

# **BIOLOGICAL/ENVIRONMENTAL WORKGROUP REPORT**

for the

Recreational Fisheries Information Network

in the Southeast United States

RecFIN(SE)

by: Biological/Environmental Workgroup

September 1993



## **1993 RecFIN(SE) BIOLOGICAL/ENVIRONMENTAL WORKGROUP REPORT**

The RecFIN(SE) Biological/Environmental Workgroup held one conference call on February 16<sup>th</sup>, and two meetings, March 26<sup>th</sup> in New Orleans and July 23<sup>rd</sup> in Miami, to accomplish 1993 workgroup tasks. The official workgroup was comprised of Maury Osborn - Chair, Al Jones, Paul Phalen, Thomas Schmidt, Ann Seiler, Tom Van Devender, and Wayne Waltz. Other RecFIN(SE) members also provided valuable input.

The workgroup made substantial progress in meeting RecFIN(SE) Strategic Plan goals. The workgroup was assigned three tasks. Task 1 (goal 2, objective 1) was to be completed during 1993 and Tasks 2 and 3 (goal 2, objectives 2 and 3) were to be completed in 1994. The workgroup completed tasks 1 and 2, and made substantial progress on task 3. In some cases, we completed work that was not specified in the original tasks, but that contributes to an overall description and understanding of the marine recreational fishery (MRF) in the Southeast Region. We believe that our 1993 products will be invaluable when the RecFIN(SE) Committee develops priorities, makes recommendations for new or expanded surveys, recommends the purposes and types of new surveys, recommends what data would be collected, and seeks necessary funds.

**Task I. Goal 2, Objective 1:** Identify the components of the fishery and required data priorities for each component.

Approach: Through existing materials and personal observations, identify all components of marine recreational fishing universe by State and Territory and quantify the units within each component. Identify data categories fishery management agencies need to reach and evaluate decisions.

Results: In order to ensure understanding and communication and to provide standard terms for all MRF surveys, the workgroup developed definitions of marine recreational fishing terms (Table 1) and a conceptual model of components of marine recreational fishing mortality (Figure 1), including harvest, catch and landings. Recreational and commercial fishermen were defined: the recreational fisherman definition implicitly includes subsistence fishermen. (By direction of the RecFIN(SE) Committee, "fisherman" is to be used rather than "fishers" or "anglers". "Fishers" are a type of weasel in addition to sounding awkward, and use of "anglers" ignores users of other gear for sport fishing.) The definition of for-hire boats, from the "Proceedings: Workshop on Marine 'For-Hire' Recreational Fisheries Survey Methodology" (Gulf States Marine Fisheries Commission (GSMFC), 1992) was evaluated. "For Hire" was defined as any boat guiding one or more sport fishermen for a fee. The terms "headboat", "charterboat", and "partyboat" have had different meanings in different surveys. Therefore an operational definition for charter/guides versus headboats was adopted as 1) guide/charter boat will mean smaller boats where passengers pay for an entire party on a per boat basis, and 2) headboat means larger boats where passengers pay on a per person basis. More specific definitions vary

according to State and Coast Guard licensing definitions. Also, some boats may switch from charterboat to headboat operations. More specific definitions need to be developed as surveys are designed or modified. Individual boats that switch around may be assigned to one or the other strata or both, depending on survey objectives.

A conceptual model of the recreational fishery in the Southeast Region was developed to define the scope of the MRF universe and include all possible components (Figures 2-5). The top of the model is the entire recreational fishery and all participants in the fishery. Components were defined first by fishing mode or platform: private/rental boats, for-hire boats -- headboats and charter/guide boats, and shore fishing, which includes both beach/bank and man-made shore areas. Fishing mode was then categorized as to whether it was organized and included competition -- e.g. tournaments, derbies, dive-club competitions, -- or not. Use of various gears can be categorized beneath each of these sub-groups, and finally finfish and shellfish species or species groups targeted and caught are the last level of categorization. "Gear" includes rods and reels as well as types of gear important in localized areas such as skin/scuba spear fishing in the Caribbean and sport shrimp trawl fisheries in the Gulf and South Atlantic. Charterboats also include the relatively new activity where commercial fishing vessels take tourist groups trawling for fun and the tourists keep the catch.

The conceptual model was used to develop an inventory form to define the absence/presence and quantify the magnitude of each fishery in all States, Territories, and smaller geographical areas such as national parks (Table 2-3). The tables did not include the gear stratification, and focused on mode and species targeted. This combination was logical in terms of adequately quantifying each fishery and in terms of survey design. This inventory can be used to group common fisheries within and among States, to identify unique fisheries in the Southeast Region, to develop priorities for data collection, and identify the best survey strategies for each fishery. All State, Territory, and National Park Service RecFIN(SE) members provided the presence/absence and magnitude data for the inventory based on the following criteria:

- 1) Use the best available source to quantify the number of boats, participants, and access points. This will also be useful in identifying major gaps in knowledge about some components of the MRF. Sources that could be used to quantify the fisheries were the Marine Recreational Fishery Statistics Survey (MRFSS) participation estimates, other surveys, license sales, boat registration files, the MRFSS master site list, special surveys, etc.
- 2) Document what sources were used, applicable time periods, and any assumptions made.
- 3) Public access points were defined as "a point of departure or point of fishing location (e.g., boat ramp, dock, marina, pier, shoreline) which is accessible to a member of the general public, either at no cost or by fee". Private access points are "a point of departure or fishing location which is accessible only to members of a limited, restricted group of persons, by reason of membership or ownership".

- 4) Guide boats and charter boats have separate columns on the inventory form since the workgroup felt these components could be fleshed out separately for State and Territorial fisheries. Known examples include offshore charter boats targeting pelagic species; smaller inshore guide boats targeting red drum and spotted seatrout, tarpon, snook, etc.; skin/scuba spear fishing charters in the Caribbean, etc.

The inventory was also used to identify which components of the fishery are being surveyed currently, and which agencies are conducting the surveys (Table 5). This table shows where there are gaps in coverage, duplication of surveys, or cooperative efforts, and can be used to recommend and prioritize expanded or new survey efforts.

The workgroup did not compile a list of required data priorities for each component as specified in the objective approach. We felt that these priorities would shift according to management priorities and would depend upon many factors including type and scope of a survey, purposes of the survey (stock assessment, survey design, or formulation and evaluation of management regulations), budgets, etc.

**Task II. Goal 2, Objective 2:** Identify biological and environmental data elements required for each fishery component.

Approach: Use GSMFC Data Report and evaluate/modify as necessary for South Atlantic and Caribbean needs. This will be done for each fishery component by subregion.

Results: We identified biological and environmental data elements necessary for the management of a fishery through use in stock assessments, survey design, or formulation and evaluation of management regulations (Table 6). The data elements table in the GSMFC "for-hire" workshop proceedings was adapted to apply to the entire recreational fishery in the Southeast Region. We did not assign the various data elements to each fishery component. The need for any of the items for a specified fishery should be determined on a case-by-case basis depending on management needs. All items listed were deemed important, but all may not be collected feasibly depending on survey design and budgets. The list provides a menu to select from based on management needs and survey design.

#### *Demographic, Social and Economic Variables*

Residence may be needed for estimation procedures (the MRFSS uses an adjustment for coastal/non-coastal residents), it may cause differences in catch rates due to experience factors, and it may be used for allocation purposes. How residence is asked must be carefully considered in areas where "winter residents" are a significant component of the fishery. Boat identification may be needed to standardize catch rates in CPUE indices and can be used in mark-recapture procedures to determine fleet size. The number of trips is needed for effort estimates. Experience levels also may cause differences in catch rates. Species targeted may be used to allocate directed effort and to stratify trips by fishery. Party size is needed to develop

effort estimates. Participation, in terms of the total number of participants, is needed for effort estimations and for allocation. Age may be important depending on survey design. For example, if licenses were used as a sampling frame, adjustment for fishermen excluded from licensing by age would be necessary. Experience and specialization may affect catch rates. Disposition of the catch is used to estimate catch, harvest, and landings. The frequency of contact with individual anglers (surveyed before) may influence survey design in order to minimize respondent burn-out.

### *Effort Variables*

Trip mode is important for estimation procedures and allocation of survey samples. The access site (geographic area where landed) is important for survey design, sample allocation, and efficiency. Site can also be used in some economic models. Fishing area is important for management; however, the geographical precision of the defined areas may vary. Time of return and trip time are important for survey design and effort calculation, respectively. Trip time can be broken into travel and searching time, but there was concern that asking anglers to break trip time into these components was not realistic. As long as there is a consistent measure of trip time, calculation of catch rates will not be compromised; however, if there is a lack of fishery independent data, changes in search time versus trip time may indicate changes in abundance. Fishing power is important but it is a composite of many different factors and difficult to calculate. Boat length, passenger capacity, speed, fishing gear, fishing method (trolling, bottom fishing, etc.), bait and hook type, and technological capabilities (LORAN, fishfinders, etc.) can all affect catch rates and choice of target species.

### *Biological Variables*

The following items were defined as important to gather on a routine survey: gross catch and landings in numbers (released alive and dead), species composition, length, weight, sex and other biological information if possible (maturity stage, gonads, fin spines, otoliths, scales, etc.). Data on the number of fish released and the reasons for releases will increase in importance as regulations increase. Data used for determining age (lengths or hard parts where lengths are inadequate) should be collected as a random sample of the catch. Weights are needed unless length-weight regressions are available. In some situations, weight needs to be collected even though length-weight relationships are known, for example, to calculate condition factors, or where there is evidence of "lighter" stocks of some species, such as mackerel. We felt it was not important to ask anglers whether they caught any tagged fish, although samplers should collect information on tagged fish when encountered.

### *Environmental Variables*

Although many factors may affect fish abundance, fishing effort and catch rates, the environmental factors listed were deemed important for monitoring on a routine basis. Some are important for management, and some for sampling efficiency. Some factors may be important in modeling trends in catch rates by explaining some of the variability.

## *Metadata*

Additional data called "Metadata" were discussed. Metadata is defined as information that is necessary to interpret survey data and is more descriptive than analytical ("meta" means transcending). Such data include environmental perturbations, economic conditions, regulations (including licensing), contracting/procedural changes in conduct of surveys, and social factors. The workgroup recommends that a metadata base be developed for the MRFSS in the Southeast beginning with 1980. Such a file would be incorporated into the national MRF data base to be developed by the MRFSS staff in consultation with other users. In 1994, workgroup members will provide their thoughts on metadata criteria (types, examples, sources, spatial/temporal scope, etc). Once criteria are established, the workgroup will start compiling database items.

**Task III. Goal 2, Objective 3:** Identify and determine standards for biological and environmental data collection, including statistics, training, and quality assurance and quality control standards.

Approach: Review existing quality assurance and quality control documents and modify as necessary for application to RecFIN.

Results: A draft document incorporating standards developed by the MRFSS program, the States, and the GSMFC Data Management Subcommittee has been compiled. Workgroup members are in the process of a critical review and adaptation of this document. Final QA/QC standards will be presented in 1994.

## **Other Business**

All projects described in the MRF Data Collection Project Summaries (Strategic Plan Appendix) were examined concerning incorporation into regional and national MRF data bases. Of 66 MRF surveys, 13 were classified as high priority, 31 as lower priority, and 22 as not appropriate for incorporation (Table 7). Data bases were evaluated using the following criteria:

- 1) contain data elements described on data elements table;
- 2) reasonably wide temporal/spatial scope;
- 3) reliability;
- 4) fill current data gaps;
- 5) do not duplicate other data bases; and
- 6) provide syntheses of data sets with additional information.

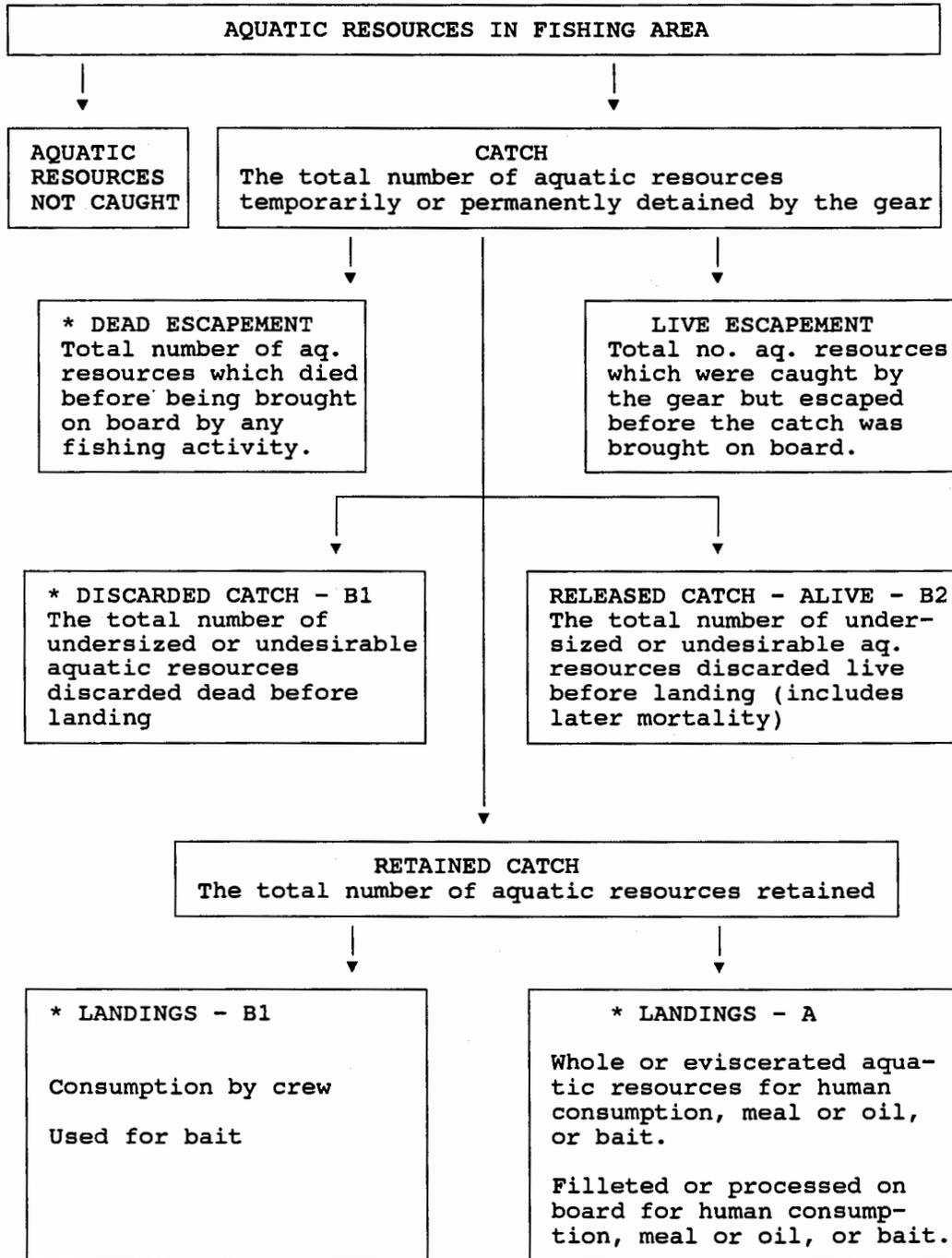


Figure 1. Components of Catch and Their Relation to Fishing and Fishing Mortality. \* = the sum of these quantities is total fishing mortality (harvest).

