAR). TIP reports average length sampling for 2000-2004 in excess of 6,000, and otolith samples since 1991 with an average of over 400 per year for 2000-2004. MRFSS length samples are available since 1981, with a 2000-2004 average exceeding 1000. Headboat samples are fewer, averaging 57 between 2000 and 2004, with some years since 1974 showing very low samples. Few otoliths are available from the headboat program.

SEDAR 18. Gulf and South Atlantic Red Drum (2009)

Few length and otolith samples are available through the TIP program for either region. This may not be a major concern since commercial fisheries for this species are heavily restricted.

Considerable length samples are available for the MRFSS. The 2000-2004 average number of MRFSS lengths is 2465 for the Gulf and 561 for the South Atlantic. Few red drum observations are reported in the headboat program for the South Atlantic. Samples sizes for the Gulf, however, number several hundred per year since 1996.

No otolith samples are available from MRFSS so other sources of age information may need to be pursued. It is possible that State agencies have age samples which can be accessed.

SEDAR 19. Hogfish and Atlantic Yellowtail Snapper (2009)

A hogfish assessment was reviewed and largely rejected by the SEDAR 6 Review Panel. Several hundred length samples are available per year from TIP since 1997. MRFSS and headboat samples are in the 20's and 30's most years. Few otolith samples are reported.

Primary concerns with the hogfish assessment that should be addressed prior to this next attempt include: adequacy of the MRFSS-derived CPUE index, development of the catch-age matrix, overall improved documentation of data treatments and assessment methods, collection of biological data from the spearfish fishery, and development of a CPUE index from the logbook data.

Yellowtail snapper were assessed successfully during SEDAR 3. Length sampling is generally adequate.

SEDAR 20. Gulf Red Snapper (2010)

Red snapper were recently assessed during SEDAR 7. Numerous length and age samples were available.

The primary uncertainty in this assessment was the magnitude of shrimp bycatch and the effect of bycatch removals on population productivity. Efforts to better estimate and annually monitor bycatch removals is advised. Research directed toward determining the effects of bycatch removals on population dynamics should be pursued.

SEDAR 21. Caribbean Yellowtail Snapper, Spiny Lobster, and Queen Conch. (2010)

Yellowtail snapper assessments were pursued during SEDAR 3 and SEDAR 8. Length and age samples are severely lacking. Landings from the USVI are generally not available by species.

2.6. Commonly identified research and monitoring needs

A number of typical ‘problem areas’ emerge when the discussions and recommendations of previous assessment reviews are considered. Most of these items apply to those assessments listed above that will be assessed through SEDAR in the future.

1. Complete and accurate catch statistics. This issue is most pronounced in the USVI fisheries, though there are numerous species which are landed in aggregated categories within the commercial fisheries. Efforts should be devoted to improving the accuracy of reported landings. There are also concerns with the accuracy of the MRFSS landings estimates that will require attention in future assessments.

2. Adequate biological sampling. This includes length, age, weight and in some instances, sex observations. It is encouraging that length sampling intensity is generally improving for several species listed above. Continuing such efforts will improve future assessments. Attention should also be devoted to securing adequate length and weight samples.

Securing adequate age samples and ensuring such samples are appropriately collected and evaluated is an ongoing concern. The recent gag assessment is notable in that ageing issues were addressed prior to the DW when the primary investigators took the initiative to hold an age workshop.

The Steering Committee may wish to consider supporting age workshops for scheduled assessments well in advance of scheduled data workshops.

3. Discard estimation. Although the quality and quantity of discard information has improved in recent years, there is still room for further improvement. Cooperative research programs could be pursued to provide species composition and biological information for discarded species. The recent discard logbook program should be evaluated to ensure that the data provided are useful and reliable. Expansion of the discard logbook program should be considered.

4. Fishery-Dependent Abundance Indices. Many Southeast assessments must rely heavily on fishery-dependent abundance information despite widespread knowledge that such sources of information are less than ideal and may at times be biased. Methods for developing indices from

fishery data have improved considerably in recent years. Nonetheless, significant effort and discussion is devoted at data and assessment workshops to developing and interpreting abundance indices.

The Steering Committee may wish to support a workshop devoted to index development to improve the efficiency of this process for future assessments.

5. Fishery-Independent Abundance Indices. Issues continue to arise regarding independent abundance indices, especially for the South Atlantic and Caribbean areas.

The only source available in the South Atlantic is the MARMAP program. Concerns with this survey are primarily related to geographic and temporal coverage. Further, important species such as gag grouper do not appear in the catches with sufficient frequency to develop reliable indices.

The Steering Committee may wish to consider soliciting an outside review of this program to address concerns raised in previous assessments so that such issues can be resolved for future assessments and updates.

