Charterboat Catch and Effort From Southeastern U.S. Waters, 1983

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Introduction

In 1982, a pilot survey was initiated at the Southeast Fisheries Center's Panama City Laboratory (SEFC-PC) using charterboat captains to obtain fishing data (Williams et al., 1984; Brusher et al., 1984). In 1983, the survey was expanded to include charterboats along the coastal and offshore waters of the southeastern United States (From North Carolina to the Florida Keys), the Gulf of Mexico (from the Florida Keys to Texas), and the U.S. Caribbean Sea (U.S. Virgin Islands and Puerto Rico).

Marine fish resources within the described areas (Fig. 1) are diverse and are exploited by recreational and commercial fishermen. Sampling within the private recreational boat fisheries group would be difficult because of the numerous docking and landing site problems and costly because of the number and categories of boats in the sampling frame. Within the charterboat fishery where recreational fishermen hire a captain and vessel for purposes of fishing, dockage and landing sites are limited, and the number of boats is usually smaller. These two factors have led researchers to select charterboat captains for obtaining marine recreational fish catch. Estimating catch per boat fishing hour (CPH) from a recreational boat fishery is less expensive than estimating total catch and effort and can provide a basis for monitoring relative abundance of species.

Personnel at the Panama City Laboratory have conducted four marine recre-

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ABSTRACT—In 1983, charterboat captains from coastal areas of the southeastern United States, Gulf of Mexico, and Caribbean Sea were contracted to provide daily catch and effort data. A total of 348,976 pelagic and demersal fish were caught during 46,921.5 hours of fishing. Species catch and catch per boat fishing hour (CPH) are presented by year, month, and location. These data are compared with the data obtained in a 1982 charterboat survey.

Major species caught by trolling were dolphin, Coryphaena hippurus; *king mackerel,* Scomberomorus cavalla; *Spanish mackerel,* S. maculatus; *little tunny,* Euthynnus alletteratus; *blue runner,* Caranx crysos; *Atlantic bonito,* Sarda sarda; *bluefish,* Pomatomus saltatrix; *great barracuda,* Sphyraena barracuda; *yellowfin tuna,* Thunnus albacares; *and blackfin tuna,* T. atlanticus. *Major species caught by methods other than trolling included red snapper,* Lutjanus campechanus; *black sea bass,* Centropristis striata; *Atlantic croaker,* Macropogonias undulatus; *sand seatrout,* Cynoscion arenarius; *seatrouts,* Cynoscion *spp.; vermillion snapper,* Rhomboplites aurorubens; *porgies, Sparidae; gray triggerfish,* Balistes capriscus; *greater amberjack,* Seriola dumerili; *and grunts, Haemulidae. CPH and species varied between survey areas.*

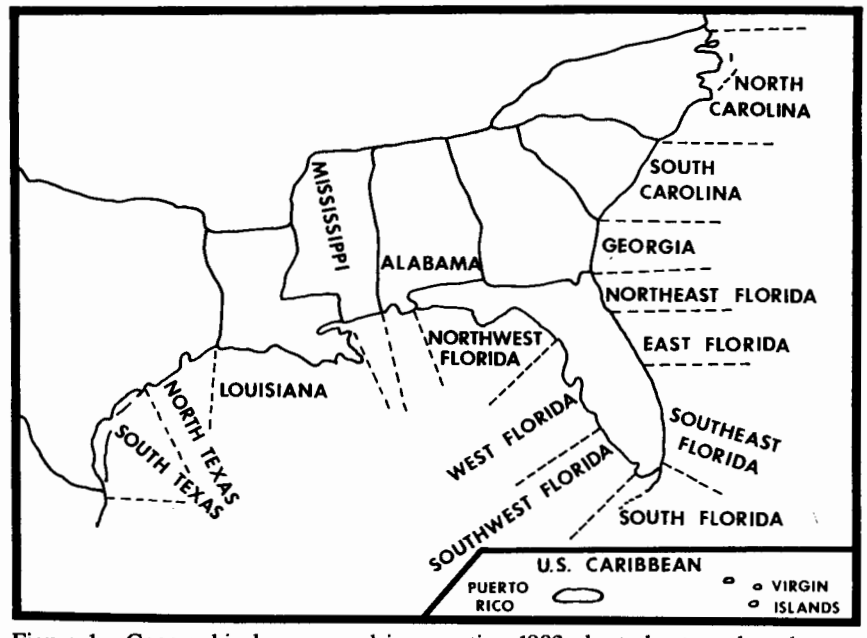


Figure 1.—Geographical areas used in reporting 1983 charterboat catch and effort from the southeastern United States and the U.S. Caribbean Sea.

ational boat fishing surveys: In 1975 (Brusher et al., 1977); 1976 (Brusher, n.d.[1]); 1982 (Williams et al., 1984a, Brusher et al., 1984); and 1983 (Williams et al., 1984b). The objectives of these surveys were to: 1) Evaluate and improve methods of obtaining CPH from charterboat captains throughout the southeastern United States, and 2) obtain biological information and determine geographic and seasonal availability of various recreationally caught marine species.

The 1975 and 1976 studies (Brusher et al., 1977; Brusher[1]) relied on voluntary participation by boat owners and boat captains. The results indicated that this survey method (even with monthly reward systems) was neither efficient nor reliable. The 1982 survey proved more successful because charterboat captains were contracted to provide timely catch and effort data. Also, the 1982 survey data indicated the feasibility of establishing a long-term data base concerning the availability of coastal, reef, and oceanic fishes of the southeastern United States, the Gulf of Mexico, and the U.S. Caribbean Sea. As a result, the 1983 survey was expanded in areas as well as in number of charterboats. In this report, we describe the expanded survey, highlight the results, and provide detailed CPH data for each species throughout the entire area.

Methods

Charterboats were surveyed because they are an easily identified and important component of recreational fisheries, and fishing effort is relatively consistent since charterboat captains are professional fishermen whose livelihood depends on angling success.

For this survey, charterboats were defined as a vessel available to an angler or group of anglers for which a fee is paid for the use of the captain and vessel. Letters describing our survey goals were sent to 972 charterboat captains operating in the marine waters of the southeastern United States, the Gulf of Mexico and the U.S. Caribbean Sea. We asked captains to indicate their interest in being considered as participants in the survey. From 164 positive returns, 100 were randomly selected which represented about 10 percent of the full-time charterboat captains within each of 16 areas (Fig. 1). Each captain was contracted to provide SEFC-PC with daily catch and effort data at the end of each week. Captains were paid each month only if all weekly logs for that month were received by project personnel.

The survey began on 27 March 1983 and ended on 3 December 1983, except in southeast Florida, south Florida, southwest Florida, west Florida, Louisiana, and the U.S. Caribbean Sea, where coverage extended through 31 December 1983. Some captains voluntarily submitted catch and effort data before the official starting date of 27 March, and their data have also been included in our analysis.

The cooperation we received from the majority of survey captains was excellent. Their recordkeeping was very thorough as was their promptness in submitting weekly logs. If captains failed to respond in a timely fashion, they were replaced with another captain from the original list. Twelve captains were replaced from April 1983 through November 1983.

Each captain was provided with a logbook which included log forms (Fig. 2) for reporting daily records of their catch and effort, and monthly invoice statements. A fishing week was from Sunday through Saturday and log forms (self-addressed and postpaid) were returned on Monday or Tuesday of the next week.

Upon receipt of the log form, data were documented as to date received, and each charterboat was identified by numeric code. Combinations of fishing zones were coded per the 1982 survey (Williams et al., 1984). Hours of fishing were rounded to the nearest 0.5 hour, and all fish species were assigned a numeric code. The captains were contacted by telephone to correct inaccurate or incomplete logs before the data were entered into the computer. All species were listed by the names in Robins et al. (1980). Suspected identification problems were resolved by sending FAO species identification sheets (Fischer, 1978) to captains.