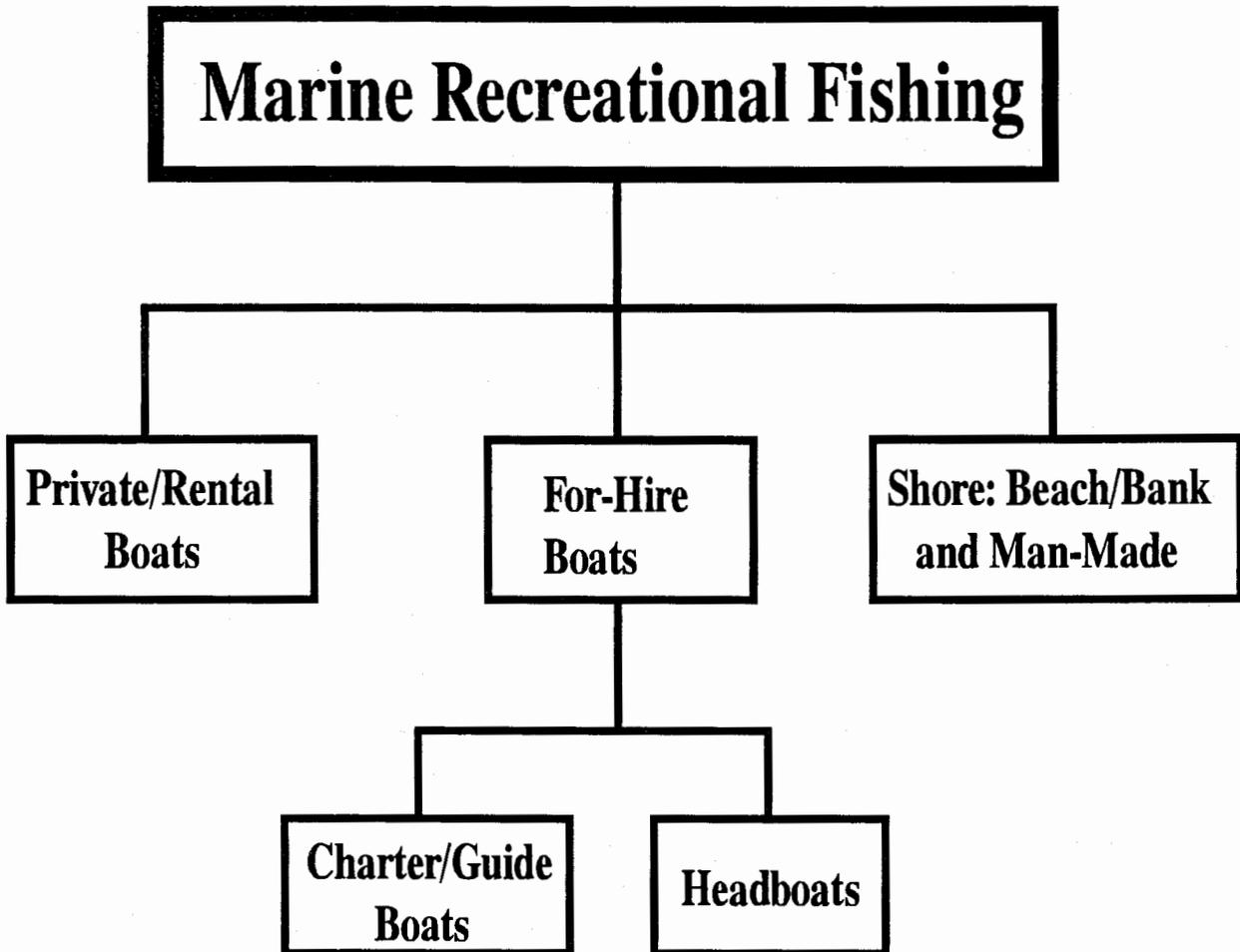
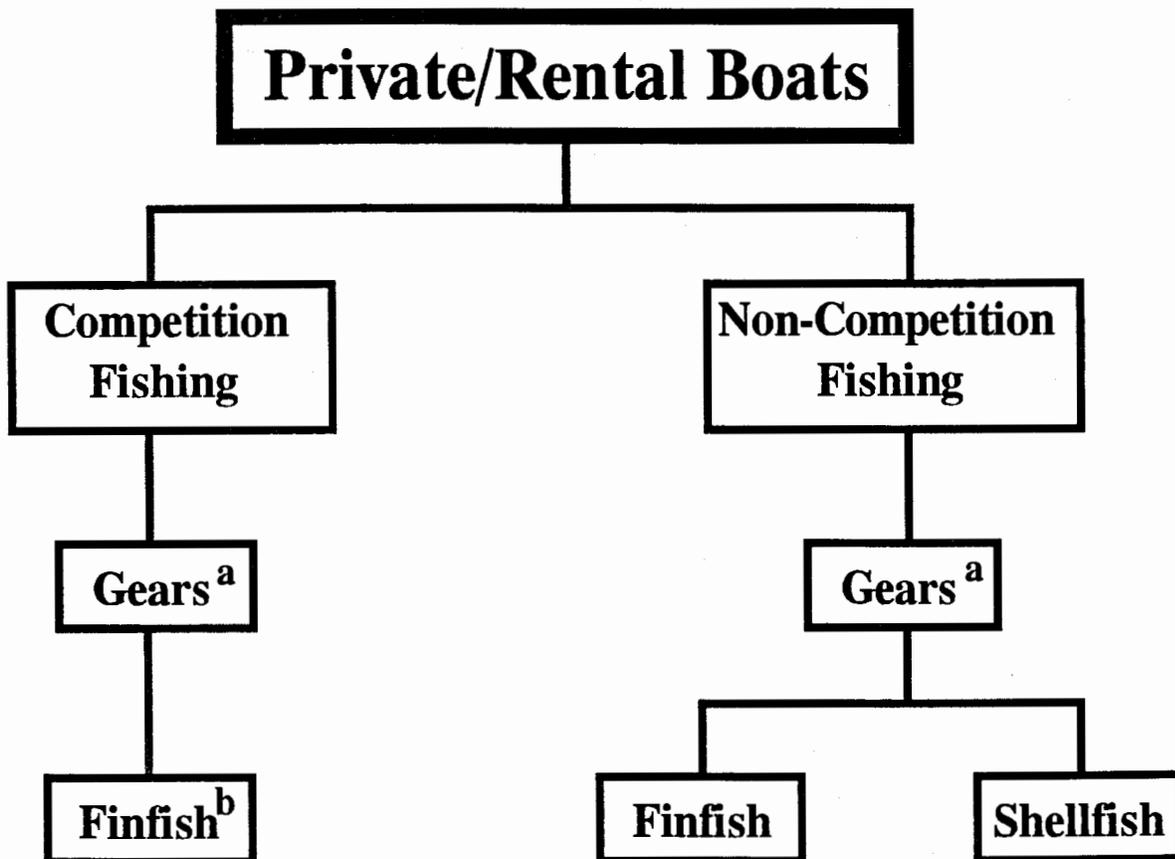


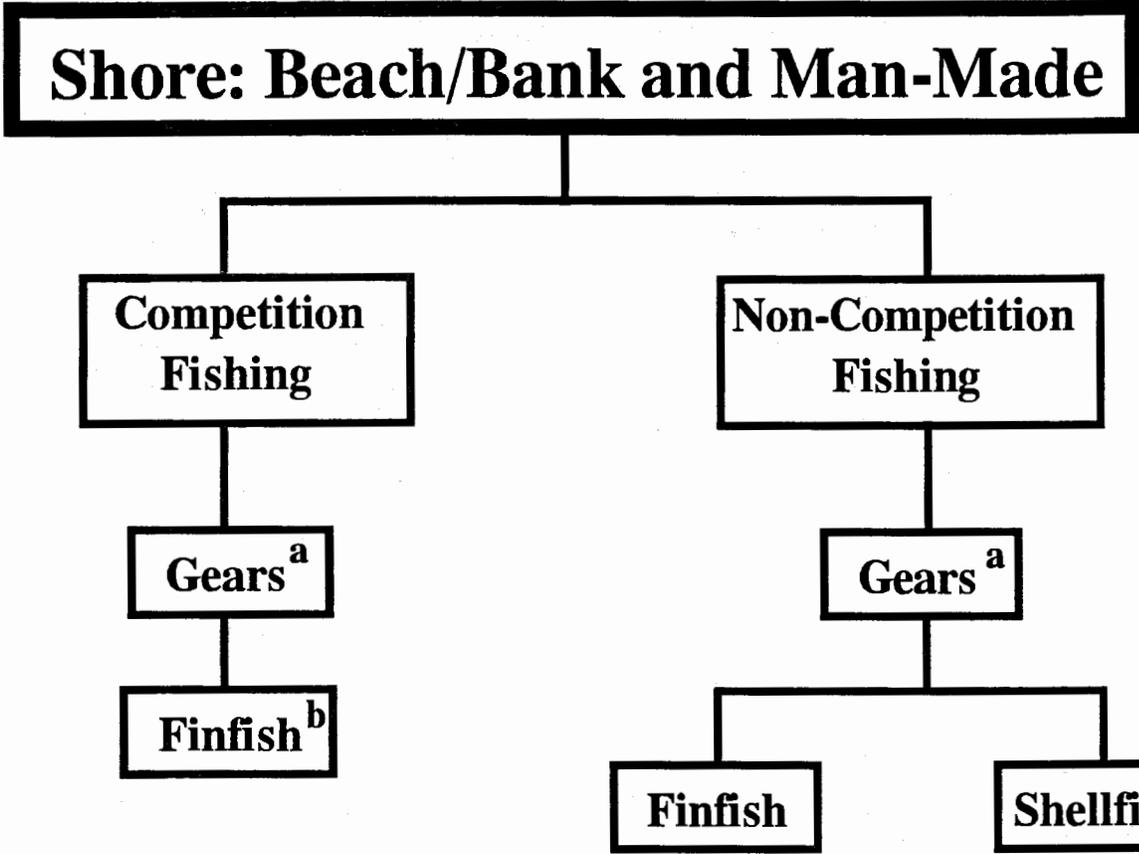
Figure 2. Model of the Marine Recreational Fishery Components in the Southeast Region.



<sup>a</sup> Gears include rod and reel, various nets and traps, oyster tongs, spear fishing while skin/scuba diving, and any gear used in recreational fishing for finfish or shellfish.

<sup>b</sup> In a few areas, there are dive clubs with individuals who compete with others in the group for spiny lobsters.

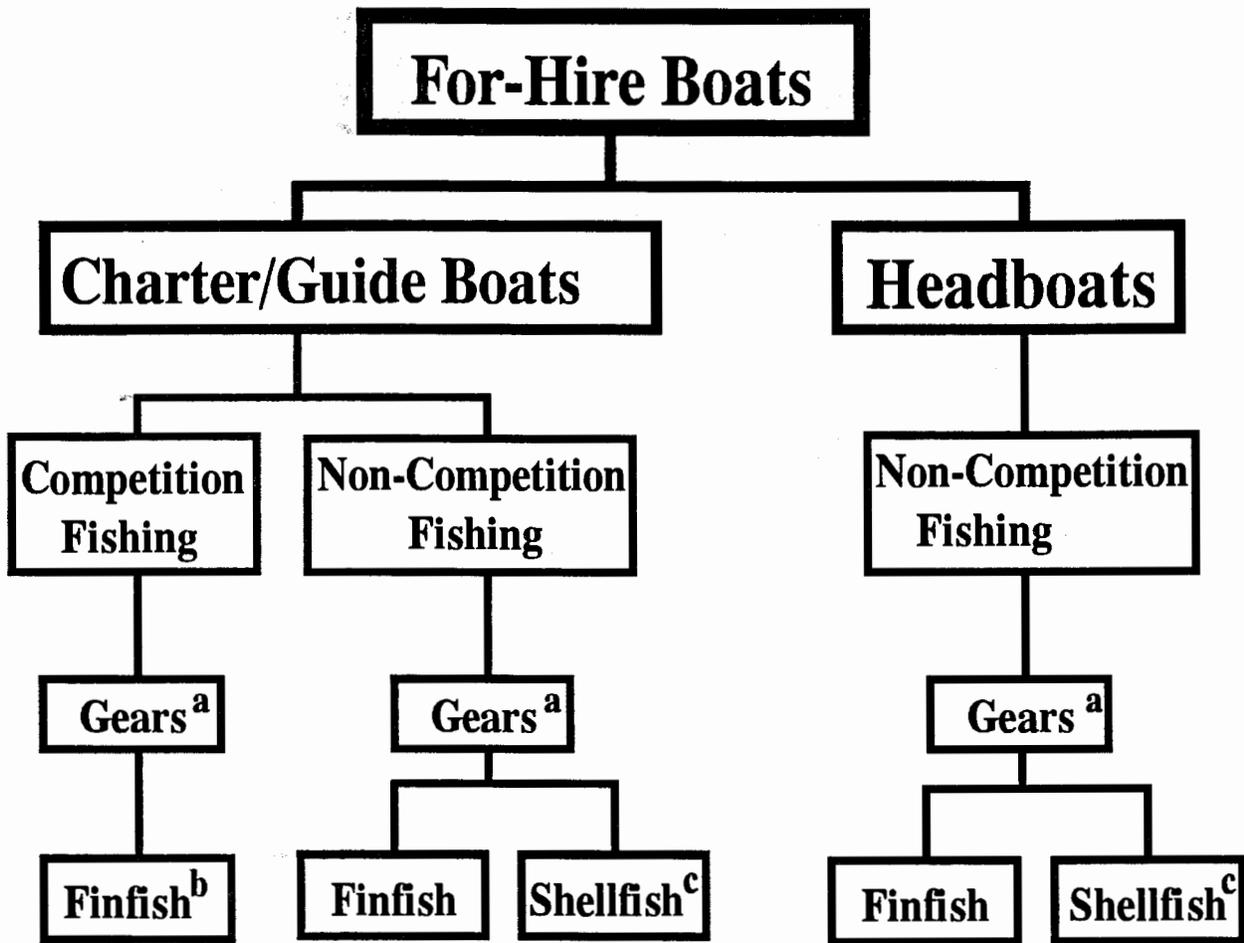
Figure 3. Breakdown of the Private/Rental Boats Component.



<sup>a</sup> Gears include rod and reel, various nets and traps, oyster tongs, spear fishing while skin/scuba diving, and any gear used in recreational fishing for finfish or shellfish.

<sup>b</sup> In a few areas, there are dive clubs with individuals who compete with others in the group for spiny lobsters.

Figure 4. Breakdown of the Shore: Beach/Bank and Man-Made Component.



- <sup>a</sup> Gears include rod and reel, various nets and traps, oyster tongs, spear fishing while skin/scuba diving, and any gear used in recreational fishing for finfish or shellfish.
- <sup>b</sup> In a few areas, there are dive clubs with individuals who compete with others in the group for spiny lobsters.
- <sup>c</sup> In some areas, charter and headboats will take groups or individuals for skin/scuba lobster trips. Some charter and headboats take tourists trawling and they keep the fish for fun.

Figure 5. Breakdown of the For-Hire Boats Component.

Table 1. Definitions of Terms for Marine Recreational Fisheries Data Collection Programs.

Term	Definition
Catch	Aquatic organisms temporarily or permanently removed from a population.
Commercial Fisherman	Any person who sells, barter, or receives compensation for any or all of their catch.
Fish Guide	A person who is compensated for accompanying or transporting a recreational fisherman.
Fisherman	Any person who attempts to catch aquatic organisms.
Harvest	Aquatic organisms permanently removed from a population.
Landings	Aquatic organisms brought to land from water.
Recreational Fisherman	Any person who catches or attempts to catch aquatic organisms for personal disposition, except for sale.

Table 2. Presence of Marine Recreational Fishery Components by State. X=present. Shaded cells indicate absence.