The primary source of independent abundance information for the Caribbean region is the SEAMAP program. The limited geographic range of this survey has greatly limited its use for assessments.

3. Overall collection ability.

The SEFSC TIP (Trip Incidence Program) database contains records from over 97,000 fishing trips sampled between 1984 and 2006. On average the program adds over 4,000 sampled trips per year. This includes trips sampled by SEFSC port samplers as well as trips sampled by state personnel and provided by the state to the database. These trips are presented by year and region in the figure below (Figure 14).

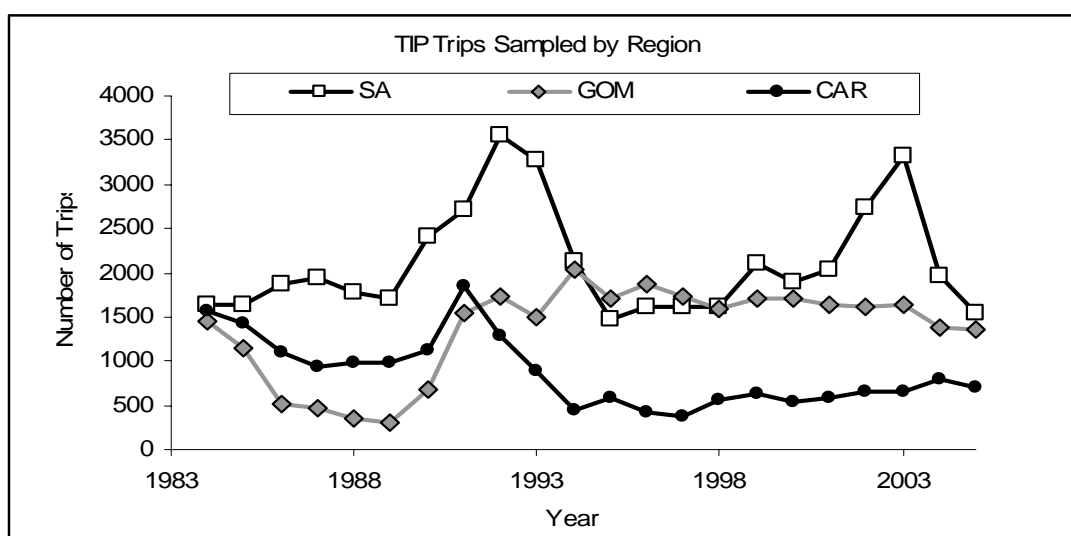


Figure 14. Number of sampled trips available in the SEFSC TIP database by year and Region. SA = South Atlantic, GOM= Gulf of Mexico, and CAR= Caribbean.

Among the data collected for these 97,000 trips are over 4 million individual fish lengths, over 500,000 individual weights, and over 200,000 otoliths. The annual number of lengths is reported by region in the table below.

Both the South Atlantic and Gulf of Mexico areas show a decrease in the total number of lengths since peaks in 1999 (Figure 15). This pattern is contrary to that shown for many of the individual species examined above for which the number of available length samples increased recently. This may reflect an increase in sampling directed toward snapper-grouper species.

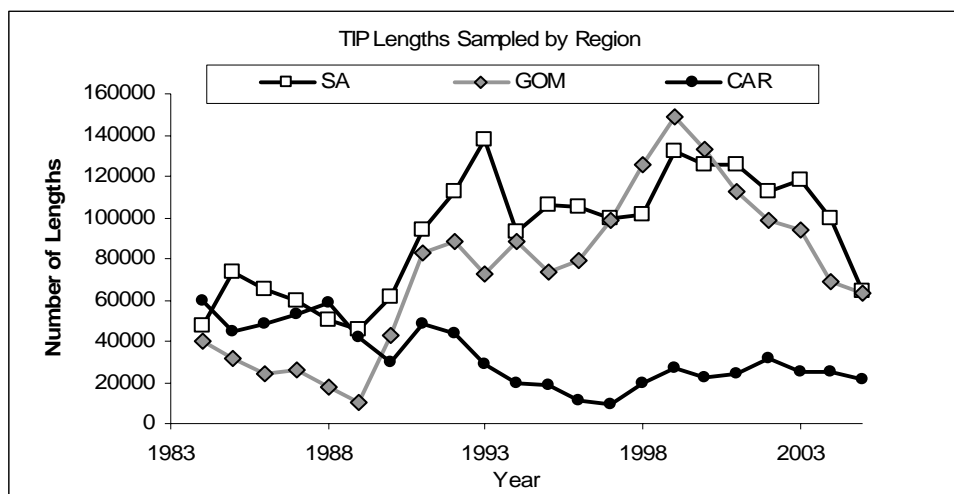


Figure 15. Total annual number of lengths available in the TIP database by region.