After all log forms were corrected and numerically coded, data were "posted" into the SEFC-PC minicomputer to maintain a response file. After all log forms were posted, data were entered into the Burroughs[2] time-sharing system (located at the NMFS Northwest and Alaska Fisheries Center, Seattle, Wash., verified, corrected, and then transferred to archival storage. Data analysis provided total catch and CPH. CPH was computed by dividing the total catch per species by the total boat hours of fishing.

Data can be reported by individual boats or by combined boats, by individual areas or by combined areas, by trolling or by nontrolling fishing methods, by fishing zone(s), by daily, weekly, monthly, or yearly intervals, and by any combination(s) of the above. Computer capabilities give unlimited analytical capacity to represent statistically any species or species group.

Charterboat Characteristics

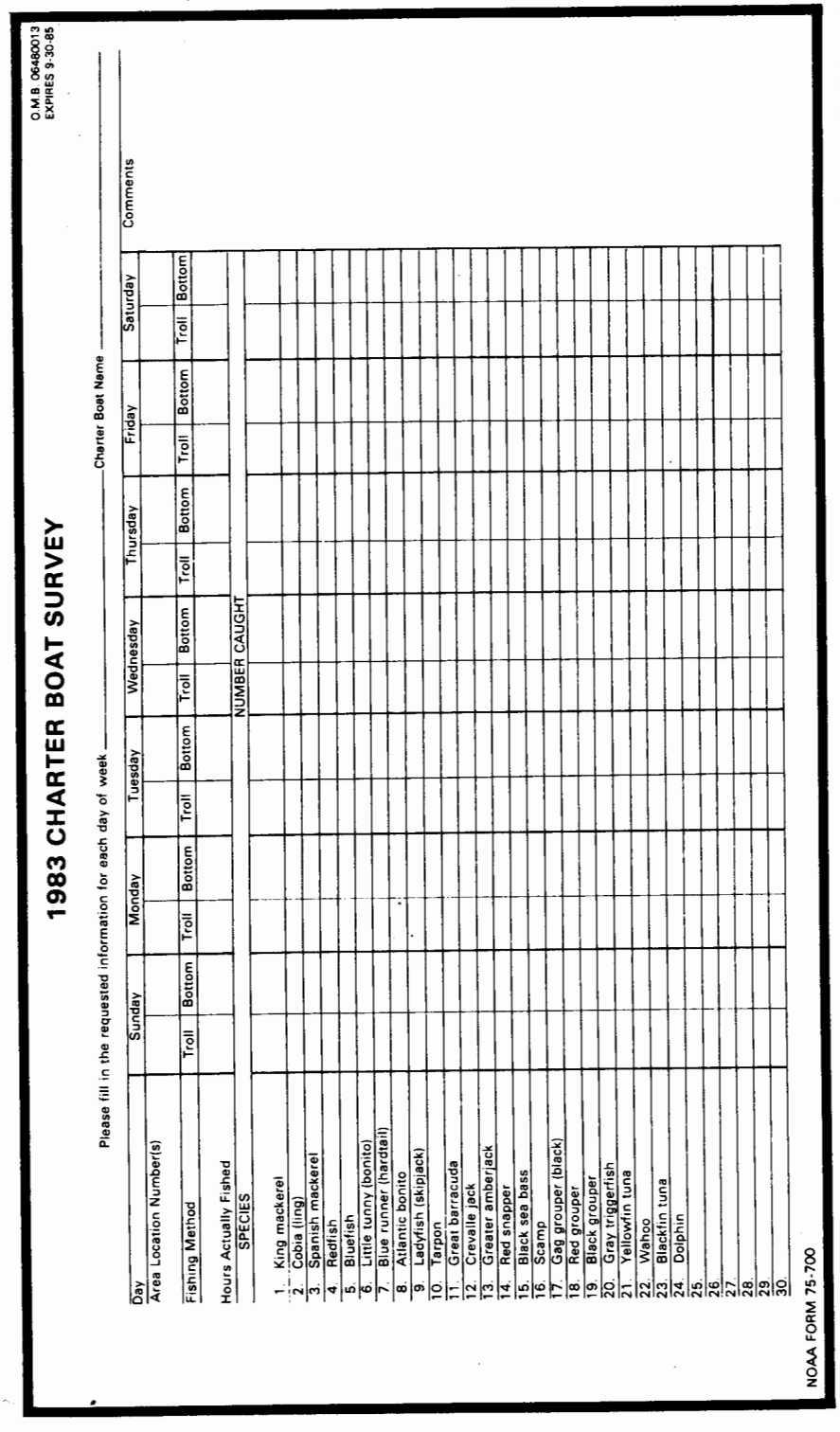
Charterboats ranged in length from 24 to 58 feet and were powered by outboard or inboard (twin or single screw) engines. Trolling boats fished 1-8 lines, but usually 4. If other fishing methods were used, 1-20 lines were fished with 4-6 being typical.

White marlin, blue marlin, dolphin, king mackerel, Spanish mackerel, sailfish, and amberjack were reported as target species when trolling, while black sea bass, seatrout, snappers, and groupers were reported as target species when using other fishing techniques.

Fishing effort in an area was affected by 1) the target species sought by charterboat clients and 2) the inshore/offshore bottom topography. For example, the 100-fathom depth is closer to the coastlines of North Carolina, southeast Florida, south Florida, northwest Florida, south Texas, and the U.S. Caribbean Sea. More boats in these areas fished for oceanic or pelagic species than did charterboats off southwest Florida, west Florida, or Louisiana. In those areas,

[1]Brusher, H. A., SEFC Panama City Laboratory NMFS, NOAA, 3500 Delwood Beach Road, Panama City, FL 32407-7499. Unpubl. data.

[2]Mention of trade names or commercial firms does not imply endorsement by the National Marine Fisheries Service, NOAA.



1983 CHARTER BOAT SURVEY

O.M.B. 06480013
EXPIRES 9-30-85

Please fill in the requested information for each day of week _____ Charter Boat Name _____

Day	Sunday		Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Comments
Area Location Number(s)															
Fishing Method	Troll	Bottom	Troll	Bottom	Troll	Bottom	Troll	Bottom	Troll	Bottom	Troll	Bottom	Troll	Bottom	
Hours Actually Fished															
SPECIES	NUMBER CAUGHT														
1. King mackerel															
2. Cobia (ling)															
3. Spanish mackerel															
4. Redfish															
5. Bluefish															
6. Little tunny (bonito)															
7. Blue runner (hardtail)															
8. Atlantic bonito															
9. Ladyfish (skipjack)															
10. Tarpon															
11. Great barracuda															
12. Crevalle jack															
13. Greater amberjack															
14. Red snapper															
15. Black sea bass															
16. Scamp															
17. Gag grouper (black)															
18. Red grouper															
19. Black grouper															
20. Gray triggerfish															
21. Yellowfin tuna															
22. Wahoo															
23. Blackfin tuna															
24. Dolphin															
25.															
26.															
27.															
28.															
29.															
30.															

NOAA FORM 75-700

Figure 2.—Logform used for reporting catch and effort from the 1983 charterboat survey of southeastern United States and the U.S. Caribbean Sea.

the dominant fishing method was geared toward the capture of reef or demersal species. Off Louisiana, a technique called "fly-lining," where live bait is fished from anchored vessels was used. Trolling effort was reported from all 16 areas, and fishing effort other than trolling was reported in all areas except the U.S. Caribbean Sea.