St	Private Boat						Guide Boat						Charter Boat						Headboat						Shore								
	Finfish			Shellfish			Finfish			Shellfish			Finfish			Shellfish			Finfish			Shellfish			Finfish			Shellfish					
	N	T	L	S	C	M	N	T	L	S	C	M	N	T	L	S	C	M	N	T	L	S	C	M	N	T	L	S	C	M			
NC	X	X		X	X	X	X	X					X	X	X	X			X		X				X		X	X	X		X	X	X
SC	X	X		X	X	X	X	X					X	X					X						X			X	X		X	X	X
GA	X	X	X	X	X	X	X	X	X				X	X	X				X						X			X	X		X	X	X
FL	X	X	X	X	X	X	X	X					X	X	X				X		X				X		X	X	X	X	X	X	X
AL	X	X	X	X	X	X	X	X					X	X	X				X						X			X	X		X	X	X
MS	X	X		X	X	X	X						X	X					X						X			X	X		X	X	
LA	X	X		X	X	X	X	X					X	X					X						X			X	X		X	X	
TX	X	X		X	X	X	X	X					X	X		X			X						X			X	X		X	X	X
PR	X	X	X			X							X												X			X	X		X		
VI	X	X	X		X	X	X	X	X			X	X	X											X			X	X	X		X	X
NPS	X	X	X	X	X	X	X	X					X						X		X				X			X			X		

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KEY:

- N Non-organized
- T Tournament
- L Spiny Lobster
- S Shrimp
- C Crab
- M Molluscs - oysters, scallops, clams, conch, whelk
- NPS National Park Service

Table 3. Magnitude of Marine Recreational Fishery Components by State.

St	Number of Boats				Number of Participants				
	P/R	Gb	Cb	Hb	P/R	Gb	Cb	Hb	Sh
NC	280,000	<20	185	13	300,000	w/Cb	20,000	10,000+	10,000+
SC	61,519	w/Cb	122	29	73,701	w/Cb	13,473	?	?
GA	30,000+	?	70	3	?	?	?	?	?
FL	?	889	851	137	813,000	?	?	?	> 1 M
AL	20,000	10+	90+	2	50,000	1,000+	20,000+	10,000+	10,000
MS	39,215	w/Cb	41	w/Cb	?	?	?	?	?
LA	?	?	?	?	?	?	?	?	?
TX	109,286	272	128	29	603,900	12,058	51,252	90,372	688,957
PR	<19,000	?	6	0	?	?	?	0	?
VI	3,000	1	70	0	10,000	200	5,000	0	500
NPS	38,000	5,556	360	432	102,657	14,745	1,000	3,000	?

St	No. of Public Access Points					No. of Private Access Points				
	P/R	Gb	Cb	Hb	Sh	P/R	Gb	Cb	Hb	Sh
NC	142	5	32	5	235	?	?	0	0	?
SC	93	?	?	?	20	?	?	?	?	?
GA	77	?	?	2	27	?	?	?	?	?
FL	2,139	?	309	84	3,570	?	?	?	?	?
AL	10+	10+	10+	10+	?	?	?	?	?	?
MS	43+	?	?	?	39+	?	?	?	?	?
LA	?	?	?	?	?	?	?	?	?	?
TX	306	?	?	?	702	121	?	?	?	?
PR	52	?	?	?	193	22	?	?	?	0
VI	50+	1	15	0	?	?	1	0	0	?
NPS	9+	?	?	?	?	0	?	?	?	0

KEY:

P/R Private/Rental Boat  
 Sh Shore/Pier  
 Hb Headboat

Cb Charter Boat  
 Gb Guide Boat  
 NPS National Park Service

Table 4. Sources of data in Table 3 and additional details.

State	Data Source/Notes
NC	<p><u>No. of boats</u> P/R: NC Wildlife Resource Commission data. Gb: Best guess. Cb and Hb: NC Division of Marine Fisheries license files.</p>
	<p><u>No. of participants</u> P/R, Cb and Sh: MRFSS. Gb participants are included with Cb. Hb: NC Wildlife Resource Commission data.</p>
	<p><u>No. of public access points</u> P/R and Cb: MRFSS Site Inventory. Gb and Hb: Best guess. Sh mode includes 200 beach/bank sites estimates by best guess and 35 public piers from NC license files.</p>
SC	<p><u>No. of boats</u> P/R: SC boat registration files. Includes all registered vessels in the six coastal counties. Does not include vessels in inland counties that are used in saltwater. Gb are included in Cb category, currently no way to separate. Cb: Annual (July 1992-May 1993) permits sold to boats carrying six or fewer passengers. Hb: Annual (July 1992-May 1993) permits sold to boats carrying seven or more passengers.</p>
	<p><u>No. of participants:</u> P/R: Saltwater stamps (July 1992-May 1993). Cb: Based on logbook reports (July 1992-December 1992).</p>
	<p><u>No. of public access points</u> P/R: Waltz, W. and C. Moore. 1987. Public Access to Marine Recreational Fishing in South Carolina. Unpublished manuscript.</p>
GA	<p><u>No. of boats</u> P/R: GA boat registration files. Includes all power driven vessels, including jet-skis) in the 6 coastal counties. Does not include vessels in inland counties that are used in saltwater.</p>
	<p><u>No. of public access points</u> P/R and Sh: MRFSS Site Inventory. No estimate available for private access for PR, CB, of Sh.</p>
	<p><i>Additional Information:</i> The spiny lobster fishery is quite small (about 10 boats) and is seasonal.</p>

Table 4. Continued.

<b>State</b>	<b>Data Source/Notes</b>
FL	<p><u>No. of boats</u> Gb, Cb, and Hb: Derived from Florida saltwater fishing license information. Those boats licensed to carry 3 or fewer fishing passengers were termed "guide boats"; 4-10 passengers were "charter boats"; and 11 or more passengers were "party/head boats".</p> <p><u>No. of participants</u> P/R: Derived from Florida saltwater fishing license information. Florida residents who fish from boats (there are some additional criteria and license exemptions) and all non-residents (except those fishing from boats or fishing piers) must possess a valid saltwater licence. All saltwater fishing licenses issued were included as a rough estimate of the number of participants. Sh: Loosesly derived from MRFSS estimates of participants in saltwater fishing in Florida.</p> <p><u>No. of public access points</u> P/R, Cb, Hb and Sh: Derived from a survey that the FRMI's Juvenile Fish Monitoring Group conducts of recreational fishing access sites in the State.</p>
AL	<p><u>No. of boats, participants, and public access points</u> 1985 Alabama Creel Survey.</p>
MS	<p><u>No. of boats</u> P/R: State license registrations from coastal counties. Gb, Cb, and Hb: 1993 license sales, can not be separated by class.</p> <p><u>No. of participants</u> Beginning July 1, 1993 a saltwater recreational fishing license will be required.</p> <p><u>No. of public access points</u> P/R and Sh: Mississippi Creel Survey.</p>
TX	<p><u>No. of boats</u> P/R: <math>x=y*z</math> where <math>x</math>=number of private boats, <math>y</math>=boats registered at or near end of FY 1991 (Weixelman et al. 1992), and <math>z</math>=proportion of TX boat owners who used their boat for saltwater sportfishing in 1982 (Ferguson and Green 1987). Gb: <math>x=y-z</math> where <math>x</math>=number of guide boats, <math>y</math>=number of guide and charter boats (L.W. McEachron, TPWD, personal communication), and <math>z</math>=number of charter boats (Holland et al. 1992). Cb: Holland et al. 1992. Hb: Includes bay headboats (9) surveyed by TPWD November 1990-May 1991 and gulf headboats (McEachron et al. 1984 and Ditton et al. 1992).</p>

Table 4. Continued.

State	Data Source/Notes
TX (cont.)	<p><u>No. of participants</u>            P/R: <math>x=y*z</math> where <math>x</math>=number of private-boat participants, <math>y</math>=5-year (1988-92) estimated mean number saltwater fishermen based on sales of saltwater fishing stamps (850,564), and <math>z</math>=percentage of saltwater fishermen using private boats (71) (Green et al. 1982). Bay Gb and Hb: September 1981-August 1982 McEachron 1984. Gulf Cb: Holland et al. (1992) estimates 51,252. Gulf Hb: <math>x=y+z</math> where <math>x</math>=number of headboat participants, <math>y</math>=number of bay headboat participants (55,999) (McEachron et al. 1984) and <math>z</math>=number of gulf headboat participants (34,373) (Ditton et al. 1992). Sh: <math>x=y*z</math> where <math>x</math>=number of shore-based participants, <math>y</math>=5-year (1988-92) estimated mean number saltwater fishermen based on sales of saltwater fishing stamps (850,564), and <math>z</math>=percentage of shore-based saltwater fishermen (81) (Green et al, 1982).</p>
	<p><u>No. of public access points</u>            P/R: TPWD May-November 1993 boat-access inventory. Includes boat-ramps and wet-slip facilities. Sh: TPWD May 1990-May 1991 wade/bank and lighted pier inventory.</p>
	<p><u>No. of private access points</u>            P/R: Spiller 1987. Includes canal subdivisions and other docking facilities.</p>
	<p><i>Literature Cited:</i>            Ditton, R.B., S.M. Holland, and D.A. Gill. 1992. The U.S. Gulf of Mexico party boat industry: activity centers, species targeted, and fisheries management options. <i>Marine Fisheries Review</i> 54(2):15-20.             Ferguson, M.O., and A.W. Green. 1987. An estimate of unsurveyed coastal recreational boat fishing activity in Texas. <i>Marine Fisheries Review</i> 49(2):155-161.             Green, A.W., L.Z. Barrington, and G.C. Matlock. 1982. An estimation of the total number of Texas fishermen, 1 September 1978 - 31 August 1979. <i>Proceedings Annual Conference Southeastern Assoc. Fish and Wildlife Agencies</i>. 1982:241-251.             Holland, S.M., R.B. Ditton, and D.A. Gill. 1992. The U.S. Gulf of Mexico charter boat industry: activity centers, species targeted, and fisheries management options. <i>Marine Fisheries Review</i> 54(2):21-27.</p>

Table 4. Continued.

<b>State</b>	<b>Data Source/Notes</b>
TX (cont.)	<p>McEachron, L.W. 1984. Harvest estimates for Texas marine charter boats (1978-1982). Technical Series Number 29. Texas Parks and Wildlife Department. Austin, Texas. 90 p.</p> <p>McEachron, L.W., P. Campbell, and K. Meador. 1984. Harvest by Texas headboat fisherman during September 1982-May 1983. Management Data Series Number 58. Texas Parks and Wildlife Department. Austin, Texas. 25 p.</p> <p>Spiller, K.W. 1987. Inventory of boat access sites on the Texas coast. Management Data Series Number 110. Texas Parks and Wildlife Department, Coastal Fisheries Branch. Austin, Texas. 69 p.</p> <p>Weixelman, M., K.W. Spiller, and P. Campbell. 1992. Trends in finfish landings of sport-boat anglers in Texas marine waters, May 1974-May 1991. Management Data Series Number 85. Texas Parks and Wildlife Department. Austin, Texas. 226 p.</p>
PR	<p><u>No. of boats</u> P/R: Puerto Rico DNR. Commission of Navigation. Cb: Sea Grant Report "Developing Strategies to Enhance Charter Boat Fishing Operations in Puerto Rico and the United States Virgin Islands".</p> <p><u>No. of participants</u> There are an estimated 81,000 resident sport fishermen, but they are not separated by mode. R.L. Schmeid. 1986. "The Nature and Extent of Marine Recreational Fishing and Associated Developmental Efforts in the Caribbean." Proceedings of the Gulf and Caribbean Fishing Institute 40:37-52.</p> <p><u>No. of public access points</u> P/R and Sh: Sea Grant Report "In Support of Marine Recreational Fishing" which includes ramps and marinas. Private beaches are illegal in Puerto Rico.</p> <p><i>Additional information:</i> There are 16 organized sport fishing clubs affiliated with the Asociacion de Pesca de Puerto Rico, an organization that belongs to the International Game Fish Organization. These clubs hold 15-20 tournaments annually. The tournaments target primarily big game fish such as billfish (blue and white marlin, sailfish, spearfish) or other pelagics (wahoo, dolphin, barracuda, shortfin mako, tunas). Saltwater species preferred by charter boat customers are marlin, tuna, sailfish,</p>

Table 4. Continued.

State	Data Source/Notes
PR (cont.)	dolphin, king mackerel, wahoo, sharks, bluefish, and to a lesser degree bonefish, tarpon, yellow snapper, swordfish, and yellowtail. Other non-organized fishing targets jacks, snook, tarpon, and reef fish.
VI	<u>No. of boats, part., public &amp; private access points</u> Enforcement (boat registrations).
NPS	<u>No. of boats, participants, and public access points</u> All information is for south Florida parks only. P/R and Gb boat and participant estimates are mean annual fishing boater trips from 1973-85 to Everglades National Park (VI parks are not surveyed)(Tilmant et al. 1990). Marine species preferred by P/R participants are spotted seatrout, gray snappers, red drum and snook. Cb and Hb estimates are total 1991 annual estimates from Commercial License Master Log and park visitation figures from the Dry Tortugas National Park. A 1985 estimate for the guide fishery in Everglades National Park was 8,446 boat trips and 24,086 participants (Tilmant et al. 1990). No estimate for Biscayne National Park.
<i>Literature Cited:</i>	
Tilmant, J.T., E.S. Tutherford, R.H. Dawson, and E.B. Thue. 1990. Impacts of gamefish harvest in Everglades National Park. pp. 75-103. G. Larson and M. Soukup (eds.) Vol. 6 Proceedings of the Conference of Science in the National Parks. Washington, D.C.	
FWS	There is no data available for the FWS National Refuges. However, the group believed that the states' information includes activities from the refuges, thus providing a complete picture of the magnitude of marine recreational fishing activities.

Table 5. Survey Coverage of Marine Recreational Fishery Components by State and Survey Type. (Shaded areas = not applicable.)

State	Private/Rental Boat					
	Finfish		Shellfish			
	N	T	L	S	C	M
NC	B/SS/FS	SS				
SC	B/SS	SS		SS		
GA	M					
FL	M	FS	SS/FS			
AL	M	FS				
MS	M/S	FS				
LA	M	FS				
TX	S/SS	FS		S	S	S
PR						
VI	S	S	S			S
NPS	M/F	F				F

M = Federal MRFSS                      B = MRFSS with state add-on  
S = State routine survey program    FS = Federal special study  
SS = State special study                F = Other Federal program

Notes:

- NC    N SS=Albemarle Sound Creel survey. FS=Large Pelagics Survey. T SS=King Mackerel Tournament survey.
- SC    B=SC personnel conduct intercept interviews but do not add to the sample size. SS=additional sampling/different methodology. T SS=Billfish Monitoring Project, Ocean Pelagic Gamefish Survey. S SS=Shrimp Baiting Survey.
- FL    T FS=NMFS Recreational Billfish Tournament Sampling. L SS=Survey of spiny lobster recreational license holders. FS=NMFS 1992 special survey of lobster fishing in Dade and Monroe County.
- AL    T FS=NMFS Recreational Billfish Tournament Sampling.
- MS    S=Creel Survey of the Sound and Adjacent Waters. T FS=NMFS Recreational Billfish Tournament Sampling.
- LA    T FS=NMFS Recreational Billfish Tournament Sampling.
- TX    S=Monitoring of Coastal Finfish Resources for Sportfish Management. SS=1978-79 Gulf Pier and Jetty Survey; 1974-76, 1979-80 and 1990-91 Wade/Bank and Lighted Pier Survey; 1981 Spring Black Drum Bay Sport-boat Survey; 1981 Fall Red Drum Gulf Pier Survey; 1987-91 Sport-boat Socioeconomic Survey; 1991 Nighttime Flounder Gigging Survey; and 1993-94 Sport-boat Bycatch Survey. T FS=NMFS Recreational Billfish Tournament Sampling.
- VI    S=Recreational Port Sampling.
- NPS    F=Everglades National Park Marine Gamefish Harvest Monitoring, Biscayne National Park Creel Census.

Table 5. Continued.