Available TIP length samples were broken out by state for each region. In the South Atlantic (Figure 16) most are reported by Florida (east coast), followed by NC, SC, and GA. Of concern is the declining trend in sampled lengths for most states in recent years. In the Gulf most are also reported by Florida (Figure 16). This region also shows a decline in recent years for Florida.

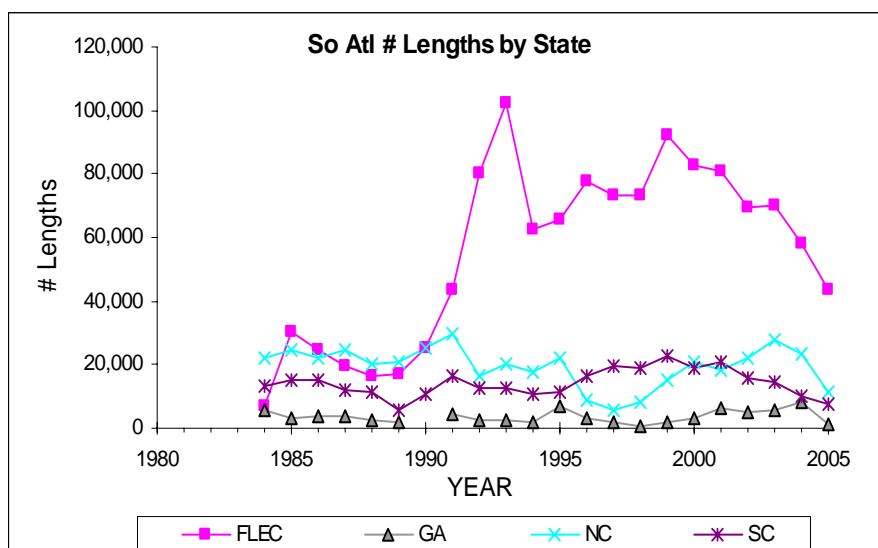


Figure 16. The number of lengths available in the TIP program by states in the South Atlantic.

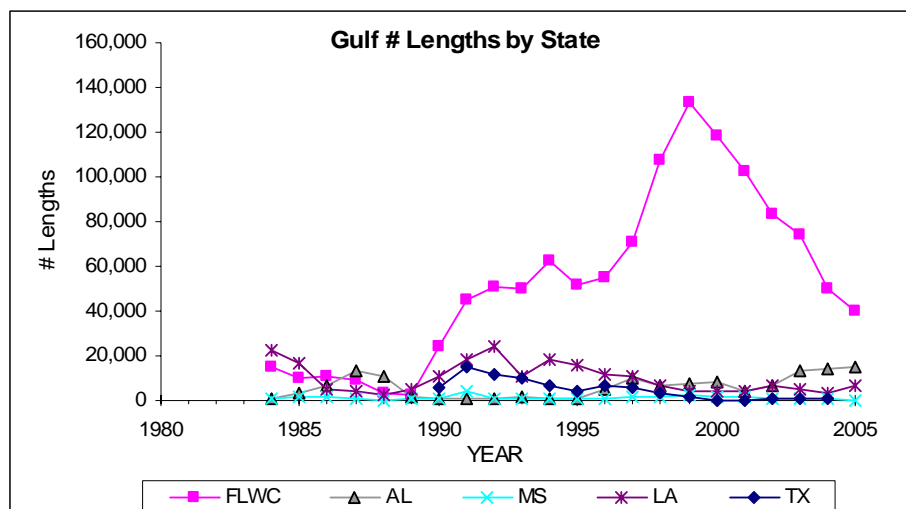


Figure 17. The number of lengths available in TIP by state in the Gulf of Mexico region.

Information on the number of biological samplers operating in each state and the SEFSC is available from ACCSP (Table 3). Most samplers are employed by the SEFSC. There are very few state personnel reported as participating full-time in commercial sampling operations.

Other personnel contributing to sampling include those working with MRFSS and the headboat program.

Table 3. ACCSP: Current Number of Biological Samplers by Partner (South Atlantic)

Partner	Number of Port/Field Agents	Location of Port/Field Agents
NMFS SE	13 samplers	2 – New Smyrna Beach, FL 1 – Ormond Beach, FL 3 – Tequesta, FL 1 – Miami, FL 2 – Key West, FL 1 – Myrtle Beach, FL 1 – Wilmington, NC 2 – Beaufort, NC
North Carolina	2 temporary sampling for TIP (will lose these positions soon)	
South Carolina	2 samplers	Charleston City, SC
Georgia	A portion of 2 CRD staff time	Brunswick, GA
Florida	4 state samplers	1 – Jacksonville 1 – Melbourne 1 – Tequesta 1 – Marathon

4. Regional Sampling and Statistical Programs

ACCSP

The Atlantic Coast Cooperative Statistics Program (ACCSP) is a state/federal cooperative intended to improve fisheries statistics of the Atlantic Coast. The South Atlantic Council supports and participates in the ACCSP program. The Council typically adopts ACCSP sampling designs and strategies for FMP's. ACCSP warehouses data (commercial statistics at present), supports research and monitoring programs, and coordinates data collection efforts.