Results

Charterboat captains reported 3,479 of the 3,503 available boat fishing weeks. Within 10 days after a fishing week the response rate (i.e., receipt of logs) was over 60 percent, within 20 days over 70 percent and by 30 days over 90 percent. In 1983, we obtained 99.3 percent of the logs for which we contracted. Captains reported fishing a total of 46,921.5 hours, of which 31,122.0 hours (66.3 percent) were spent trolling and 15,799.5 hours (33.7 percent) were spent other than trolling (Table 1). Of the reported total fishing effort, 58.3 percent was in zone 3 (waters >10 fathoms), 19.0 percent was in zone 2 (waters <10 fathoms), 9.1 percent was in zone 1 (bay or estuarine waters), and 13.6 percent was in zones 4 through 7 (combinations of zones 1, 2, and 3).

Evaluation of total fishing effort showed that along the coastal waters of the Atlantic, south Florida had the greatest total fishing effort (32.4 percent), followed by North Carolina (22.1 percent), and east Florida (16.0 percent). In the Gulf of Mexico, northwest Florida had the greatest total fishing effort (28.4 percent), followed by southwest Florida (15.9 percent), and south Texas (11.9 percent). There was general agreement between the percentage of total fishing effort in different zones reported in 1982 (Brusher et al., 1984) and this survey.

During this survey, 348,976 pelagic and demersal fish specimens were caught (Tables 2 and 3), of which 111,664, representing 84 species and species groups, were taken by trolling and 237,312, representing 107 species and species groups, were taken by other methods. Of the reported 128 taxa, 15 were caught only by trolling, and 37 only by methods other than trolling.

Table 1.—Total fishing hours by area, zone, and method of fishing during 1983 charterboat survey off southeastern United States and in the U.S. Caribbean Sea.

Area	1 Estuarine	2 Oceanic (<10 fm)	3 Oceanic (>10 fm)	4 Estuarine and oceanic (<10 fm)	5 Estuarine and oceanic (>10 fm)	6 Oceanic (all depths)	7 Estuarine and oceanic (all depths)	Total
	Hours trolling and (other fishing)							
North Carolina	270.5 (83.0)	245.5 (57.0)	3,896.5 (213.0)	16.0 (4.0)	— (—)	70.0 (16.0)	— (—)	4,498.5 (375.0)
South Carolina	— (—)	638.5 (99.0)	144.5 (72.0)	— (—)	— (—)	48.5 (249.0)	— (—)	859.5 (420.0)
Georgia	— (—)	100.5 (60.0)	69.5 (55.5)	— (—)	— (—)	10.5 (1.5)	— (—)	180.5 (117.0)
Florida (NE)	20.0 (149.5)	166.0 (43.0)	105.0 (68.0)	— (39.0)	— (—)	249.0 (3.0)	— (—)	540.0 (302.5)
Florida (E)	7.0 (1.0)	35.0 (53.5)	1,833.0 (413.5)	— (—)	— (—)	1,198.0 (3.5)	— (—)	3,073.0 (471.5)
Florida (SE)	86.0 (14.0)	115.0 (41.0)	3,256.5 (295.5)	— (—)	16.5 (1.0)	273.0 (37.0)	— (—)	3,749.0 (388.5)
Florida (S)	34.5 (130.5)	232.0 (161.5)	5,111.0 (506.5)	4.5 (240.5)	— (—)	556.5 (180.5)	— (—)	5,938.5 (1,219.5)
Florida (SW)	53.0 (2,040.5)	33.0 (1,026.0)	— (214.0)	— (104.5)	— (11.0)	— (463.5)	— (—)	86.0 (3,859.5)
Florida (W)	5.5 (776.5)	801.0 (410.0)	113.5 (223.0)	— (—)	— (—)	175.5 (7.0)	— (—)	1,095.5 (1,416.5)
Florida (NW)	323.5 (—)	1,210.0 (436.5)	1,148.0 (2,706.5)	304.0 (17.0)	— (—)	603.5 (289.0)	14.0 (—)	3,603.0 (3,449.0)
Alabama	12.0 (—)	701.0 (141.0)	69.0 (282.0)	6.0 (—)	12.0 (—)	481.5 (377.0)	— (—)	1,281.5 (800.0)
Mississippi	— (—)	733.5 (79.5)	12.0 (9.0)	— (—)	— (—)	3.0 (6.0)	— (—)	748.5 (94.5)
Louisiana	5.0 (10.0)	23.0 (20.0)	516.5 (1,868.5)	— (—)	— (5.0)	103.5 (14.0)	— (5.0)	650.0 (1,922.5)
Texas (N)	— (27.0)	164.0 (199.0)	331.5 (385.5)	— (—)	— (—)	7.0 (1.0)	— (—)	502.5 (612.5)
Texas (S)	9.0 (210.5)	820.0 (64.5)	1,638.0 (43.5)	— (31.0)	— (—)	123.5 (1.5)	— (—)	2,590.5 (351.0)
U.S. Caribbean	— (—)	— (—)	1,748.5 (—)	5.0 (—)	— (—)	— (—)	— (—)	1,753.5 (—)
Totals	826.0 (3,442.5)	6,006.0 (2,901.5)	19,997.0 (7,356.0)	335.5 (436.0)	28.5 (17.0)	3,913.0 (1,641.5)	14.0 (5.0)	31,122.0 (15,799.5)

[1]Dashes indicate no effort within this fishing zone for this area.

Table 2.—Number of each species or species group caught by trolling during 1983 charterboat survey off southeastern United States and the U.S. Caribbean Sea.

Common name	Scientific name	Total	Common name	Scientific name	Total
Dolphin	*Coryphaena hippurus*	24,047	Gray snapper	*Lutjanus griseus*	20
King mackerel	*Scomberomorus cavalla*	19,733	Lizardfishes	Synodontidae	20
Spanish mackerel	*Scomberomorus maculatus*	14,847	Bar jack	*Caranx ruber*	19
Little tunny	*Euthynnus alletteratus*	11,133	Atlantic mackerel	*Scomber scombrus*	17
Blue runner	*Caranx crysos*	9,361	Dusky shark	*Carcharhinus obscurus*	16
Atlantic bonito	*Sarda sarda*	7,065	Remoras	Echeneidae	16
Bluefish	*Pomatomus saltatrix*	4,997	Snowy grouper	*Epinephelus niveatus*	15
Great barracuda	*Sphyraena barracuda*	4,460	Scamp	*Mycteroperca phenax*	14
Yellowfin tuna	*Thunnus albacares*	4,438	Leatherjacket	*Oligoplites saurus*	14
Blackfin tuna	*Thunnus atlanticus*	2,067	Tilefishes	Malacanthidae	14
Crevalle jack	*Caranx hippos*	1,441	Red grouper	*Epinephelus morio*	12
Greater amberjack	*Seriola dumerili*	1,049	Bull shark	*Carcharhinus leucas*	11
Wahoo	*Acanthocybium solanderi*	950	Sea basses	Serranidae	11
Ladyfish	*Elops saurus*	942	Atlantic cutlassfish	*Trichiurus lepturus*	10
Red drum	*Sciaenops ocellatus*	564	Horse-eye jack	*Caranx latus*	10
Cobia	*Rachycentron canadum*	455	Silky shark	*Carcharhinus falciformis*	10
Skipjack tuna	*Euthynnus pelamis*	427	Tripletail	*Lobotes surinamensis*	10
Sailfish	*Istiophorus platypterus*	370	Flounder	*Paralichthys* sp.	9
Yellowtail snapper	*Ocyurus chrysurus*	285	Finetooth shark	*Carcharhinus isodon*	8
White marlin	*Tetrapturus albidus*	279	Menhaden	*Brevoortia* sp.	8
Cero	*Scomberomorus regalis*	248	Tigar shark	*Galeocerdo cuvieri*	7
Albacore	*Thunnus alalunga*	230	Mako	*Isurus* sp.	7
Red snapper	*Lutjanus campechanus*	203	Rainbow runner	*Elagatis bipinnulata*	6
Gray triggerfish	*Balistes capriscus*	176	Bluefin tuna	*Thunnus thynnus*	5
Sharks	Squaliformes	164	Snappers	Lutjanidae	5
Black sea bass	*Centropristis striata*	156	Almaco jack	*Seriola rivoliana*	4
Blue marlin	*Makaira nigricans*	151	Bigeye scad	*Selar crumenophthalmus*	4
Hammerhead shark	*Sphyrna* sp.	151	Houndfish	*Tylosurus crocodilus*	3
Black grouper	*Mycteroperca bonaci*	129	Sheepshead	*Archosargus probatocephalus*	3
Blacktip shark	*Carcharhinus limbatus*	124	Atlantic moonfish	*Selene setapinnis*	1
Vermilion snapper	*Rhomboplites aurorubens*	102	Atlantic spadefish	*Chaetodipterus faber*	1
Lesser amberjack	*Seriola fasciata*	81	Black drum	*Pogonias cromis*	1
Gag	*Mycteroperca microlepis*	69	Bonnethead	*Sphyrna tiburo*	1
Porgies	Sparidae	67	Cownose ray	*Rhinoptera bonasus*	1
Tarpon	*Megalops atlanticus*	56	Hardhead catfish	*Arius felis*	1
Atlantic sharpnose shark	*Rhizoprionodon terraenovae*	51	Permit	*Trachinotus falcatus*	1
Seatrout	*Cynoscion* sp.	50	Sandbar shark	*Carcharhinus plumbeus*	1
Mutton snapper	*Lutjanus analis*	48	Searobins	Triglidae	1
Lane snapper	*Lutjanus synagris*	47	Spinner shark	*Carcharhinus brevipinna*	1
Grunts	Haemulidae	38	Swordfish	*Xiphias gladius*	1
Yellow jack	*Caranx bartholomaei*	30	Sand seatrout	*Cynoscion arenarius*	1
Sand perch	*Diplectrum* sp.	24			
Bigeye tuna	*Thunnus obesus*	21	Total		111,664