State	Guide Boat					
	Finfish		Shellfish			
	N	T	L	S	Cr	M
NC	B					
SC	B/S	S				
GA	M					
FL	M	SS				
AL	M					
MS	M/S					
LA	M					
TX	S	S				
PR						
VI	S	S	S			
NPS	M/F	F				

M = Federal MRFSS                      B = MRFSS with state add-on  
 S = State routine survey program    FS = Federal special study  
 SS = State special study                F = Other Federal program

Notes:

- SC    B SC personnel conduct intercept interviews but do not add to the sample size.  
       S=Recreational Pier, Charterboat and Headboat Reporting.
- FL    SS=1993 Special survey of guide boat fishing in Apalachicola. This survey will be  
       continued in 1994.
- MS    S=Creel Survey of the Sound and Adjacent Waters.
- TX    S=Monitoring of Coastal Finfish Resources for Sportfish Management.
- VI    S=Recreational Port Sampling.
- NPS    F=Everglades National Park Marine Gamefish Harvest Monitoring, Biscayne National  
       Park Creel Census.

Table 5. Continued.

	Charter Boat					
	Finfish		Shellfish			
State	N	T	L	S	Cr	M
NC	FS/B/F	FS/F				
SC	B/S	S				
GA	M/F					
FL	M/F	FS				
AL	M/F	FS				
MS	M/F	FS				
LA	M/F	FS				
TX	S/F	FS				
PR						
VI	S	S				
NPS	M/F					

M = Federal MRFSS                      B = MRFSS with state add-on  
 S = State routine survey program    FS = Federal special study  
 SS = State special study                F = Other Federal program

**Notes:**

NC    FS=Large Pelagics Survey.    F=NMFS Southeast Charterboat Survey.  
 SC    B SC personnel conduct intercept interviews but do not add to the sample size.  
       S=Recreational Pier, Charterboat and Headboat Reporting.  
 GA    F=NMFS Southeast Charterboat Survey.  
 FL    F=NMFS Southeast Charterboat Survey.    T FS=NMFS Recreational Billfish  
       Tournament Sampling.  
 LA    F=NMFS Southeast Charterboat Survey.    T FS=NMFS Recreational Billfish  
       Tournament Sampling.  
 TX    S=Monitoring of Coastal Finfish Resources for Sportfish Management.    F=NMFS  
       Southeast Charterboat Survey.    T FS=NMFS Recreational Billfish Tournament  
       Sampling.  
 VI    S=Recreational Port Sampling.  
 NPS    F=NMFS Southeast Charterboat Survey.

Table 5. Continued.

	Head Boat					
	Finfish		Shellfish			
State	N	T	L	S	Cr	M
NC	F/SS					
SC	F/S					
GA	F					
FL	F					
AL	F					
MS	F					
LA	F					
TX	F/S					
PR						
VI						
NPS	F					

M = Federal MRFSS                      B = MRFSS with state add-on  
 S = State routine survey program    FS = Federal special study  
 SS = State special study                F = Other Federal program

Notes:

NC    F=NMFS Beaufort Headboat Survey.    SS=Albemarle Sound Creel Survey.  
 SC    F=NMFS Beaufort Headboat Survey.    S=Recreational Pier, Charterboat and Headboat Reporting.  
 GA    F=NMFS Beaufort Headboat Survey.  
 FL    F=NMFS Beaufort Headboat Survey.  
 LA    F=NMFS Beaufort Headboat Survey.  
 TX    S=Monitoring of Coastal Finfish Resources for Sportfish Management.    F=NMFS Beaufort Headboat Survey.  
 NPS    F=NMFS Beaufort Headboat Survey.

Table 5. Continued.

State	Shore					
	Finfish		Shellfish			
	N	T	L	S	Cr	M
NC	B/SS					
SC	M/S					
GA	M					
FL	M					
AL	M					
MS	M					
LA	M					
TX	S					
PR						
VI	S	S				S
NPS	M					

M = Federal MRFSS                      B = MRFSS with state add-on  
 S = State routine survey program    FS = Federal special study  
 SS = State special study                F = Other Federal program

Notes:

- NC    N SS=Albemarle Sound Creel survey.
- SC    B=SC personnel conduct intercept interviews but do not add to the sample size.  
       S=Recreational Pier, Charterboat and Headboat Reporting.
- TX    S=Monitoring of Coastal Finfish Resources for Sportfish Management.
- VI    S=Recreational Port Sampling.

Table 6. Biological and environmental data items needed in the management of a fishery, assessed as to different data collection methodologies. S=Self-reported, O=Observed, Dash=Not Collectable.

Category Item	On-Site					Off-Site				
	Rove	Access Site	Catch Cards	Aerial	On-board Observers	Log Book	Random Phone	Known Phone	Mail	Door to Door
<b>Demographics/Sociology/Economics</b>										
<u>"For-hire" Operator</u>										
Residence - Zip	S	S	S	-	S	S	O	O	S	O
Boat ID	O	O	S	-	O	S	S	S	S	S
Annual or seasonal number of trips	S	S	S	-	S	S	O	O	S	S
Experience (years)	S	S	S	-	S	S	S	S	S	S
Species targeted by trip	S	S	S	-	O	S	S	S	S	S
<u>Recreational Fisherman</u>										
Residence - Zip	S	S	S	-	S	S	O	O	S	O
Party size	O	O	O	O	O	S	S	S	S	S
No. of participants	-	-	-	-	-	-	S	S	S	S
Age	S	S	S	-	S	S	S	S	S	S
Experience (years fished)	S	S	S	-	S	S	S	S	S	S
Specialization (self-perceived skill)	S	S	S	-	S	S	S	S	S	S
Disposition - catch	S	S	S	-	S	-	-	S	S	S
Surveyed before (frequency)	S	S	S	-	S	S	S	S	S	S
<b>Effort</b>										
Trip Mode	O	O	S	-	O	S	S	S	S	S
Geographic area where landed	S/O	O	S	-	O	S	S	S	S	S
Geographic area where fished	S/O	S	S	O	O	S	S	S	S	S
Time and date of return	S/O	O	S	-	O	S	S	S	S	S

Table 6. Continued

Category Item	On-Site					Off-Site				
	Rove	Access Site	Catch Cards	Aerial	On-board Observers	Log Book	Random Phone	Known Phone	Mail	Door to Door
<b>Effort (cont.)</b>										
Trip duration	S	S	S	-	O	S	S	S	S	S
Fishing time	S	S	S	-	O	S	S	S	S	S
Fishing power										
Boat length	O	O	S/O	-	O	S	S	S	S	S
Passenger capacity	S	S	S/O	-	S	-	-	S	S	S
Speed	S	S	S	-	S	-	-	S	S	S
Fishing gear	O	O	S/O	O	O	-	-	S	S	S
Fishing method	O	O	S/O	O	O	-	-	S	S	S
Bait type	O	O	S/O	-	O	-	-	S	S	S
Hook type	S	S	S	-	O	-	-	S	S	S
Technological capabilities	S	S	S	-	O	S	S	S	S	S
<b>Biological</b>										
<b>Gross catch</b>										
Number released										
Dead	S	S	S	-	O	S	S	S	S	S
Alive	S	S	S	-	O	S	S	S	S	S
Reason	S	S	S	-	O	S	S	S	S	S
Species composition	S	S	S	-	O	S	S	S	S	S
Sex	S	S	S	-	O	-	-	-	-	-
Biological data <sup>a</sup>	S	S	S	-	O	-	-	-	-	-
Tag returns	S	S	S	-	O	S	S	S	S	S
Weight	S	S	S	-	O	-	-	-	-	-
Length	S	S	S	-	O	-	-	-	-	-
Landings										
Number	O	O	S	-	O	S	S	S	S	S
Species composition	O	O	S	-	O	S	S	S	S	S
Sex	O	O	S	-	O	S	-	-	-	-
Biological data <sup>a</sup>	O	O	S	-	O	S	-	-	-	-

Table 6. Continued.

Category Item	On-Site					Off-Site				
	Rove	Access Site	Catch Cards	Aerial	On-board Observers	Log Book	Random Phone	Known Phone	Mail	Door to Door
<b>Biological (cont.)</b>										
Tag returns	O	O	S	-	O	S	S	S	S	S
Weight	O	O	S	-	O	S	-	-	-	-
Length	O	O	S	-	O	S	-	-	-	-
<b>Abiotic</b>										
Windspeed	O	O	S	O	O	S	S	S	S	S
Wind direction	O	O	S	O	O	S	S	S	S	S
Cloud cover	O	O	S	O	O	S	S	S	S	S
Moon phase	O	O	S	O	O	S	S	S	S	S
<b>Currents</b>										
Surface	S	S	S	-	O	-	-	S	S	S
Bottom	S	S	S	-	O	-	-	S	S	S
Water temperature	S	S	S	-	O	-	-	S	-	-
Air temperature	O	O	S	O	O	-	-	S	-	-
Barometric pressure	O	O	S	O	O	S	S	S	S	S
Precipitation	O	O	S	O	O	S	S	S	S	S
Fog	O	O	S	O	O	S	S	S	S	S
Wave height	S	S	S	O	O	S	S	S	S	S
Tide	O	O	S	O	O	S	S	S	S	S
Water depth	S	S	S	O	O	S	S	S	S	S
Bottom type	S	S	S	O	O	S	S	S	S	S
Water clarity	S	S	S	-	O	S	S	S	S	S
Night/Day/Twilight	S	S	S	-	O	S	S	S	S	S
Bottom type/Structure	S	S	S	-	O	S	S	S	S	S

<sup>a</sup> Biological data includes such items as maturity stage, gonads, fin spines, otoliths, scales, etc.

Table 7. Projects To Be Included in a National Marine Recreational Fisheries Data Base.

<b>PROJECT TITLE</b>	<b>PRIORITY</b>
USFWS National Survey of Fishing, Hunting and Wildlife-Associated Recreation	N
NPS Everglades National Park Marine Gamefish Harvest Monitoring	Y
NPS Biscayne National Park Creel Census	Y
NMFS Marine Recreational Fisheries Statistics Survey (MRFSS)	H
NMFS Large Pelagics Survey	Y
NMFS Economic Data Collection - Gulf of Mexico Recreational Reef-fish Fishery	Y
NMFS Beaufort Headboat Survey	H
NMFS Southeast Charterboat Survey	H
NMFS Recreational Billfish Tournament Sampling Program	H
NMFS Recreational Billfish Non-Tournament Sampling Program	H
NMFS Consumption Survey of Fish and Shellfish Caught in Recreational & Subsistence Fisheries	N
NMFS Survey of Recreational Shrimpers in the Bay & Sound Systems of the Gulf Coast	N
NC Albemarle Sound Creel Survey	Y
NC Marine Recreational Statistics Survey (MRFSS)	N
SC Billfish Monitoring Project	N
SC Ocean Pelagic Gamefish Survey	Y
SC Marine Recreational Fisheries Survey, 1987-1988 (MRFSS only)	N
SC Marine Recreational Fisheries Survey, 1989-present (MRFSS & SS)	Y
SC Recreational Pier, Charterboat and Headboat Reporting	Y

Abbreviations: SS=Special Study, N=Not Include in National Database (in several cases the data are already included through another program), Y=Do Include in National Database, H=Highest Priority for Inclusion, L=Link Electronically

Table 7. Continued.

<b>PROJECT TITLE</b>	<b>PRIORITY</b>
SC Survey of Recreational Saltwater Private-boat Anglers and Shellfish Gatherers	N
SC Assessment of Participation & Resource Impact of Shrimp Baiting	Y
SC Survey of the Shrimp Baiting Fishery, 1988-1991	Y
SC Economic and Biological Evaluation of the Pier Fishery	Y
SC Socio-economic Profile of Offshore Sport Fishermen	N
SC Recreational Shellfish Gathering, 1980-1981	N
SC Recreational Shellfish Harvesters - Folly/Stono Rivers & Sullivan's Island/Isle of palms public shellfish areas	N
SC Survey of the Tailrace Canal Recreational Shad Fishery	N
SC Giggling Fishery	N
GA Marine Recreational Fisheries Survey, 1985-1991 (MRFSS)	N
FL Marine Recreational Fishery Statistical Data Collection - Site Description Survey	Y
FL Recreational Saltwater Fishing license Database	L
FL Apalachicola River Watershed Investigations	Y
AL Recreational Creel Survey	Y
MS Creel Survey of the Sound and Adjacent Waters	Y
MS Data Collection of Recreational Oyster Harvest	Y
LA Survey of Marine Recreational Fishery of Lower Barataria Bay, 1975-1977	Y
LA Creel Survey of Rec. Saltwater Anglers	Y
LA Survey of Recreational Anglers, 1990-1991	Y

Abbreviations: SS=Special Study, N=Not Include in National Database (in several cases the data are already included through another program), Y=Do Include in National Database, H=Highest Priority for Inclusion, L=Link Electronically

Table 7. Continued.

PROJECT TITLE	PRIORITY
FL Marine Recreational Fishery Statistical Data Collection - Angler Interviews	Y
TX Monitoring of Coastal Finfish Resources for Sportfish Management (Boat-based)	H
TX Monitoring of Coastal Finfish Resources for Sportfish Management (Shore-based)	H
TX Night-time Flounder Gig Study	Y
TX Attitude and Opinion Surveys	H
PR Marine Sport Fisheries Creel Survey	H
Developing Strategies to Enhance Charter Boat Fishing Operations in Puerto Rico and the USVI	H
Developing Marine Recreational Fishing in Puerto Rico & the USVI	H
Assessment of Access and Infrastructure Needs of Puerto Rico & the USVI in Order to Support Increased Marine Recreational Fishing	H
VI Recreational Port Sampling, 1981-present	H
VI Recreational Fishing Survey	Y
VI Surface Deepwater Fish Aggregating Devices (FADs) - St. Croix	N
VI Fish Attractant Devices (FADs)	N
VI ICCAT Billfish Sampling	N
VI Recreational live-bait fishing for yellowfin tuna	Y
VI Assessment of the Exocoetidae (Flyingfish) and Belonidae (needlefish) Resources	Y

Abbreviations: SS=Special Study, N=Not Include in National Database (in several cases the data are already included through another program), Y=Do Include in National Database, H=Highest Priority for Inclusion, L=Link Electronically



## **1993 RecFIN(SE) BIOLOGICAL/ENVIRONMENTAL WORKGROUP REPORT**

The RecFIN(SE) Biological/Environmental Workgroup held one conference call on February 16<sup>th</sup>, and two meetings, March 26<sup>th</sup> in New Orleans and July 23<sup>rd</sup> in Miami, to accomplish 1993 workgroup tasks. The official workgroup was comprised of Maury Osborn - Chair, Al Jones, Paul Phalen, Thomas Schmidt, Ann Seiler, Tom Van Devender, and Wayne Waltz. Other RecFIN(SE) members also provided valuable input.

The workgroup made substantial progress in meeting RecFIN(SE) Strategic Plan goals. The workgroup was assigned three tasks. Task 1 (goal 2, objective 1) was to be completed during 1993 and Tasks 2 and 3 (goal 2, objectives 2 and 3) were to be completed in 1994. The workgroup completed tasks 1 and 2, and made substantial progress on task 3. In some cases, we completed work that was not specified in the original tasks, but that contributes to an overall description and understanding of the marine recreational fishery (MRF) in the Southeast Region. We believe that our 1993 products will be invaluable when the RecFIN(SE) Committee develops priorities, makes recommendations for new or expanded surveys, recommends the purposes and types of new surveys, recommends what data would be collected, and seeks necessary funds.

**Task I. Goal 2, Objective 1:** Identify the components of the fishery and required data priorities for each component.

Approach: Through existing materials and personal observations, identify all components of marine recreational fishing universe by State and Territory and quantify the units within each component. Identify data categories fishery management agencies need to reach and evaluate decisions.