The ACCSP develops annual biological sampling targets for lengths and age structures for commercial fisheries. Sampling targets are typically developed for each state on a species by species basis and allocated across gears, market categories, and season. These serve as a general guide to the Partners, although it is not clear how much tracking is done of these targets during the year. Presumably, each partner is responsible for tracking their own efforts.

Three problems have emerged with the ACCSP sampling design strategy. First, as noted above, sampling targets are developed by species. Such a strategy works well for fisheries that primarily harvest a few species, but when dealing with a multi-species fishery it could lead to significant sampling gaps in biological sampling. Developing targets by fishery and gear would be more effective for multi-species fisheries such as that for snapper-grouper in the Southeast.

Second, targets for length and age samples are developed with the premise of developing age-length keys and therefore call for large numbers of length samples with fewer age samples. Examination of age and growth information in past assessments shows that length is not informative of age for many South Atlantic species, and therefore age-length keys are not useful. Evaluations have also shown that attempting to 'randomly' sample a very small number (such as 5 or 10) fish for age structures produces biased samples¹. Sampling targets of species for which length is not informative of age should be properly designed to allow direct determination of catch age composition.

Third, overall sampling intensity is typically developed by applying some 'rule of thumb' to determine how many lengths are needed based on the total pounds landed. Such approaches work well for large fisheries with high landings, but result in potentially ridiculous sampling targets for smaller fisheries. Sampling targets for the smaller fisheries of the Southeast should be developed with attention to the wide range of species and broad geographic and temporal variation in fishing methods and catch composition.

Fisheries Information Network

The Fisheries Information Network (FIN) is a state/federal cooperative program designed to provide fisheries statistics in the Gulf Region. FIN projects include managing and

¹ Chih, C-P. 2006. Effect of some variations in sampling practices on the length frequency distribution of gag groupers caught by commercial fisheries in the Gulf of Mexico. SEDAR 10-DW-23. SEDAR, Charleston SC.

disseminating both commercial and recreational statistics, sampling menhaden and headboat fisheries, and developing trip ticket programs for gulf states.

In a letter dated December 15, 2005, FIN Committee Chair Page Campbell outlined numerous SEDAR research recommendations that FIN is addressing. These are summarized below:

1. SEDAR 3 (yellowtail snapper)

Discard Information: FIN developed a coast-wide bycatch/discard and observer program (GOM and Caribbean) for commercial, recreational, and for-hire fisheries. The program is implemented through MRFSS and head-boat sampling. The commercial component has not been implemented.

Biological Sampling: The FIN biological sampling program has been implemented in all 5 Gulf states. Targets are developed to allow direct age estimation. Current target species are red snapper, king mackerel, greater amberjack, gulf flounder, and southern flounder.

Recreational statistics: A FIN workgroup is considering catch rate differences between private and public access point anglers. FIN has been working for several years to improve the sampling frame for recreational surveys.

2. SEDAR 4. (Caribbean deepwater)

Expansion Factors: FIN has evaluated expansion factors and considers those used for 1988-2002 reasonable.

TIP Sampling: FIN has worked to increase TIP sampling. Total weight is collected.

3. SEDAR 5 (king mackerel)

Biological sampling: FIN biological sampling targets king mackerel. Data include length, weight, sex, and age structures.

SEAMAP

The Southeast Area Monitoring and Assessment Program (SEAMAP) is a federal/state/university cooperative program for collection of fishery independent data. SEAMAP programs began in the Gulf of Mexico in 1981, expanded to the Atlantic in 1983, and to the Caribbean in 1988. Each region operates as an individual entity, establishing its own objectives and programs.

Gulf of Mexico SEAMAP surveys have provided important sources of fishery independent information in several SEDAR assessments of Gulf species (e.g., red snapper, Gulf gag grouper, greater amberjack, vermilion snapper, and gray triggerfish).

Atlantic and Caribbean SEAMAP surveys have been considered during several data workshops, but not used in any successful assessments. The Caribbean program suffers from short time series on many surveys and a very narrow geographic distribution on the longer time-series trawl survey for which sampling is confined to the western end of Puerto Rico. The Atlantic program primarily samples young of the year fish, and has only occasional reported catches of many species assessed to date through SEDAR. SEDAR 5, king mackerel, is the only assessment to use an Atlantic SEAMAP index.