Table 3.—Number of each species or species group caught by methods other than trolling during 1983 charterboat survey off southeastern United States.

Common name	Scientific name	Total	Common name	Scientific name	Total
Red snapper	*Lutjanus campechanus*	50,766	Cusk-eels	Ophidiidae	51
Black sea bass	*Centropristis striata*	36,610	Leatherjackets	Balistidae	49
Atlantic croaker	*Micropogonias undulatus*	23,714	Lesser amberjack	*Seriola fasciata*	48
Sand seatrout	*Cynoscion arenarius*	18,452	Toadfish	*Opsanus* sp.	48
Seatrouts	*Cynoscion* spp.	14,408	Gafftopsail catfish	*Bagre marinus*	36
Vermilion snapper	*Rhomboplites aurorubens*	13,477	Wrasses	Labridae	36
Porgies	Sparidae	13,247	Bigeye scad	*Selar crumenophthalmus*	34
Gray triggerfish	*Balistes capriscus*	13,114	Almaco jack	*Seriola rivoliana*	33
Greater amberjack	*Seriola dumerili*	8,093	Cero	*Scomberomorus regalis*	33
Grunts	Haemulidae	4,127	Rainbow runner	*Elagatis bipinnulata*	33
Red grouper	*Epinephelus morio*	3,831	Permit	*Trachinotus falcatus*	27
Gag	*Mycteroperca microlepis*	3,169	Palometa	*Trachinotus goodei*	24
Spotted seatrout	*Cynoscion nebulosus*	2,871	Remoras	Echeneidae	23
Gray snapper	*Lutjanus griseus*	2,263	Nurse shark	*Ginglymostoma cirratum*	18
Ladyfish	*Elops saurus*	2,245	Wahoo	*Acanthocybium solanderi*	18
Red drum	*Sciaenops ocellatus*	2,233	Blackfin tuna	*Thunnus atlanticus*	16
Bluefish	*Pomatomus saltatrix*	2,108	Puffers	Tetraodontidae	16
King mackerel	*Scomberomorus cavalla*	2,014	Yellow jack	*Caranx bartholomaei*	15
Dolphin	*Coryphaena hippurus*	1,980	Dusky shark	*Carcharhinus obscurus*	14
Yellowtail snapper	*Ocyurus chrysurus*	1,807	Lemon shark	*Negaprion brevirostris*	14
Crevalle jack	*Caranx hippos*	1,753	Sailfish	*Istiophorus platypterus*	14
Blue runner	*Caranx crysos*	1,701	Bonefish	*Albula vulpes*	13
Pinfish	*Lagodon rhomboides*	1,100	Soapfish	*Rypticus* sp.	11
Little tunny	*Euthynnus alletteratus*	1,018	Bull shark	*Carcharhinus leucas*	7
Kingfish	*Menticirrhus* sp.	974	Bonnethead	*Sphyrna tiburo*	6
Spanish mackerel	*Scomberomorus maculatus*	855	Jewfish	*Epinephelus itajara*	6
Hardhead catfish	*Arius felis*	812	Tiger shark	*Galeocerdo cuvieri*	6
Scamp	*Mycteroperca phenax*	769	Atlantic sharpnose shark	*Rhizoprionodon terraenovae*	5
Sheepshead	*Archosargus probatocephalus*	647	Yellowfin tuna	*Thunnus albacares*	5
Lane snapper	*Lutjanus synagris*	637	Houndfish	*Tylosurus crocodilus*	4
Tarpon	*Megalops atlanticus*	605	Lizardfishes	Synodontidae	4
Cobia	*Rachycentron canadum*	554	Morays	Muraenidae	4
Sharks	Squaliformes	545	Yellowfin grouper	*Mycteroperca venenosa*	4
Sand perch	*Diplectrum* sp.	409	Atlantic moonfish	*Selene setapinnis*	3
Black grouper	*Mycteroperca bonaci*	382	Horse-eye jack	*Caranx latus*	3
Snappers	Lutjanidae	365	Lookdown	*Selene vomer*	3
Great barracuda	*Sphyraena barracuda*	363	African pompano	*Alectis ciliaris*	2
Mutton snapper	*Lutjanus analis*	284	Codfishes	Gadidae	2
Snowy grouper	*Epinephelus niveatus*	262	Sennet	*Sphyraena* sp.	2
Atlantic bonito	*Sarda sarda*	246	Spot	*Leiostomus xanthurus*	2
Silver perch	*Bairdiella chrysoura*	245	Atlantic guitarfish	*Rhinobatos lentiginosus*	1
Blacktip shark	*Carcharhinus limbatus*	209	Flyingfishes	Exocoetidae	1
Tilefishes	Malacanthidae	197	Leatherjacket	*Oligoplites saurus*	1
Flounder	*Paralichthys* sp.	181	Mako	*Isurus* sp.	1
Warsaw grouper	*Epinephelus nigritus*	142	Sand lance	*Ammodytes* sp.	1
Snook	*Centropomus* sp.	123	Sand tiger	*Odontaspis taurus*	1
Sea basses	Serranidae	122	Searobins	Triglidae	1
Black drum	*Pogonias cromis*	121	Shrimp eel	*Ophichthus gomesi*	1
Angelfishes	Pomacanthidae	119	Silky shark	*Carcharhinus falciformis*	1
Florida pompano	*Trachinotus carolinus*	83	Skates	Rajidae	1
Atlantic spadefish	*Chaetodipterus faber*	72	Skipjack tuna	*Euthynnus pelamis*	1
Hammerhead shark	*Sphyrna* sp.	65			
Tripletail	*Lobotes surinamensis*	63	Total		237,312
Stingrays	Dasyatidae	55			

Trolling produced an average of 3.6 fish per boat hour. The ten most abundantly caught fishes (areas combined) by number and percent of total trolling catch were: Dolphin, 24,047 (21.5 percent); king mackerel, 19,733 (17.7 percent); Spanish mackerel, 14,847 (13.3 percent); little tunny, 11,133 (10.0 percent); blue runner, 9,361 (8.4 percent); Atlantic bonito, 7,065 (6.3 percent); bluefish, 4,997 (4.5 percent); great barracuda, 4,460 (4.0 percent); yellowfin tuna, 4,438 (4.0 percent); and blackfin tuna, 2,087 (1.9 percent).