Results: In order to ensure understanding and communication and to provide standard terms for all MRF surveys, the workgroup developed definitions of marine recreational fishing terms (Table 1) and a conceptual model of components of marine recreational fishing mortality (Figure 1), including harvest, catch and landings. Recreational and commercial fishermen were defined: the recreational fisherman definition implicitly includes subsistence fishermen. (By direction of the RecFIN(SE) Committee, "fisherman" is to be used rather than "fishers" or "anglers". "Fishers" are a type of weasel in addition to sounding awkward, and use of "anglers" ignores users of other gear for sport fishing.) The definition of for-hire boats, from the "Proceedings: Workshop on Marine 'For-Hire' Recreational Fisheries Survey Methodology" (Gulf States Marine Fisheries Commission (GSMFC), 1992) was evaluated. "For Hire" was defined as any boat guiding one or more sport fishermen for a fee. The terms "headboat", "charterboat", and "partyboat" have had different meanings in different surveys. Therefore an operational definition for charter/guides versus headboats was adopted as 1) guide/charter boat will mean smaller boats where passengers pay for an entire party on a per boat basis, and 2) headboat means larger boats where passengers pay on a per person basis. More specific definitions vary



according to State and Coast Guard licensing definitions. Also, some boats may switch from charterboat to headboat operations. More specific definitions need to be developed as surveys are designed or modified. Individual boats that switch around may be assigned to one or the other strata or both, depending on survey objectives.

A conceptual model of the recreational fishery in the Southeast Region was developed to define the scope of the MRF universe and include all possible components (Figures 2-5). The top of the model is the entire recreational fishery and all participants in the fishery. Components were defined first by fishing mode or platform: private/rental boats, for-hire boats -- headboats and charter/guide boats, and shore fishing, which includes both beach/bank and man-made shore areas. Fishing mode was then categorized as to whether it was organized and included competition -- e.g. tournaments, derbies, dive-club competitions, -- or not. Use of various gears can be categorized beneath each of these sub-groups, and finally finfish and shellfish species or species groups targeted and caught are the last level of categorization. "Gear" includes rods and reels as well as types of gear important in localized areas such as skin/scuba spear fishing in the Caribbean and sport shrimp trawl fisheries in the Gulf and South Atlantic. Charterboats also include the relatively new activity where commercial fishing vessels take tourist groups trawling for fun and the tourists keep the catch.

The conceptual model was used to develop an inventory form to define the absence/presence and quantify the magnitude of each fishery in all States, Territories, and smaller geographical areas such as national parks (Table 2-3). The tables did not include the gear stratification, and focused on mode and species targeted. This combination was logical in terms of adequately quantifying each fishery and in terms of survey design. This inventory can be used to group common fisheries within and among States, to identify unique fisheries in the Southeast Region, to develop priorities for data collection, and identify the best survey strategies for each fishery. All State, Territory, and National Park Service RecFIN(SE) members provided the presence/absence and magnitude data for the inventory based on the following criteria:

- 1) Use the best available source to quantify the number of boats, participants, and access points. This will also be useful in identifying major gaps in knowledge about some components of the MRF. Sources that could be used to quantify the fisheries were the Marine Recreational Fishery Statistics Survey (MRFSS) participation estimates, other surveys, license sales, boat registration files, the MRFSS master site list, special surveys, etc.
- 2) Document what sources were used, applicable time periods, and any assumptions made.
- 3) Public access points were defined as "a point of departure or point of fishing location (e.g., boat ramp, dock, marina, pier, shoreline) which is accessible to a member of the general public, either at no cost or by fee". Private access points are "a point of departure or fishing location which is accessible only to members of a limited, restricted group of persons, by reason of membership or ownership".



- 4) Guide boats and charter boats have separate columns on the inventory form since the workgroup felt these components could be fleshed out separately for State and Territorial fisheries. Known examples include offshore charter boats targeting pelagic species; smaller inshore guide boats targeting red drum and spotted seatrout, tarpon, snook, etc.; skin/scuba spear fishing charters in the Caribbean, etc.

The inventory was also used to identify which components of the fishery are being surveyed currently, and which agencies are conducting the surveys (Table 5). This table shows where there are gaps in coverage, duplication of surveys, or cooperative efforts, and can be used to recommend and prioritize expanded or new survey efforts.

The workgroup did not compile a list of required data priorities for each component as specified in the objective approach. We felt that these priorities would shift according to management priorities and would depend upon many factors including type and scope of a survey, purposes of the survey (stock assessment, survey design, or formulation and evaluation of management regulations), budgets, etc.

**Task II. Goal 2, Objective 2:** Identify biological and environmental data elements required for each fishery component.

Approach: Use GSMFC Data Report and evaluate/modify as necessary for South Atlantic and Caribbean needs. This will be done for each fishery component by subregion.

Results: We identified biological and environmental data elements necessary for the management of a fishery through use in stock assessments, survey design, or formulation and evaluation of management regulations (Table 6). The data elements table in the GSMFC "for-hire" workshop proceedings was adapted to apply to the entire recreational fishery in the Southeast Region. We did not assign the various data elements to each fishery component. The need for any of the items for a specified fishery should be determined on a case-by-case basis depending on management needs. All items listed were deemed important, but all may not be collected feasibly depending on survey design and budgets. The list provides a menu to select from based on management needs and survey design.

#### *Demographic, Social and Economic Variables*

Residence may be needed for estimation procedures (the MRFSS uses an adjustment for coastal/non-coastal residents), it may cause differences in catch rates due to experience factors, and it may be used for allocation purposes. How residence is asked must be carefully considered in areas where "winter residents" are a significant component of the fishery. Boat identification may be needed to standardize catch rates in CPUE indices and can be used in mark-recapture procedures to determine fleet size. The number of trips is needed for effort estimates. Experience levels also may cause differences in catch rates. Species targeted may be used to allocate directed effort and to stratify trips by fishery. Party size is needed to develop



effort estimates. Participation, in terms of the total number of participants, is needed for effort estimations and for allocation. Age may be important depending on survey design. For example, if licenses were used as a sampling frame, adjustment for fishermen excluded from licensing by age would be necessary. Experience and specialization may affect catch rates. Disposition of the catch is used to estimate catch, harvest, and landings. The frequency of contact with individual anglers (surveyed before) may influence survey design in order to minimize respondent burn-out.

### *Effort Variables*

Trip mode is important for estimation procedures and allocation of survey samples. The access site (geographic area where landed) is important for survey design, sample allocation, and efficiency. Site can also be used in some economic models. Fishing area is important for management; however, the geographical precision of the defined areas may vary. Time of return and trip time are important for survey design and effort calculation, respectively. Trip time can be broken into travel and searching time, but there was concern that asking anglers to break trip time into these components was not realistic. As long as there is a consistent measure of trip time, calculation of catch rates will not be compromised; however, if there is a lack of fishery independent data, changes in search time versus trip time may indicate changes in abundance. Fishing power is important but it is a composite of many different factors and difficult to calculate. Boat length, passenger capacity, speed, fishing gear, fishing method (trolling, bottom fishing, etc.), bait and hook type, and technological capabilities (LORAN, fishfinders, etc.) can all affect catch rates and choice of target species.

### *Biological Variables*

The following items were defined as important to gather on a routine survey: gross catch and landings in numbers (released alive and dead), species composition, length, weight, sex and other biological information if possible (maturity stage, gonads, fin spines, otoliths, scales, etc.). Data on the number of fish released and the reasons for releases will increase in importance as regulations increase. Data used for determining age (lengths or hard parts where lengths are inadequate) should be collected as a random sample of the catch. Weights are needed unless length-weight regressions are available. In some situations, weight needs to be collected even though length-weight relationships are known, for example, to calculate condition factors, or where there is evidence of "lighter" stocks of some species, such as mackerel. We felt it was not important to ask anglers whether they caught any tagged fish, although samplers should collect information on tagged fish when encountered.

### *Environmental Variables*

Although many factors may affect fish abundance, fishing effort and catch rates, the environmental factors listed were deemed important for monitoring on a routine basis. Some are important for management, and some for sampling efficiency. Some factors may be important in modeling trends in catch rates by explaining some of the variability.



## *Metadata*

Additional data called "Metadata" were discussed. Metadata is defined as information that is necessary to interpret survey data and is more descriptive than analytical ("meta" means transcending). Such data include environmental perturbations, economic conditions, regulations (including licensing), contracting/procedural changes in conduct of surveys, and social factors. The workgroup recommends that a metadata base be developed for the MRFSS in the Southeast beginning with 1980. Such a file would be incorporated into the national MRF data base to be developed by the MRFSS staff in consultation with other users. In 1994, workgroup members will provide their thoughts on metadata criteria (types, examples, sources, spatial/temporal scope, etc). Once criteria are established, the workgroup will start compiling database items.

**Task III. Goal 2, Objective 3:** Identify and determine standards for biological and environmental data collection, including statistics, training, and quality assurance and quality control standards.

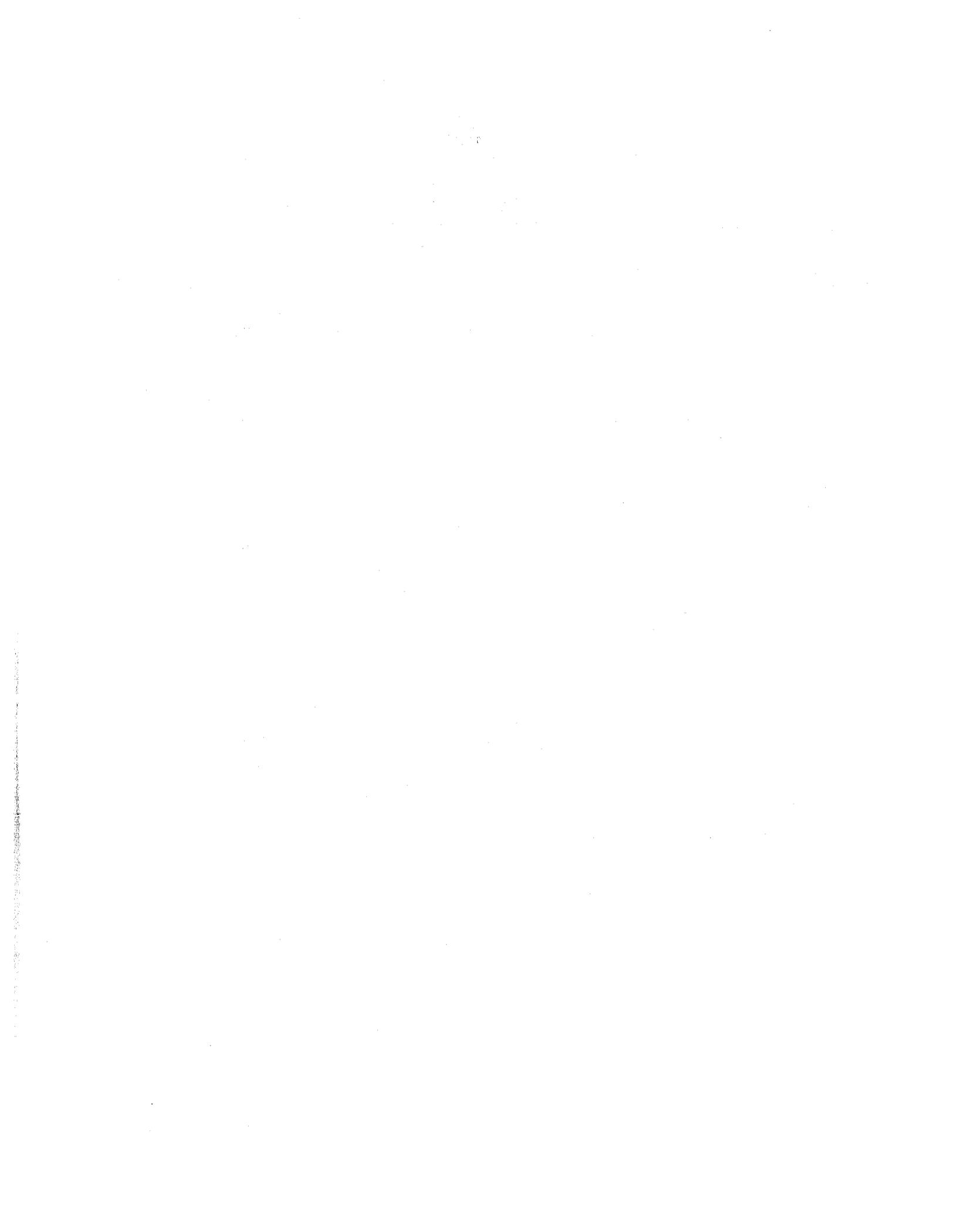
Approach: Review existing quality assurance and quality control documents and modify as necessary for application to RecFIN.

Results: A draft document incorporating standards developed by the MRFSS program, the States, and the GSMFC Data Management Subcommittee has been compiled. Workgroup members are in the process of a critical review and adaptation of this document. Final QA/QC standards will be presented in 1994.

## **Other Business**

All projects described in the MRF Data Collection Project Summaries (Strategic Plan Appendix) were examined concerning incorporation into regional and national MRF data bases. Of 66 MRF surveys, 13 were classified as high priority, 31 as lower priority, and 22 as not appropriate for incorporation (Table 7). Data bases were evaluated using the following criteria:

- 1) contain data elements described on data elements table;
- 2) reasonably wide temporal/spatial scope;
- 3) reliability;
- 4) fill current data gaps;
- 5) do not duplicate other data bases; and
- 6) provide syntheses of data sets with additional information.



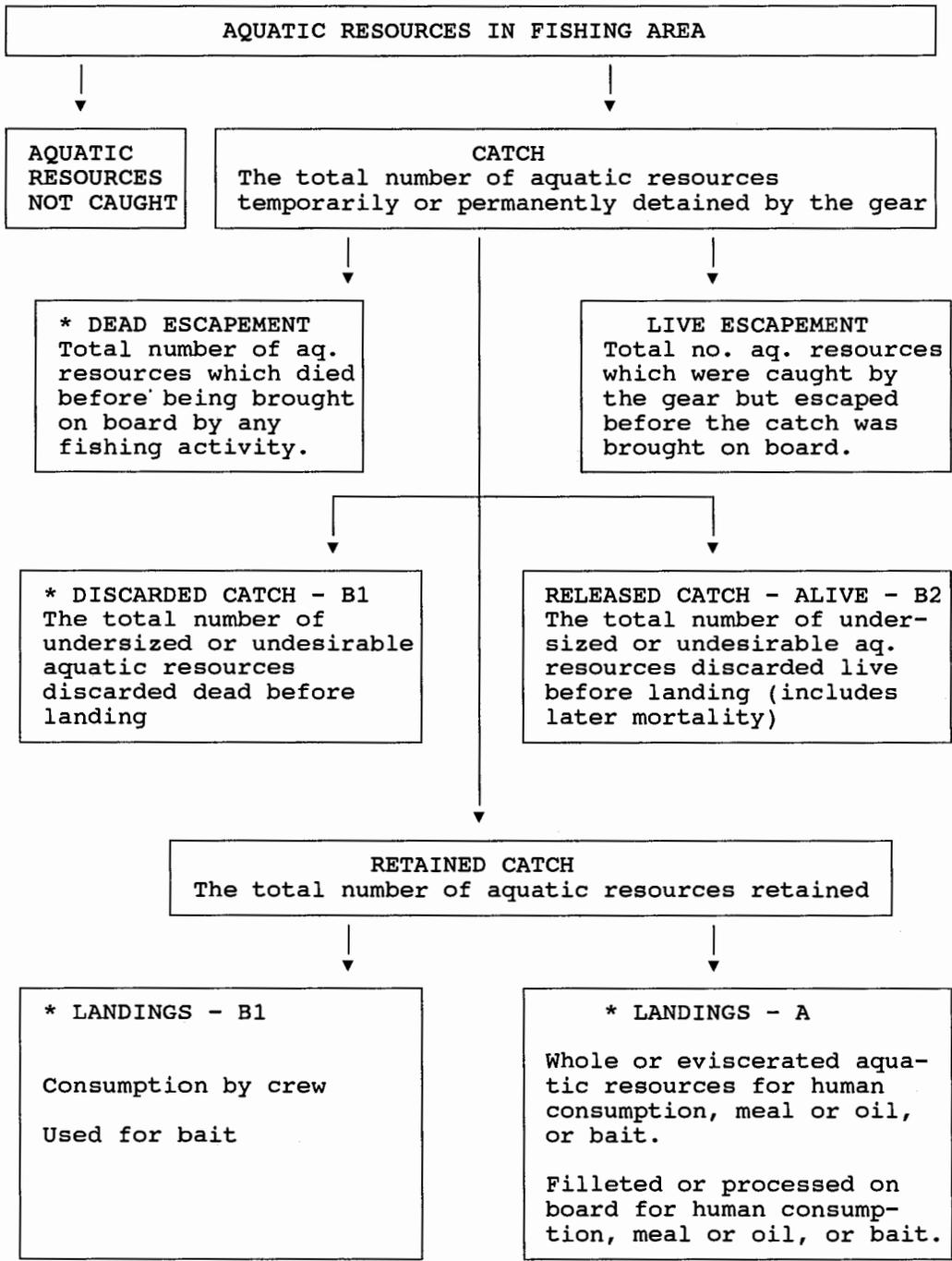


Figure 1. Components of Catch and Their Relation to Fishing and Fishing Mortality. \* = the sum of these quantities is total fishing mortality (harvest).