Fishing methods other than trolling produced an average of 15.0 fish per boat hour, with 67.4 percent of this type of fishing effort spent fishing off southwest, west, and northwest Florida, and Louisiana. The ten most abundantly caught fish (combined areas) were: Red snapper, 50,766 (21.4 percent); black sea bass, 36,610 (15.4 percent); Atlantic croaker, 23,714 (10.0 percent); sand seatrout, 18,452 (7.8 percent); unidentified seatrout, 14,408 (6.1 percent); vermilion snapper, 13,477 (5.7 percent); unidentified porgies, 13,248 (5.6 percent); gray triggerfish, 13,144 (5.5 percent); greater amberjack, 8,093 (3.4 percent); and unidentified grunts, 4,127 (1.7 percent).

Catches per boat hour and species caught by trolling varied between survey areas (Tables 4 and 5). In the U.S. south Atlantic and the U.S. Caribbean Sea, king mackerel and little tunny were among the top ten species in each area. Dolphin and great barracuda were among the top ten in all but one area. In the Gulf of Mexico, Spanish mackerel, king mackerel, and little tunny were among the top ten species in each area, with blue runner in seven of eight areas, and crevalle jack and Atlantic bonito in six of eight areas.

Table 4.—Ten most abundant species caught by trolling in each area off the U.S. south Atlantic coast and in the U.S. Caribbean during 1983 charterboat survey.

Area, rank, and species	Number caught	CPH	Percent of total catch w/i area
North Carolina			
1 Dolphin	7,669	1.71	37.08
2 Yellowfin tuna	4,086	0.91	19.75
3 King mackerel	3,361	0.75	16.25
4 Bluefish	2,949	0.66	14.26
5 Little tunny	743	0.17	3.59
6 Spanish mackerel	430	0.10	2.08
7 Wahoo	281	0.06	1.36
8 Albacore	230	0.05	1.11
9 White marlin	207	0.05	1.00
10 Blackfin tuna	188	0.04	0.91
	20,144		97.39
South Carolina			
1 Bluefish	909	1.08	35.83
2 King mackerel	520	0.62	20.50
3 Spanish mackerel	409	0.48	16.12
4 Crevalle jack	211	0.25	8.32
5 Great barracuda	93	0.11	3.67
6 Red drum	72	0.09	2.84
7 Dolphin	68	0.08	2.68
8 Yellowfin tuna	59	0.07	2.33
9 Greater amberjack	51	0.06	2.01
10 Little tunny	45	0.05	1.77
	2,437		96.07
Georgia			
1 King mackerel	102	0.57	21.17
2 Little tunny	89	0.49	18.46
3 Great barracuda	86	0.48	17.84
4 Bluefish	60	0.33	12.45
5 Spanish mackerel	37	0.21	7.68
6 Vermilion snapper	35	0.19	7.26
7 Dolphin	24	0.13	4.98
8 Greater amberjack	18	0.10	3.73
9 Black sea bass	15	0.08	3.11
Georgia (cont.)			
10.5 Cobia	8	0.00	1.66
10.5 Wahoo	8	0.00	1.66
	482		100.00
Northeast Florida			
1 Little tunny	480	0.89	37.94
2 King mackerel	238	0.44	18.81
3 Bluefish	144	0.27	11.38
4 Spanish mackerel	125	0.23	9.88
5 Great barracuda	101	0.19	7.98
6 Crevalle jack	67	0.13	5.30
7 Greater amberjack	40	0.07	3.16
8 Yellow jack	26	0.05	2.06
9 Atlantic bonito	11	0.02	0.87
10 Cutlassfish	10	0.02	0.79
	1,242		96.17
East Florida			
1 King mackerel	4,383	1.43	34.50
2 Little tunny	2,464	0.80	19.40
3 Atlantic bonito	1,714	0.56	13.49
4 Great barracuda	1,417	0.46	11.15
5 Dolphin	1,012	0.33	7.97
8 Spanish mackerel	694	0.23	5.46
7 Blue runner	293	0.10	2.31
8 Bluefish	142	0.05	1.12
9.5 Greater amberjack	80	0.03	0.63
9.5 Lesser amberjack	80	0.03	0.63
	12,279		98.66
Southeast Florida			
1 Dolphin	3,555	0.95	38.54
2 Atlantic bonito	1,232	0.33	13.36
3 King mackerel	1,125	0.30	12.20
Southeast Florida (cont.)			
4 Little tunny	737	0.20	7.99
5 Great barracuda	723	0.19	7.84
6 Spanish mackerel	448	0.12	4.86
7 Blackfin tuna	222	0.06	2.41
8 Blue runner	204	0.05	2.21
9 Wahoo	158	0.04	1.71
10 Hammerhead shark	145	0.04	1.57
	8,549		92.67
South Florida			
1 Dolphin	9,229	1.55	59.62
2 Great barracuda	1,652	0.28	10.67
3 Blackfin tuna	1,291	0.22	8.34
4 Little tunny	779	0.13	5.29
5 King mackerel	580	0.10	3.75
6 Atlantic bonito	310	0.05	2.00
7 Yellowtail snapper	235	0.04	1.52
8 Wahoo	221	0.04	1.43
9 Cero	212	0.04	1.36
10 Skipjack tuna	211	0.04	1.36
	14,720		95.34
U.S. Caribbean			
1 Dolphin	130	0.07	21.89
2 Great barracuda	104	0.06	17.51
3 Blue marlin	77	0.04	12.96
4 Little tunny	57	0.03	9.60
5 King mackerel	54	0.03	9.09
6 Yellowfin tuna	27	0.02	4.55
7 Wahoo	24	0.01	4.04
8 Skipjack tuna	23	0.01	3.87
9 Cero	22	0.01	3.70
10 Lizardfish	19	0.01	3.20
	537		90.41

Table 5.—Ten most abundant species caught by trolling in each area of the Gulf of Mexico during 1983 charterboat survey.