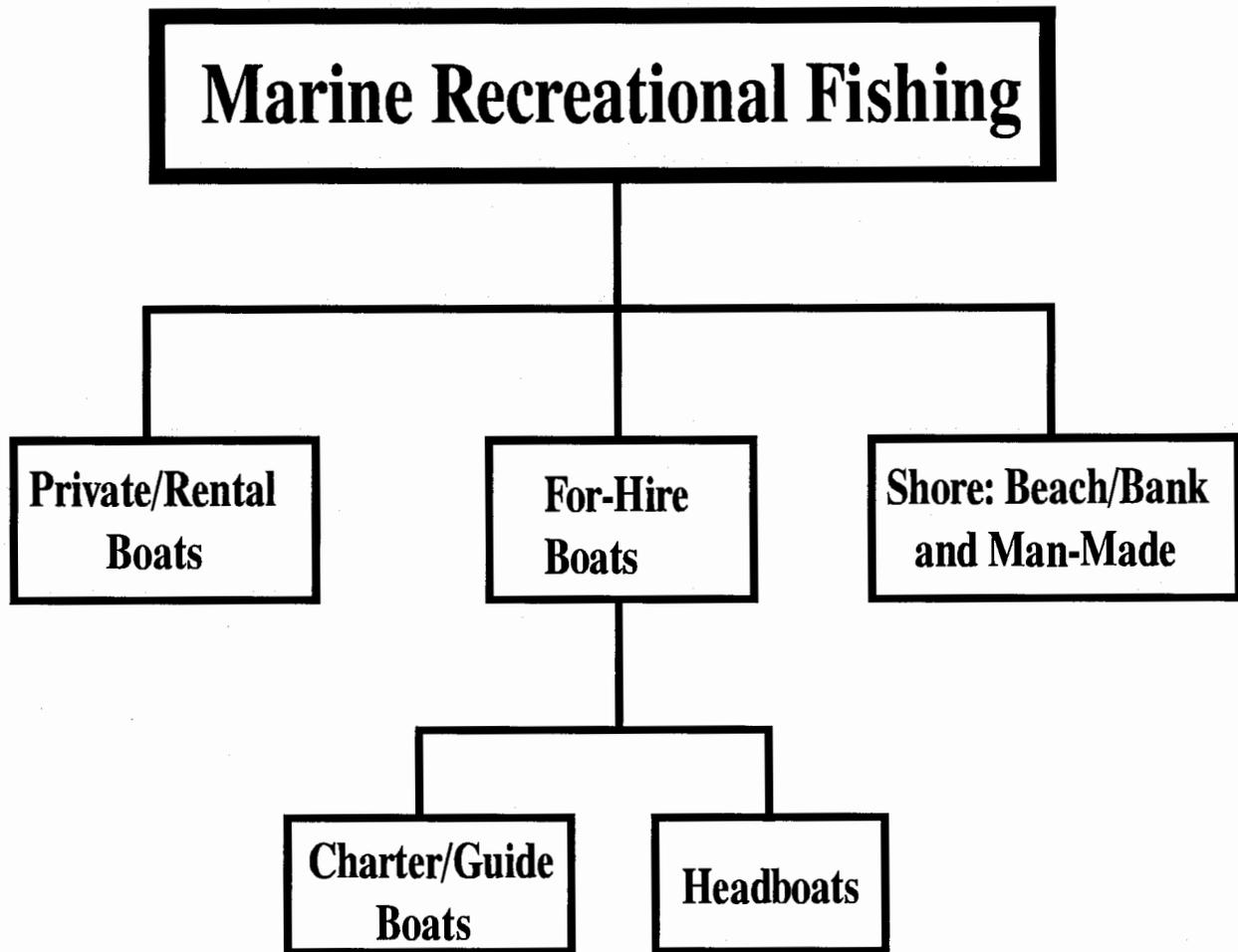
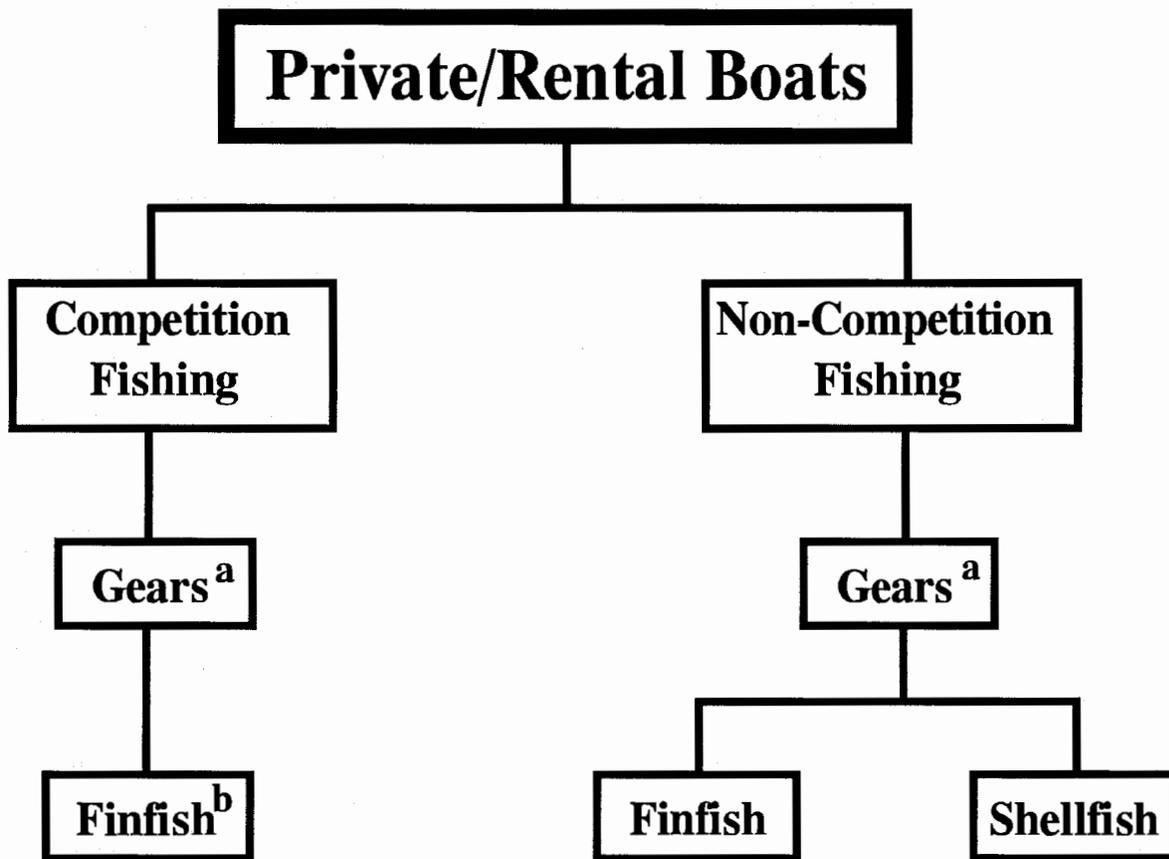


Figure 2. Model of the Marine Recreational Fishery Components in the Southeast Region.



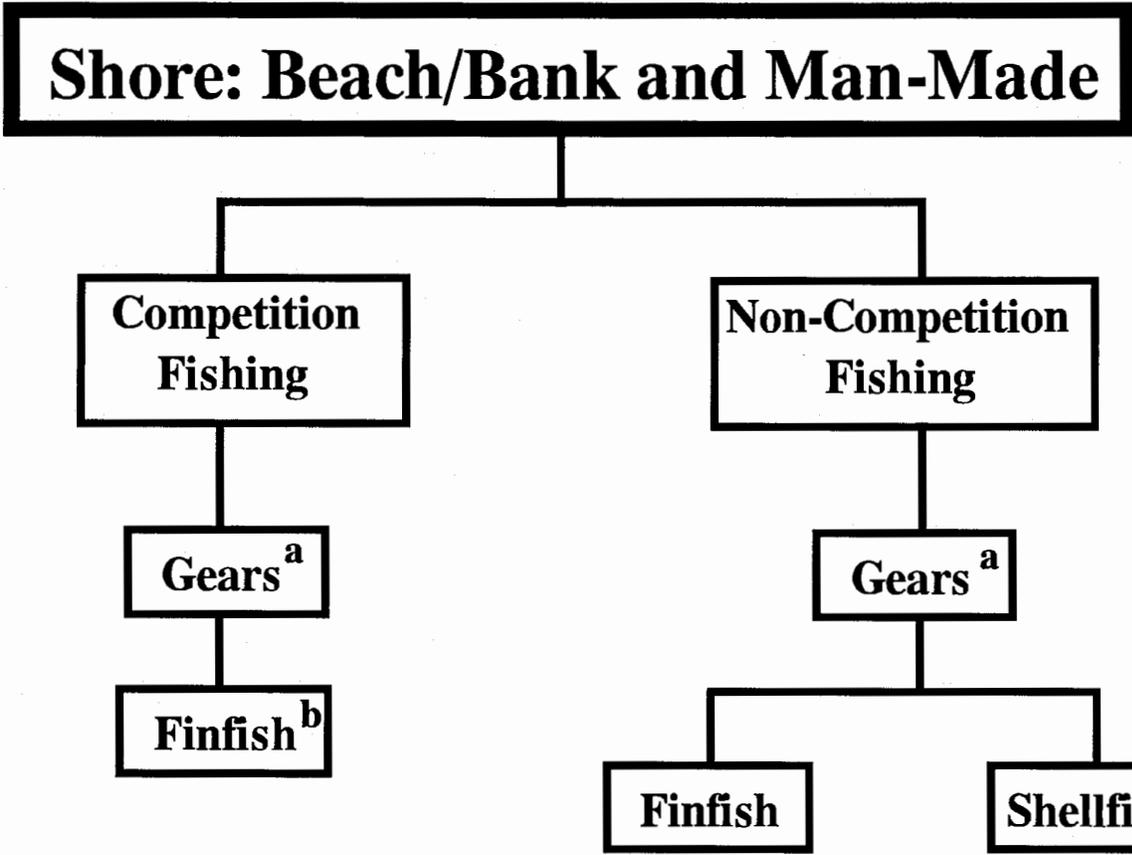


<sup>a</sup> Gears include rod and reel, various nets and traps, oyster tongs, spear fishing while skin/scuba diving, and any gear used in recreational fishing for finfish or shellfish.

<sup>b</sup> In a few areas, there are dive clubs with individuals who compete with others in the group for spiny lobsters.

Figure 3. Breakdown of the Private/Rental Boats Component.



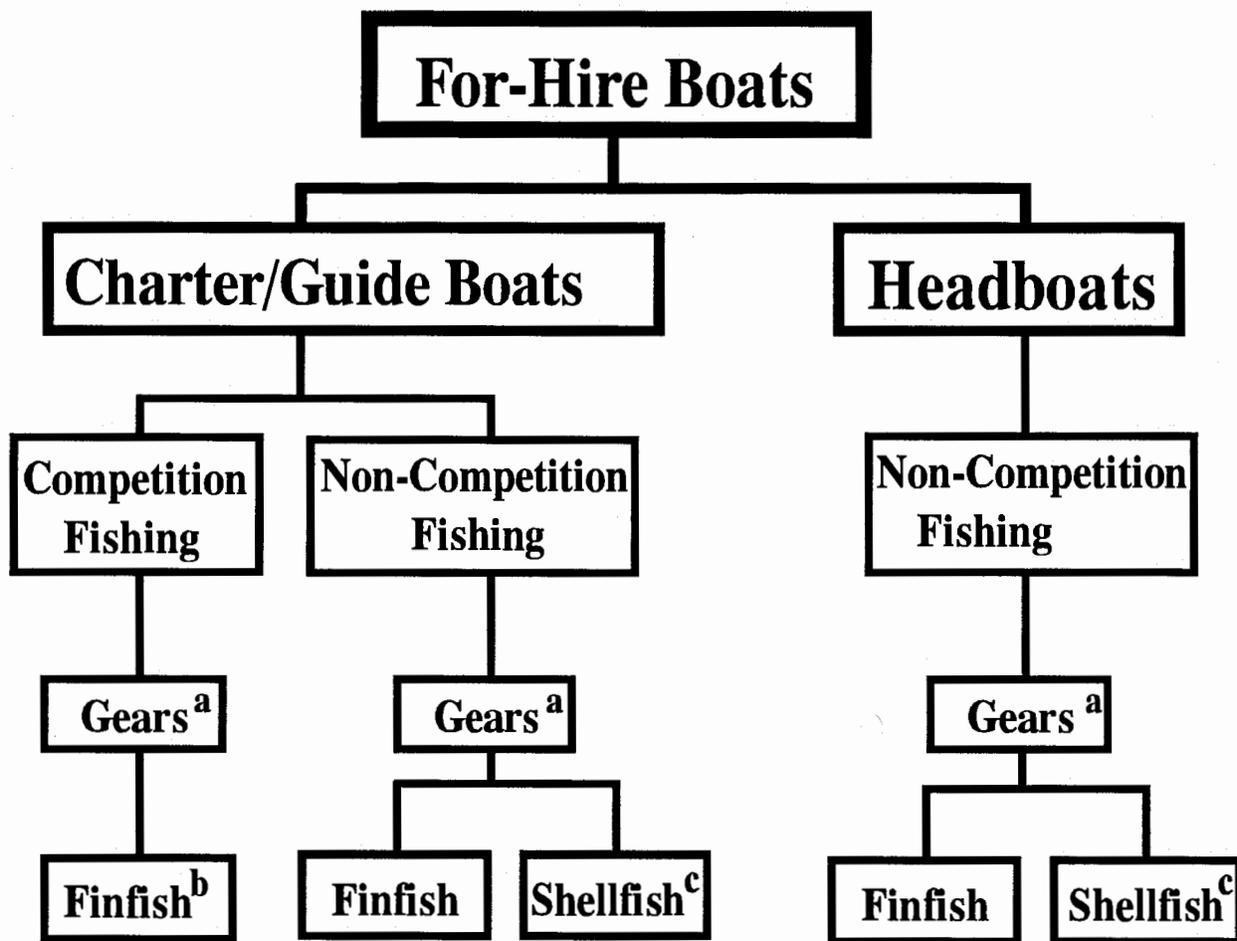


<sup>a</sup> Gears include rod and reel, various nets and traps, oyster tongs, spear fishing while skin/scuba diving, and any gear used in recreational fishing for finfish or shellfish.