Area, rank, and species	Number caught	CPH	Percent of total catch w/i area
Southwest Florida			
1 Spanish mackerel	104	1.20	38.95
2 Crevalle jack	63	0.73	23.60
3 Ladyfish	34	0.40	12.73
4 Blue runner	28	0.33	10.49
5 Bluefish	20	0.23	7.49
6.5 Red drum	8	0.09	3.00
6.5 Little tunny	8	0.09	3.00
8.5 King mackerel	1	0.01	0.37
8.5 Atlantic bonito	1	0.01	0.37
	267		100.00
West Florida			
1 Spanish mackerel	1,610	1.47	45.73
2 Little tunny	614	0.56	17.44
3 Blue runner	436	0.40	12.38
4 King mackerel	395	0.36	11.22
5 Great barracuda	152	0.14	4.32
6 Crevalle jack	104	0.10	2.95
7 Gag	40	0.04	1.14
8 Greater amberjack	38	0.04	1.08
9 Ladyfish	30	0.03	0.85
10 Atlantic bonito	26	0.02	0.74
	3,445		97.85
Northwest Florida			
1 Blue runner	7,109	2.00	33.63
2 King mackerel	4,934	1.37	23.34
3 Atlantic bonito	2,893	0.80	13.69
4 Little tunny	2,247	0.82	10.83
5 Spanish mackerel	1,434	0.40	6.78
6 Ladyfish	587	0.16	2.78
7 Dolphin	583	0.16	2.76
8 Bluefish	479	0.13	2.27
9 Greater amberjack	266	0.07	1.26
Northwest Florida (cont.)			
10 Gray triggerfish	164	0.05	0.78
	20,696		97.92
Alabama			
1 Spanish mackerel	1,994	1.56	38.10
2 Little tunny	1,215	1.00	23.22
3 Blue runner	645	0.50	12.33
4 King mackerel	601	0.47	11.48
5 Atlantic bonito	368	0.29	7.03
6 Greater amberjack	119	0.09	2.27
7 Bluefish	93	0.07	1.78
8 Ladyfish	60	0.05	1.15
9 Cobia	41	0.03	0.78
10 Red snapper	31	0.02	0.59
	5,167		98.73
Mississippi			
1 Spanish mackerel	5,501	7.35	76.07
2 Blue runner	389	0.52	5.38
3 Red drum	317	0.42	4.38
4 Little tunny	304	0.41	4.20
5 Crevalle jack	203	0.27	2.81
6 Ladyfish	196	0.26	2.71
7 King mackerel	123	0.16	1.70
8 Red snapper	65	0.09	0.90
9 Cobia	47	0.06	0.65
10 Blacktip shark	31	0.04	0.43
	7,176		99.23
Louisiana			
1 Spanish mackerel	1,649	2.54	42.52
2 Dolphin	741	1.14	19.11
3 King mackerel	647	1.00	16.68
Louisiana (cont.)			
4 Little tunny	238	0.37	6.14
5 Blue runner	146	0.23	3.77
6 Yellowfin tuna	93	0.14	2.40
7 Red drum	88	0.14	2.27
8 Bluefish	85	0.13	2.19
9 Crevalle jack	42	0.07	1.08
10 Blackfin tuna	34	0.05	0.88
	3,763		97.04
North Texas			
1 King Mackerel	1,093	2.18	35.88
2 Dolphin	688	1.37	22.59
3 Little tunny	487	0.97	15.99
4 Spanish mackerel	203	0.40	6.66
5 Greater amberjack	157	0.31	5.15
6 Atlantic bonito	80	0.16	2.63
7 Unidentified sharks	78	0.16	2.56
8 Cobia	61	0.12	2.00
9 Crevalle jack	54	0.11	1.77
10 Blue runner	50	0.10	1.64
	2,951		96.87
South Texas			
1 King mackerel	1,576	0.61	36.01
2 Little tunny	626	0.24	14.30
3 Crevalle jack	512	0.20	11.70
4 Dolphin	317	0.12	7.24
5 Blackfin tuna	238	0.10	5.44
6 Atlantic bonito	237	0.10	5.42
7 Spanish mackerel	189	0.07	4.32
8 Yellowfin tuna	141	0.05	3.22
9 Wahoo	73	0.03	1.67
10 Cobia	10	0.03	0.23
	3,919		89.55

Table 6.—Ten most abundant species caught by other than trolling in each area off the U.S. south Atlantic coast during 1983 charterboat survey.

Area, rank, and species	Number caught	CPH	Percent of total catch w/i area
North Carolina			
1 Black sea bass	12,067	32.18	73.49
2 Unidentified porgies	2,470	6.59	15.04
3 Unidentified grunts	1,234	3.29	7.52
4 Red snapper	432	1.15	2.63
5 Unidentified snappers	70	0.19	0.43
6 Gag	61	0.16	0.37
7 Wrasses	21	0.06	0.13
8 King mackerel	14	0.04	0.09
9 Vermilion snapper	11	0.03	0.07
10 Toadfish	8	0.02	0.05
	16,388		99.82
South Carolina			
1 Black sea bass	20,820	50.79	90.74
2 Unidentified porgies	783	1.93	3.45
3 Vermilion snapper	651	1.60	1.99
4 Red snapper	251	0.62	1.11
5 Bluefish	137	0.34	0.60
6 Scamp	114	0.28	0.50
7 Gray triggerfish	107	0.26	0.47
8 Gag	43	0.11	0.19
9 Unidentified sharks	10	0.03	0.04
10 Greater amberjack	3	0.01	0.01
	22,719		99.10
Georgia			
1 Vermilion snapper	534	4.56	45.68
2 Bluefish	213	1.62	16.22
3 Red snapper	187	1.60	16.00
4 Black sea bass	83	0.71	7.10
Georgia (cont.)			
5 King mackerel	58	0.50	4.96
6 Dolphin	30	0.26	2.57
7 Greater amberjack	28	0.24	2.40
8 Red drum	8	0.07	0.68
9.5 Cobia	7	0.06	0.60
9.5 Great barracuda	7	0.06	0.60
	1,155		98.81
Northeast Florida			
1 Black sea bass	1,147	3.79	56.73
2 Whiting	163	0.54	8.06
3 Unidentified seatrout	152	0.50	7.52
4 Bluefish	139	0.46	6.87
5 Hardhead catfish	88	0.29	4.35
6 Red drum	57	0.19	2.62
7.5 Pinfish	45	0.15	2.23
7.5 Unidentified sharks	45	0.15	2.23
9 Unidentified porgies	34	0.11	1.68
10 Sheepshead	27	0.09	1.34
	1,897		93.83
East Florida			
1 Black sea bass	2,083	4.42	41.44
2 Vermilion snapper	457	0.97	9.09
3 Unidentified grunts	444	0.94	8.83
4 Gray triggerfish	298	0.63	5.93
5 Red snapper	294	0.82	5.85
6 Yellowtail snapper	287	0.61	5.71
7 Greater amberjack	265	0.56	5.27
East Florida (cont.)			
8 Blue runner	142	0.30	2.83
9 Snowy grouper	80	0.17	1.59
10 Bluefish	70	0.15	1.39
	4,420		87.93
Southeast Florida			
1 Greater amberjack	392	1.01	23.31
2 Unidentified snappers	197	0.51	11.71
3 Snowy grouper	178	0.46	10.58
4 Blue runner	158	0.41	9.39
5 Unidentified tilefish	145	0.37	8.62
6 Vermilion snapper	78	0.20	4.64
7 Dolphin	62	0.16	3.69
8 Spanish mackerel	60	0.15	3.57
9 Lane snapper	43	0.11	2.56
10 Yellowtail snapper	42	0.11	2.50
	1,355		80.57
South Florida			
1 Yellowtail snapper	1,176	0.96	22.53
2 King mackerel	612	0.50	11.72
3 Unidentified grunts	459	0.38	8.79
4 Greater amberjack	314	0.26	6.02
5 Gray snapper	283	0.23	5.42
6 Mutton snapper	262	0.22	5.02
7 Blue runner	252	0.21	4.83
8 Great barracuda	203	0.17	3.89
9 Ladyfish	157	0.13	3.01
10 Crevalle jack	146	0.12	2.80
	3,864		74.01

Shown in Tables 6 and 7 are the top ten species caught by methods other than trolling. Along the U.S. south Atlantic, black sea bass, vermilion snapper, and greater amberjack were caught in five of eight areas, while red snapper was reported in four of eight areas. In the Gulf of Mexico, seatrouts (both spotted and unidentified) and gray triggerfish were among the top ten species in five of eight areas with red drum and gag in four of eight areas.

Monthly CPH's for species in each of the 16 surveyed areas were computed. In this paper, only the results for each area's five most abundantly caught species in the U.S. south Atlantic and the Caribbean (Tables 8 and 9) and in the Gulf of Mexico (Tables 10 and 11) were compared. For example, in the U.S. south Atlantic, king mackerel were most abundant (CPH >2) during October and November off North Carolina, December off northeast Florida, and August and November off east Florida (Table 8). The Gulf of Mexico provided good catches of king mackerel (CPH >2) in December off west Florida, August and September off northwest Florida, January, February, and September off Louisiana, and in June, July, and August off north Texas (Table 10). Generally, king mackerel monthly CPH was highest in the Gulf of Mexico during summer months, while off the U.S. south Atlantic and in the U.S. Caribbean, CPH's were greatest in the fall. Another example shows Spanish mackerel caught along the U.S. south Atlantic (CPHs <2) but appearing to be more abundant (CPH >3) in Gulf waters, especially off Mississippi (Tables 8 and 10). A final example shows dolphin, the most abundant troll-caught species in 1983, caught most often in late spring and early summer in all surveyed areas with over 89 percent of this species caught in U.S. south Atlantic and Caribbean waters (Tables 8 and 10).