<sup>b</sup> In a few areas, there are dive clubs with individuals who compete with others in the group for spiny lobsters.

Figure 4. Breakdown of the Shore: Beach/Bank and Man-Made Component.





- <sup>a</sup> Gears include rod and reel, various nets and traps, oyster tongs, spear fishing while skin/scuba diving, and any gear used in recreational fishing for finfish or shellfish.
- <sup>b</sup> In a few areas, there are dive clubs with individuals who compete with others in the group for spiny lobsters.
- <sup>c</sup> In some areas, charter and headboats will take groups or individuals for skin/scuba lobster trips. Some charter and headboats take tourists trawling and they keep the fish for fun.

Figure 5. Breakdown of the For-Hire Boats Component.



Table 1. Definitions of Terms for Marine Recreational Fisheries Data Collection Programs.

Term	Definition
Catch	Aquatic organisms temporarily or permanently removed from a population.
Commercial Fisherman	Any person who sells, barter, or receives compensation for any or all of their catch.
Fish Guide	A person who is compensated for accompanying or transporting a recreational fisherman.
Fisherman	Any person who attempts to catch aquatic organisms.
Harvest	Aquatic organisms permanently removed from a population.
Landings	Aquatic organisms brought to land from water.
Recreational Fisherman	Any person who catches or attempts to catch aquatic organisms for personal disposition, except for sale.



Table 2. Presence of Marine Recreational Fishery Components by State. X=present. Shaded cells indicate absence.

St	Private Boat						Guide Boat						Charter Boat						Headboat						Shore					
	Finfish			Shellfish			Finfish			Shellfish			Finfish			Shellfish			Finfish			Shellfish			Finfish			Shellfish		
	N	T	L	S	C	M	N	T	L	S	C	M	N	T	L	S	C	M	N	T	L	S	C	M	N	T	L	S	C	M
NC	X	X		X	X	X	X	X					X	X	X	X			X		X				X	X		X	X	X
SC	X	X		X	X	X	X	X					X	X					X						X	X		X	X	X
GA	X	X	X	X	X	X	X	X	X				X	X	X				X						X	X		X	X	X
FL	X	X	X	X	X	X	X	X					X	X	X				X		X				X	X	X	X	X	X
AL	X	X	X	X	X	X	X	X					X	X	X				X						X	X		X	X	X
MS	X	X		X	X	X	X						X	X					X						X	X		X	X	
LA	X	X		X	X	X	X	X					X	X					X						X	X		X	X	
TX	X	X		X	X	X	X	X					X	X		X			X						X	X		X	X	X
PR	X	X	X			X							X												X	X			X	
VI	X	X	X		X	X	X	X	X			X	X	X											X	X	X		X	X
NPS	X	X	X	X	X	X	X	X					X						X		X				X				X	

KEY:

- N Non-organized
- T Tournament
- L Spiny Lobster
- S Shrimp
- C Crab
- M Molluscs - oysters, scallops, clams, conch, whelk
- NPS National Park Service



Table 3. Magnitude of Marine Recreational Fishery Components by State.

St	Number of Boats				Number of Participants				
	P/R	Gb	Cb	Hb	P/R	Gb	Cb	Hb	Sh
NC	280,000	<20	185	13	300,000	w/Cb	20,000	10,000+	10,000+
SC	61,519	w/Cb	122	29	73,701	w/Cb	13,473	?	?
GA	30,000+	?	70	3	?	?	?	?	?
FL	?	889	851	137	813,000	?	?	?	> 1 M
AL	20,000	10+	90+	2	50,000	1,000+	20,000+	10,000+	10,000
MS	39,215	w/Cb	41	w/Cb	?	?	?	?	?
LA	?	?	?	?	?	?	?	?	?
TX	109,286	272	128	29	603,900	12,058	51,252	90,372	688,957
PR	<19,000	?	6	0	?	?	?	0	?
VI	3,000	1	70	0	10,000	200	5,000	0	500
NPS	38,000	5,556	360	432	102,657	14,745	1,000	3,000	?

St	No. of Public Access Points					No. of Private Access Points				
	P/R	Gb	Cb	Hb	Sh	P/R	Gb	Cb	Hb	Sh
NC	142	5	32	5	235	?	?	0	0	?
SC	93	?	?	?	20	?	?	?	?	?
GA	77	?	?	2	27	?	?	?	?	?
FL	2,139	?	309	84	3,570	?	?	?	?	?
AL	10+	10+	10+	10+	?	?	?	?	?	?
MS	43+	?	?	?	39+	?	?	?	?	?
LA	?	?	?	?	?	?	?	?	?	?
TX	306	?	?	?	702	121	?	?	?	?
PR	52	?	?	?	193	22	?	?	?	0
VI	50+	1	15	0	?	?	1	0	0	?
NPS	9+	?	?	?	?	0	?	?	?	0

KEY:

P/R Private/Rental Boat  
 Sh Shore/Pier  
 Hb Headboat

Cb Charter Boat  
 Gb Guide Boat  
 NPS National Park Service



Table 4. Sources of data in Table 3 and additional details.

State	Data Source/Notes
NC	<p><u>No. of boats</u> P/R: NC Wildlife Resource Commission data. Gb: Best guess. Cb and Hb: NC Division of Marine Fisheries license files.</p>
	<p><u>No. of participants</u> P/R, Cb and Sh: MRFSS. Gb participants are included with Cb. Hb: NC Wildlife Resource Commission data.</p>
	<p><u>No. of public access points</u> P/R and Cb: MRFSS Site Inventory. Gb and Hb: Best guess. Sh mode includes 200 beach/bank sites estimates by best guess and 35 public piers from NC license files.</p>
SC	<p><u>No. of boats</u> P/R: SC boat registration files. Includes all registered vessels in the six coastal counties. Does not include vessels in inland counties that are used in saltwater. Gb are included in Cb category, currently no way to separate. Cb: Annual (July 1992-May 1993) permits sold to boats carrying six or fewer passengers. Hb: Annual (July 1992-May 1993) permits sold to boats carrying seven or more passengers.</p>
	<p><u>No. of participants:</u> P/R: Saltwater stamps (July 1992-May 1993). Cb: Based on logbook reports (July 1992-December 1992).</p>
	<p><u>No. of public access points</u> P/R: Waltz, W. and C. Moore. 1987. Public Access to Marine Recreational Fishing in South Carolina. Unpublished manuscript.</p>
GA	<p><u>No. of boats</u> P/R: GA boat registration files. Includes all power driven vessels, including jet-skis) in the 6 coastal counties. Does not include vessels in inland counties that are used in saltwater.</p>
	<p><u>No. of public access points</u> P/R and Sh: MRFSS Site Inventory. No estimate available for private access for PR, CB, of Sh.</p>
	<p><i>Additional Information:</i> The spiny lobster fishery is quite small (about 10 boats) and is seasonal.</p>



Table 4. Continued.

State	Data Source/Notes
FL	<p><u>No. of boats</u> Gb, Cb, and Hb: Derived from Florida saltwater fishing license information. Those boats licensed to carry 3 or fewer fishing passengers were termed "guide boats"; 4-10 passengers were "charter boats"; and 11 or more passengers were "party/head boats".</p> <p><u>No. of participants</u> P/R: Derived from Florida saltwater fishing license information. Florida residents who fish from boats (there are some additional criteria and license exemptions) and all non-residents (except those fishing from boats or fishing piers) must possess a valid saltwater licence. All saltwater fishing licenses issued were included as a rough estimate of the number of participants. Sh: Loosely derived from MRFSS estimates of participants in saltwater fishing in Florida.</p> <p><u>No. of public access points</u> P/R, Cb, Hb and Sh: Derived from a survey that the FRMI's Juvenile Fish Monitoring Group conducts of recreational fishing access sites in the State.</p>
AL	<p><u>No. of boats, participants, and public access points</u> 1985 Alabama Creel Survey.</p>
MS	<p><u>No. of boats</u> P/R: State license registrations from coastal counties. Gb, Cb, and Hb: 1993 license sales, can not be separated by class.</p> <p><u>No. of participants</u> Beginning July 1, 1993 a saltwater recreational fishing license will be required.</p> <p><u>No. of public access points</u> P/R and Sh: Mississippi Creel Survey.</p>
TX	<p><u>No. of boats</u> P/R: <math>x = y * z</math> where <math>x</math>=number of private boats, <math>y</math>=boats registered at or near end of FY 1991 (Weixelman et al. 1992), and <math>z</math>=proportion of TX boat owners who used their boat for saltwater sportfishing in 1982 (Ferguson and Green 1987). Gb: <math>x = y - z</math> where <math>x</math>=number of guide boats, <math>y</math>=number of guide and charter boats (L.W. McEachron, TPWD, personal communication), and <math>z</math>=number of charter boats (Holland et al. 1992). Cb: Holland et al. 1992. Hb: Includes bay headboats (9) surveyed by TPWD November 1990-May 1991 and gulf headboats (McEachron et al. 1984 and Ditton et al. 1992).</p>



Table 4. Continued.

State	Data Source/Notes
TX (cont.)	<p><u>No. of participants</u> P/R: <math>x = y * z</math> where <math>x</math> = number of private-boat participants, <math>y</math> = 5-year (1988-92) estimated mean number saltwater fishermen based on sales of saltwater fishing stamps (850,564), and <math>z</math> = percentage of saltwater fishermen using private boats (71) (Green et al. 1982). Bay Gb and Hb: September 1981-August 1982 McEachron 1984. Gulf Cb: Holland et al. (1992) estimates 51,252. Gulf Hb: <math>x = y + z</math> where <math>x</math> = number of headboat participants, <math>y</math> = number of bay headboat participants (55,999) (McEachron et al. 1984) and <math>z</math> = number of gulf headboat participants (34,373) (Ditton et al. 1992). Sh: <math>x = y * z</math> where <math>x</math> = number of shore-based participants, <math>y</math> = 5-year (1988-92) estimated mean number saltwater fishermen based on sales of saltwater fishing stamps (850,564), and <math>z</math> = percentage of shore-based saltwater fishermen (81) (Green et al, 1982).</p> <p><u>No. of public access points</u> P/R: TPWD May-November 1993 boat-access inventory. Includes boat-ramps and wet-slip facilities. Sh: TPWD May 1990-May 1991 wade/bank and lighted pier inventory.</p> <p><u>No. of private access points</u> P/R: Spiller 1987. Includes canal subdivisions and other docking facilities.</p> <p><i>Literature Cited:</i> Ditton, R.B., S.M. Holland, and D.A. Gill. 1992. The U.S. Gulf of Mexico party boat industry: activity centers, species targeted, and fisheries management options. <i>Marine Fisheries Review</i> 54(2):15-20.</p> <p>Ferguson, M.O., and A.W. Green. 1987. An estimate of unsurveyed coastal recreational boat fishing activity in Texas. <i>Marine Fisheries Review</i> 49(2):155-161.</p> <p>Green, A.W., L.Z. Barrington, and G.C. Matlock. 1982. An estimation of the total number of Texas fishermen, 1 September 1978 - 31 August 1979. <i>Proceedings Annual Conference Southeastern Assoc. Fish and Wildlife Agencies</i>. 1982:241-251.</p> <p>Holland, S.M., R.B. Ditton, and D.A. Gill. 1992. The U.S. Gulf of Mexico charter boat industry: activity centers, species targeted, and fisheries management options. <i>Marine Fisheries Review</i> 54(2):21-27.</p>



Table 4. Continued.

State	Data Source/Notes
TX (cont.)	<p>McEachron, L.W. 1984. Harvest estimates for Texas marine charter boats (1978-1982). Technical Series Number 29. Texas Parks and Wildlife Department. Austin, Texas. 90 p.</p> <p>McEachron, L.W., P. Campbell, and K. Meador. 1984. Harvest by Texas headboat fisherman during September 1982-May 1983. Management Data Series Number 58. Texas Parks and Wildlife Department. Austin, Texas. 25 p.</p> <p>Spiller, K.W. 1987. Inventory of boat access sites on the Texas coast. Management Data Series Number 110. Texas Parks and Wildlife Department, Coastal Fisheries Branch. Austin, Texas. 69 p.</p> <p>Weixelman, M., K.W. Spiller, and P. Campbell. 1992. Trends in finfish landings of sport-boat anglers in Texas marine waters, May 1974-May 1991. Management Data Series Number 85. Texas Parks and Wildlife Department. Austin, Texas. 226 p.</p>
PR	<p><u>No. of boats</u> P/R: Puerto Rico DNR. Commission of Navigation. Cb: Sea Grant Report "Developing Strategies to Enhance Charter Boat Fishing Operations in Puerto Rico and the United States Virgin Islands".</p> <p><u>No. of participants</u> There are an estimated 81,000 resident sport fishermen, but they are not separated by mode. R.L. Schmeid. 1986. "The Nature and Extent of Marine Recreational Fishing and Associated Developmental Efforts in the Caribbean." Proceedings of the Gulf and Caribbean Fishing Institute 40:37-52.</p> <p><u>No. of public access points</u> P/R and Sh: Sea Grant Report "In Support of Marine Recreational Fishing" which includes ramps and marinas. Private beaches are illegal in Puerto Rico.</p> <p><i>Additional information:</i> There are 16 organized sport fishing clubs affiliated with the Asociacion de Pesca de Puerto Rico, an organization that belongs to the International Game Fish Organization. These clubs hold 15-20 tournaments annually. The tournaments target primarily big game fish such as billfish (blue and white marlin, sailfish, spearfish) or other pelagics (wahoo, dolphin, barracuda, shortfin mako, tunas). Saltwater species preferred by charter boat customers are marlin, tuna, sailfish,</p>



Table 4. Continued.

State	Data Source/Notes
PR (cont.)	dolphin, king mackerel, wahoo, sharks, bluefish, and to a lesser degree bonefish, tarpon, yellow snapper, swordfish, and yellowtail. Other non-organized fishing targets jacks, snook, tarpon, and reef fish.
VI	<u>No. of boats, part., public &amp; private access points</u> Enforcement (boat registrations).
NPS	<p data-bbox="380 600 1057 634"><u>No. of boats, participants, and public access points</u></p> <p data-bbox="380 636 1438 963">All information is for south Florida parks only. P/R and Gb boat and participant estimates are mean annual fishing boater trips from 1973-85 to Everglades National Park (VI parks are not surveyed)(Tilmant et al. 1990). Marine species preferred by P/R participants are spotted seatrout, gray snappers, red drum and snook. Cb and Hb estimates are total 1991 annual estimates from Commercial License Master Log and park visitation figures from the Dry Tortugas National Park. A 1985 estimate for the guide fishery in Everglades National Park was 8,446 boat trips and 24,086 participants (Tilmant et al. 1990). No estimate for Biscayne National Park.</p>
<p data-bbox="380 1005 602 1039"><i>Literature Cited:</i></p> <p data-bbox="380 1041 1438 1188">Tilmant, J.T., E.S. Tutherford, R.H. Dawson, and E.B. Thue. 1990. Impacts of gamefish harvest in Everglades National Park. pp. 75-103. G. Larson and M. Soukup (eds.) Vol. 6 Proceedings of the Conference of Science in the National Parks. Washington, D.C.</p>	
FWS	There is no data available for the FWS National Refuges. However, the group believed that the states' information includes activities from the refuges, thus providing a complete picture of the magnitude of marine recreational fishing activities.



Table 5. Survey Coverage of Marine Recreational Fishery Components by State and Survey Type. (Shaded areas = not applicable.)