Monthly CPH data for fishes caught by methods other than trolling show a more defined relative abundance by area. Black sea bass was taken intermittently throughout the fishing season (Table 9) but was abundant only in spring along the U.S. south Atlantic areas (North Carolina through east Florida). In the Gulf of Mexico, however, black sea bass was not abundant, but red snapper was abundant from late summer through early fall, especially in the northern Gulf (Table 11). In the Caribbean area, trolling was the only recorded fishing method.

The mackerels and tunas (Scombridae) made up 54.8 percent of the troll catch, pointing out the dominance of these coastal pelagic species to the southeastern United States. For fishing methods other than trolling, snappers (Lutjanidae) with 29.3 percent, sea basses (Serranidae) with 19.3 percent, and drums (Sciaenidae) with 26.6 percent of the total catch emphasized the importance of those demersal species.

Table 7.—Ten most abundant species caught by other than trolling in each area in the Gulf of Mexico during 1983 charterboat survey.

Area, rank, and species	Number caught	CPH	Percent of total catch w/i area
Southwest Florida			
1 Unidentified seatrout	4,961	1.29	22.30
2 Red grouper	3,358	0.87	15.11
3 Gray snapper	1,507	0.39	6.78
4 Unidentified grunts	1,406	0.36	6.32
5 Ladyfish	1,398	0.36	6.29
6 Red drum	1,312	0.34	5.90
7 Gag	1,213	0.31	5.45
8 Spotted seatrout	1,081	0.28	4.86
9 Crevalle jack	1,070	0.28	4.81
10 Hardhead catfish	660	0.17	2.97
	17,966		81.79
West Florida			
1 Spotted seatrout	936	0.66	14.64
2 Gag	502	0.35	7.85
3 Ladyfish	489	0.33	7.34
4 Black sea bass	464	0.33	7.26
5 Spanish mackerel	420	0.30	6.57
6 Unidentified seatrout	389	0.28	6.08
7 Crevalle jack	387	0.27	6.05
8 Unidentified grunts	337	0.24	5.27
9 Red drum	293	0.21	4.58
10 Red grouper	257	0.18	4.02
	4,454		69.66
Northwest Florida			
1 Red snapper	13,340	3.87	26.03
2 Vermilion snapper	11,461	3.32	22.37
3 Unidentified porgies	9,694	2.81	18.92
4 Gray triggerfish	8,504	2.47	18.60
5 Greater amberjack	4,485	1.30	8.75
6 Gag	1,179	0.34	2.30
7 Little tunny	506	0.15	0.99
8 Scamp	452	0.13	0.88
9 Dolphin	402	0.12	0.78
Northwest Florida (cont.)			
10 Blue runner	267	0.08	0.52
	50,290		98.14
Alabama			
1 Red snapper	7,070	8.84	68.65
2 Gray triggerfish	1,771	2.21	17.20
3 Greater amberjack	637	0.80	6.19
4 Unidentified grunts	213	0.27	2.07
5 Vermilion snapper	165	0.21	1.60
6 Spadefish	111	0.14	1.08
7 Silver perch	91	0.11	0.68
8 Black sea bass	45	0.06	0.44
9 Gag	33	0.04	0.32
10 Gray snapper	30	0.04	0.29
	10,166		98.72
Mississippi			
1 Whiting	472	5.00	41.96
2 Spotted seatrout	286	3.03	25.42
3 Red snapper	163	1.73	14.49
4 Sand seatrout	70	0.74	6.22
5 Unidentified sharks	50	0.53	4.44
6 Ladyfish	30	0.32	2.67
7 Little tunny	17	0.18	1.51
8 Blue runner	10	0.11	0.89
9 Blacktip shark	8	0.09	0.64
10 Cobia	7	0.07	0.62
	1,113		98.86
Louisiana			
1 Atlantic croaker	23,261	12.29	28.11
2 Red snapper	23,199	12.07	28.04
3 Sand seatrout	17,785	9.25	21.49
4 Unidentified seatrout	8,407	4.37	10.16
Louisiana (cont.)			
5 Gray triggerfish	1,835	0.95	2.22
6 Greater amberjack	1,595	0.83	1.93
7 Dolphin	1,313	0.68	1.59
8 Bluefish	934	0.49	1.13
9 King mackerel	907	0.47	1.10
10 Pinfish	780	0.41	0.94
	80,016		96.71
North Texas			
1 Red snapper	4,867	8.00	70.17
2 Bluefish	401	0.66	5.78
3 Gray triggerfish	209	0.34	3.01
4 King mackerel	195	0.32	2.81
5 Little tunny	194	0.32	2.80
6 Unidentified seatrout	191	0.31	2.75
7 Spotted seatrout	160	0.26	2.31
8 Unidentified sharks	144	0.24	2.08
9 Cobia	140	0.23	2.02
10 Red drum	66	0.11	0.95
	6,567		94.68
South Texas			
1 Red snapper	621	1.77	30.16
2 Spotted seatrout	383	1.09	18.60
3 Sand seatrout	223	0.64	10.83
4 Unidentified seatrout	222	0.63	10.78
5 Red drum	156	0.44	7.58
6 Atlantic croaker	87	0.25	4.23
7 Gray triggerfish	70	0.20	3.40
8 Greater amberjack	84	0.18	3.11
9 Bluefish	30	0.10	1.46
10.5 Sheepshead	20	0.06	0.97
10.5 Black drum	20	0.06	0.97
	1,896		91.19

Table 8.—Mean catch per boat hour by month for five most abundant species caught by trolling off each U.S. south Atlantic and Caribbean area during 1983 charterboat survey.

Area and species	Mean catch per boat hour											
	January	February	March	April	May	June	July	August	September	October	November	December
North Carolina												
Dolphin	—	—	—	0.00	0.95	3.31	3.29	1.42	0.88	0.43	0.00	0.00
Yellowfin tuna	—	—	—	0.00	0.99	1.63	1.37	0.78	0.28	0.39	0.00	0.00
King mackerel	—	—	—	0.03	1.16	0.32	0.11	0.06	0.32	2.83	2.94	1.75
Bluefish	—	—	—	12.01	2.37	0.07	0.00	0.02	0.00	0.27	2.20	4.13
Little tunny	—	—	—	0.19	0.23	0.11	0.08	0.05	0.14	0.39	0.61	0.38
South Carolina												
Bluefish	—	—	—	2.53	1.62	1.17	1.47	1.07	0.06	0.52	0.84	—
King mackerel	—	—	—	0.63	0.89	0.29	0.23	0.28	1.02	1.33	0.89	—
Spanish mackerel	—	—	—	0.00	0.13	1.28	0.37	0.60	0.64	0.07	0.00	—
Crevalle jack	—	—	—	0.00	0.00	0.42	0.27	0.59	0.00	0.10	0.00	—
Great barracuda	—	—	—	0.00	0.00	0.07	0.20	0.18	0.18	0.02	0.00	—
Georgia												
King mackerel	—	—	—	—	0.40	0.47	0.96	0.45	0.80	—	—	—
Little tunny	—	—	—	—	0.24	0.16	0.21	0.86	0.67	—	—	—
Great barracuda	—	—	—	—	0.00	0.36	0.35	0.81	0.00	—	—	—
Bluefish	—	—	—	—	1.28	0.63	0.13	0.00	0.00	—	—	—
Spanish mackerel	—	—	—	—	0.00	0.00	0.00	0.50	0.00	—	—	—
Northeast Florida												
Little tunny	—	—	—	1.93	1.39	0.40	0.55	0.86	0.81	0.58	0.33	1.14
King mackerel	—	—	—	0.09	0.66	0.66	0.46	0.31	0.22	0.23	0.00	2.14
Bluefish	—	—	—	0.53	0.43	0.01	0.05	0.04	0.47	0.07	2.15	0.00
Spanish mackerel	—	—	—	0.46	0.41	0.09	0.09	0.20	0.38	0.18	0.00	0.00
Great barracuda	—	—	—	0.00	0.04	0.14	0.34	0.42	0.34	0.07	0.00	0.00

Continued on next page.