	Private/Rental Boat					
	Finfish		Shellfish			
State	N	T	L	S	C	M
NC	B/SS/FS	SS				
SC	B/SS	SS		SS		
GA	M					
FL	M	FS	SS/FS			
AL	M	FS				
MS	M/S	FS				
LA	M	FS				
TX	S/SS	FS		S	S	S
PR						
VI	S	S	S			S
NPS	M/F	F				F

M = Federal MRFSS                      B = MRFSS with state add-on  
S = State routine survey program      FS = Federal special study  
SS = State special study                F = Other Federal program

**Notes:**

NC    N SS=Albemarle Sound Creel survey. FS=Large Pelagics Survey. T SS=King Mackerel Tournament survey.  
SC    B=SC personnel conduct intercept interviews but do not add to the sample size. SS=additional sampling/different methodology. T SS=Billfish Monitoring Project, Ocean Pelagic Gamefish Survey. S SS=Shrimp Baiting Survey.  
FL    T FS=NMFS Recreational Billfish Tournament Sampling. L SS=Survey of spiny lobster recreational license holders. FS=NMFS 1992 special survey of lobster fishing in Dade and Monroe County.  
AL    T FS=NMFS Recreational Billfish Tournament Sampling.  
MS    S=Creel Survey of the Sound and Adjacent Waters. T FS=NMFS Recreational Billfish Tournament Sampling.  
LA    T FS=NMFS Recreational Billfish Tournament Sampling.  
TX    S=Monitoring of Coastal Finfish Resources for Sportfish Management. SS=1978-79 Gulf Pier and Jetty Survey; 1974-76, 1979-80 and 1990-91 Wade/Bank and Lighted Pier Survey; 1981 Spring Black Drum Bay Sport-boat Survey; 1981 Fall Red Drum Gulf Pier Survey; 1987-91 Sport-boat Socioeconomic Survey; 1991 Nighttime Flounder Giggling Survey; and 1993-94 Sport-boat Bycatch Survey. T FS=NMFS Recreational Billfish Tournament Sampling.  
VI    S=Recreational Port Sampling.  
NPS    F=Everglades National Park Marine Gamefish Harvest Monitoring, Biscayne National Park Creel Census.



Table 5. Continued.

	Guide Boat					
	Finfish		Shellfish			
State	N	T	L	S	Cr	M
NC	B					
SC	B/S	S				
GA	M					
FL	M	SS				
AL	M					
MS	M/S					
LA	M					
TX	S	S				
PR						
VI	S	S	S			
NPS	M/F	F				

M = Federal MRFSS                      B = MRFSS with state add-on  
 S = State routine survey program    FS = Federal special study  
 SS = State special study                F = Other Federal program

Notes:

SC    B SC personnel conduct intercept interviews but do not add to the sample size.  
       S=Recreational Pier, Charterboat and Headboat Reporting.  
 FL    SS=1993 Special survey of guide boat fishing in Apalachicola. This survey will be  
       continued in 1994.  
 MS    S=Creel Survey of the Sound and Adjacent Waters.  
 TX    S=Monitoring of Coastal Finfish Resources for Sportfish Management.  
 VI    S=Recreational Port Sampling.  
 NPS    F=Everglades National Park Marine Gamefish Harvest Monitoring, Biscayne National  
       Park Creel Census.



Table 5. Continued.

State	Charter Boat					
	Finfish		Shellfish			
	N	T	L	S	Cr	M
NC	FS/B/F	FS/F				
SC	B/S	S				
GA	M/F					
FL	M/F	FS				
AL	M/F	FS				
MS	M/F	FS				
LA	M/F	FS				
TX	S/F	FS				
PR						
VI	S	S				
NPS	M/F					

M = Federal MRFSS                      B = MRFSS with state add-on  
 S = State routine survey program    FS = Federal special study  
 SS = State special study                F = Other Federal program

Notes:

- NC    FS=Large Pelagics Survey.    F=NMFS Southeast Charterboat Survey.
- SC    B SC personnel conduct intercept interviews but do not add to the sample size.  
       S=Recreational Pier, Charterboat and Headboat Reporting.
- GA    F=NMFS Southeast Charterboat Survey.
- FL    F=NMFS Southeast Charterboat Survey.    T FS=NMFS Recreational Billfish  
       Tournament Sampling.
- LA    F=NMFS Southeast Charterboat Survey.    T FS=NMFS Recreational Billfish  
       Tournament Sampling.
- TX    S=Monitoring of Coastal Finfish Resources for Sportfish Management.    F=NMFS  
       Southeast Charterboat Survey.    T FS=NMFS Recreational Billfish Tournament  
       Sampling.
- VI    S=Recreational Port Sampling.
- NPS    F=NMFS Southeast Charterboat Survey.



Table 5. Continued.

State	Head Boat					
	Finfish		Shellfish			
	N	T	L	S	Cr	M
NC	F/SS					
SC	F/S					
GA	F					
FL	F					
AL	F					
MS	F					
LA	F					
TX	F/S					
PR						
VI						
NPS	F					

M = Federal MRFSS                      B = MRFSS with state add-on  
 S = State routine survey program    FS = Federal special study  
 SS = State special study                F = Other Federal program

Notes:

NC    F=NMFS Beaufort Headboat Survey.    SS=Albemarle Sound Creel Survey.  
 SC    F=NMFS Beaufort Headboat Survey.    S=Recreational Pier, Charterboat and Headboat Reporting.  
 GA    F=NMFS Beaufort Headboat Survey.  
 FL    F=NMFS Beaufort Headboat Survey.  
 LA    F=NMFS Beaufort Headboat Survey.  
 TX    S=Monitoring of Coastal Finfish Resources for Sportfish Management.    F=NMFS Beaufort Headboat Survey.  
 NPS    F=NMFS Beaufort Headboat Survey.



Table 5. Continued.

State	Shore					
	Finfish		Shellfish			
	N	T	L	S	Cr	M
NC	B/SS					
SC	M/S					
GA	M					
FL	M					
AL	M					
MS	M					
LA	M					
TX	S					
PR						
VI	S	S				S
NPS	M					

M = Federal MRFSS

B = MRFSS with state add-on

S = State routine survey program FS = Federal special study

SS = State special study

F = Other Federal program

Notes:

NC N SS=Albemarle Sound Creel survey.

SC B=SC personnel conduct intercept interviews but do not add to the sample size.

S=Recreational Pier, Charterboat and Headboat Reporting.

TX S=Monitoring of Coastal Finfish Resources for Sportfish Management.

VI S=Recreational Port Sampling.



Table 6. Biological and environmental data items needed in the management of a fishery, assessed as to different data collection methodologies. S=Self-reported, O=Observed, Dash=Not Collectable.

Category Item	On-Site					Off-Site				
	Rove	Access Site	Catch Cards	Aerial	On-board Observers	Log Book	Random Phone	Known Phone	Mail	Door to Door
<b>Demographics/Sociology/Economics</b>										
<u>"For-hire" Operator</u>										
Residence - Zip	S	S	S	-	S	S	O	O	S	O
Boat ID	O	O	S	-	O	S	S	S	S	S
Annual or seasonal number of trips	S	S	S	-	S	S	O	O	S	S
Experience (years)	S	S	S	-	S	S	S	S	S	S
Species targeted by trip	S	S	S	-	O	S	S	S	S	S
<u>Recreational Fisherman</u>										
Residence - Zip	S	S	S	-	S	S	O	O	S	O
Party size	O	O	O	O	O	S	S	S	S	S
No. of participants	-	-	-	-	-	-	S	S	S	S
Age	S	S	S	-	S	S	S	S	S	S
Experience (years fished)	S	S	S	-	S	S	S	S	S	S
Specialization (self-perceived skill)	S	S	S	-	S	S	S	S	S	S
Disposition - catch Surveyed before (frequency)	S	S	S	-	S	-	-	S	S	S
<b>Effort</b>										
Trip Mode	O	O	S	-	O	S	S	S	S	S
Geographic area where landed	S/O	O	S	-	O	S	S	S	S	S
Geographic area where fished	S/O	S	S	O	O	S	S	S	S	S
Time and date of return	S/O	O	S	-	O	S	S	S	S	S



Table 6. Continued

Category Item	On-Site					Off-Site				
	Rove	Access Site	Catch Cards	Aerial	On-board Observers	Log Book	Random Phone	Known Phone	Mail	Door to Door
<b>Effort (cont.)</b>										
Trip duration	S	S	S	-	O	S	S	S	S	S
Fishing time	S	S	S	-	O	S	S	S	S	S
Fishing power										
Boat length	O	O	S/O	-	O	S	S	S	S	S
Passenger capacity	S	S	S/O	-	S	-	-	S	S	S
Speed	S	S	S	-	S	-	-	S	S	S
Fishing gear	O	O	S/O	O	O	-	-	S	S	S
Fishing method	O	O	S/O	O	O	-	-	S	S	S
Bait type	O	O	S/O	-	O	-	-	S	S	S
Hook type	S	S	S	-	O	-	-	S	S	S
Technological capabilities	S	S	S	-	O	S	S	S	S	S
<b>Biological</b>										
Gross catch										
Number released										
Dead	S	S	S	-	O	S	S	S	S	S
Alive	S	S	S	-	O	S	S	S	S	S
Reason	S	S	S	-	O	S	S	S	S	S
Species composition	S	S	S	-	O	S	S	S	S	S
Sex	S	S	S	-	O	-	-	-	-	-
Biological data <sup>a</sup>	S	S	S	-	O	-	-	-	-	-
Tag returns	S	S	S	-	O	S	S	S	S	S
Weight	S	S	S	-	O	-	-	-	-	-
Length	S	S	S	-	O	-	-	-	-	-
Landings										
Number	O	O	S	-	O	S	S	S	S	S
Species composition	O	O	S	-	O	S	S	S	S	S
Sex	O	O	S	-	O	S	-	-	-	-
Biological data <sup>a</sup>	O	O	S	-	O	S	-	-	-	-



Table 6. Continued.

Category Item	On-Site					Off-Site				
	Rove	Access Site	Catch Cards	Aerial	On-board Observers	Log Book	Random Phone	Known Phone	Mail	Door to Door
<b>Biological (cont.)</b>										
Tag returns	O	O	S	-	O	S	S	S	S	S
Weight	O	O	S	-	O	S	-	-	-	-
Length	O	O	S	-	O	S	-	-	-	-
<b>Abiotic</b>										
Windspeed	O	O	S	O	O	S	S	S	S	S
Wind direction	O	O	S	O	O	S	S	S	S	S
Cloud cover	O	O	S	O	O	S	S	S	S	S
Moon phase	O	O	S	O	O	S	S	S	S	S
<b>Currents</b>										
Surface	S	S	S	-	O	-	-	S	S	S
Bottom	S	S	S	-	O	-	-	S	S	S
Water temperature	S	S	S	-	O	-	-	S	-	-
Air temperature	O	O	S	O	O	-	-	S	-	-
Barometric pressure	O	O	S	O	O	S	S	S	S	S
Precipitation	O	O	S	O	O	S	S	S	S	S
Fog	O	O	S	O	O	S	S	S	S	S
Wave height	S	S	S	O	O	S	S	S	S	S
Tide	O	O	S	O	O	S	S	S	S	S
Water depth	S	S	S	O	O	S	S	S	S	S
Bottom type	S	S	S	O	O	S	S	S	S	S
Water clarity	S	S	S	-	O	S	S	S	S	S
Night/Day/Twilight	S	S	S	-	O	S	S	S	S	S
Bottom type/Structure	S	S	S	-	O	S	S	S	S	S

<sup>a</sup> Biological data includes such items as maturity stage, gonads, fin spines, otoliths, scales, etc.



Table 7. Projects To Be Included in a National Marine Recreational Fisheries Data Base.

<b>PROJECT TITLE</b>	<b>PRIORITY</b>
USFWS National Survey of Fishing, Hunting and Wildlife-Associated Recreation	N
NPS Everglades National Park Marine Gamefish Harvest Monitoring	Y
NPS Biscayne National Park Creel Census	Y
NMFS Marine Recreational Fisheries Statistics Survey (MRFSS)	H
NMFS Large Pelagics Survey	Y
NMFS Economic Data Collection - Gulf of Mexico Recreational Reef-fish Fishery	Y
NMFS Beaufort Headboat Survey	H
NMFS Southeast Charterboat Survey	H
NMFS Recreational Billfish Tournament Sampling Program	H
NMFS Recreational Billfish Non-Tournament Sampling Program	H
NMFS Consumption Survey of Fish and Shellfish Caught in Recreational & Subsistence Fisheries	N
NMFS Survey of Recreational Shrimpers in the Bay & Sound Systems of the Gulf Coast	N
NC Albemarle Sound Creel Survey	Y
NC Marine Recreational Statistics Survey (MRFSS)	N
SC Billfish Monitoring Project	N
SC Ocean Pelagic Gamefish Survey	Y
SC Marine Recreational Fisheries Survey, 1987-1988 (MRFSS only)	N
SC Marine Recreational Fisheries Survey, 1989-present (MRFSS & SS)	Y
SC Recreational Pier, Charterboat and Headboat Reporting	Y

Abbreviations: SS=Special Study, N=Not Include in National Database (in several cases the data are already included through another program), Y=Do Include in National Database, H=Highest Priority for Inclusion, L=Link Electronically



Table 7. Continued.

<b>PROJECT TITLE</b>	<b>PRIORITY</b>
SC Survey of Recreational Saltwater Private-boat Anglers and Shellfish Gatherers	N
SC Assessment of Participation & Resource Impact of Shrimp Baiting	Y
SC Survey of the Shrimp Baiting Fishery, 1988-1991	Y
SC Economic and Biological Evaluation of the Pier Fishery	Y
SC Socio-economic Profile of Offshore Sport Fishermen	N
SC Recreational Shellfish Gathering, 1980-1981	N
SC Recreational Shellfish Harvesters - Folly/Stono Rivers & Sullivan's Island/Isle of palms public shellfish areas	N
SC Survey of the Tailrace Canal Recreational Shad Fishery	N
SC Gigging Fishery	N
GA Marine Recreational Fisheries Survey, 1985-1991 (MRFSS)	N
FL Marine Recreational Fishery Statistical Data Collection - Site Description Survey	Y
FL Recreational Saltwater Fishing license Database	L
FL Apalachicola River Watershed Investigations	Y
AL Recreational Creel Survey	Y
MS Creel Survey of the Sound and Adjacent Waters	Y
MS Data Collection of Recreational Oyster Harvest	Y
LA Survey of Marine Recreational Fishery of Lower Barataria Bay, 1975-1977	Y
LA Creel Survey of Rec. Saltwater Anglers	Y
LA Survey of Recreational Anglers, 1990-1991	Y

Abbreviations: SS=Special Study, N=Not Include in National Database (in several cases the data are already included through another program), Y=Do Include in National Database, H=Highest Priority for Inclusion, L=Link Electronically



Table 7. Continued.

<b>PROJECT TITLE</b>	<b>PRIORITY</b>
FL Marine Recreational Fishery Statistical Data Collection - Angler Interviews	Y
TX Monitoring of Coastal Finfish Resources for Sportfish Management (Boat-based)	H
TX Monitoring of Coastal Finfish Resources for Sportfish Management (Shore-based)	H
TX Night-time Flounder Gig Study	Y
TX Attitude and Opinion Surveys	H
PR Marine Sport Fisheries Creel Survey	H
Developing Strategies to Enhance Charter Boat Fishing Operations in Puerto Rico and the USVI	H
Developing Marine Recreational Fishing in Puerto Rico & the USVI	H
Assessment of Access and Infrastructure Needs of Puerto Rico & the USVI in Order to Support Increased Marine Recreational Fishing	H
VI Recreational Port Sampling, 1981-present	H
VI Recreational Fishing Survey	Y
VI Surface Deepwater Fish Aggregating Devices (FADs) - St. Croix	N
VI Fish Attractant Devices (FADs)	N
VI ICCAT Billfish Sampling	N
VI Recreational live-bait fishing for yellowfin tuna	Y
VI Assessment of the Exocoetidae (Flyingfish) and Belonidae (needlefish) Resources	Y

Abbreviations: SS=Special Study, N=Not Include in National Database (in several cases the data are already included through another program), Y=Do Include in National Database, H=Highest Priority for Inclusion, L=Link Electronically