Table 8.—Continued.

Area and species	Mean catch per boat hour											
	January	February	March	April	May	June	July	August	September	October	November	December
East Florida												
King mackerel	—	—	0.42	1.12	1.12	1.22	0.88	2.16	1.42	1.06	3.22	1.05
Little tunny	—	—	0.00	0.36	0.60	0.57	0.93	1.91	0.75	0.44	0.58	0.12
Atlantic bonito	—	—	0.21	0.49	0.32	0.25	0.67	1.07	0.99	0.13	0.45	0.27
Great barracuda	—	—	0.64	0.19	0.11	0.21	0.41	0.55	0.63	0.21	0.17	2.14
Dolphin	—	—	0.10	0.32	0.26	0.78	0.36	0.17	0.23	0.38	0.15	0.40
Southeast Florida												
Dolphin	—	—	0.13	0.76	0.98	2.25	0.56	0.39	1.79	0.80	0.28	0.60
Atlantic bonito	—	—	0.00	0.02	0.09	0.06	0.35	1.47	0.42	0.17	0.31	0.47
King mackerel	—	—	0.00	0.12	0.17	0.09	0.14	0.48	0.31	0.58	0.64	0.38
Little tunny	—	—	0.00	0.09	0.02	0.04	0.20	0.77	0.30	0.19	0.19	0.13
Great barracuda	—	—	0.00	0.03	0.05	0.14	0.30	0.42	0.17	0.30	0.23	0.30
South Florida												
Dolphin	0.08	0.29	0.00	1.46	2.83	3.19	1.06	1.15	1.46	0.83	0.17	0.27
Great barracuda	0.46	0.35	0.71	0.27	0.09	0.06	0.20	0.51	0.51	0.44	0.37	0.34
Blackfin tuna	0.08	0.00	0.00	0.39	0.25	0.27	0.12	0.17	0.19	0.25	0.12	0.20
Little tunny	0.23	0.29	0.06	0.14	0.15	0.07	0.28	0.16	0.19	0.02	0.07	0.05
King mackerel	0.56	1.88	0.00	0.02	0.00	0.00	0.01	0.03	0.00	0.12	0.30	0.50
U.S. Caribbean Sea												
Dolphin	—	—	0.84	0.16	0.12	0.07	0.01	0.00	0.04	0.00	0.09	0.06
Great barracuda	—	—	0.00	0.06	0.07	0.03	0.04	0.05	0.10	0.11	0.05	0.16
Blue marlin	—	—	0.02	0.00	0.00	0.07	0.11	0.06	0.03	0.01	0.01	0.00
Little tunny	—	—	0.00	0.00	0.03	0.02	0.00	0.00	0.01	0.02	0.07	0.46
King mackerel	—	—	0.00	0.04	0.02	0.02	0.02	0.01	0.05	0.06	0.06	0.07

Table 9.—Mean catch per boat hour by month for five most abundant species caught by other than trolling off each U.S. south Atlantic area during 1983 charterboat survey.

Area and species	Mean catch per boat hour									
	March	April	May	June	July	August	September	October	November	December
North Carolina										
Black sea bass	—	36.47	46.40	25.70	34.80	26.21	31.12	0.00	28.00	—
Porgies	—	5.75	10.26	5.02	8.90	5.32	5.45	3.00	4.52	—
Grunts	—	0.51	0.80	4.07	6.33	3.85	5.12	0.00	0.00	—
Red snapper	—	0.00	0.00	0.00	0.00	6.29	0.00	7.00	0.00	—
Snappers	—	0.00	0.00	0.00	0.00	0.00	1.43	0.00	0.00	—
South Carolina										
Black sea bass	—	9.85	56.39	80.73	49.07	85.46	41.51	—	—	—
Porgies	—	1.12	2.59	0.00	0.00	0.36	4.25	—	—	—
Vermilion snapper	—	0.00	0.00	0.00	0.14	1.38	4.48	—	—	—
Red snapper	—	0.00	0.43	1.00	1.14	0.72	0.57	—	—	—
Bluefish	—	0.95	1.32	0.00	0.00	0.00	0.00	—	—	—
Georgia										
Vermilion snapper	—	9.33	0.51	5.56	4.24	0.00	0.00	—	—	—
Bluefish	—	0.00	2.64	4.89	0.00	0.00	0.00	—	—	—
Red snapper	—	4.67	1.15	0.09	0.00	0.00	0.00	—	—	—
Black sea bass	—	0.00	1.41	0.76	0.48	0.33	0.00	—	—	—
King mackerel	—	0.33	0.08	0.22	1.57	2.33	0.00	—	—	—
Northeast Florida										
Black sea bass	—	3.99	21.48	5.28	6.25	0.34	0.00	4.05	0.14	—
Kingfish	—	1.07	0.00	0.30	1.00	0.28	0.96	0.65	0.11	—
Seatrout	—	0.01	0.00	0.00	0.00	0.00	0.67	1.35	1.57	—
Bluefish	—	0.28	0.00	0.02	0.00	0.00	0.00	0.00	1.80	—
Hardhead catfish	—	0.74	0.00	0.40	0.25	0.00	0.00	0.09	0.00	—
East Florida										
Black sea bass	4.83	7.95	5.42	2.32	3.42	3.64	4.29	4.25	0.28	0.00
Vermilion snapper	0.00	0.91	0.82	0.36	1.01	0.26	2.20	2.44	1.03	0.00
Grunts	0.00	0.51	1.24	0.19	1.01	1.18	0.00	6.07	0.00	0.00
Gray triggerfish	0.50	0.88	0.27	0.77	0.35	0.42	0.86	2.04	0.00	0.00
Red snapper	0.00	0.34	0.44	0.62	0.21	0.88	1.66	1.31	0.21	0.67
Southeast Florida										
Greater amberjack	—	0.85	2.83	0.51	0.04	0.00	0.00	0.14	0.46	0.67
Snappers	—	0.11	0.00	0.00	0.00	0.00	0.00	2.95	2.71	1.33

Continued on next page

Table 9.—Continued.

Area and species	Mean catch per boat hour									
	March	April	May	June	July	August	September	October	November	December
Southeast Florida (cont.)										
Snowy grouper	—	0.05	0.11	0.82	1.13	1.01	1.39	1.22	0.00	0.30
Blue runner	—	0.03	1.20	0.00	0.08	0.00	0.00	0.03	1.54	0.00
Tilefish	—	0.19	0.46	0.51	0.49	0.78	1.13	0.00	0.04	0.42
South Florida										
Yellowtail snapper	0.70	1.06	0.25	0.00	4.44	1.72	1.59	1.14	0.63	0.44
King mackerel	0.05	0.07	0.04	0.00	0.00	0.15	0.09	0.29	0.58	2.46
Grunts	0.00	0.75	0.34	0.00	0.84	0.04	0.28	0.10	0.13	0.26
Greater amberjack	0.55	0.41	0.25	0.36	0.30	0.43	0.09	0.05	0.09	0.19
Gray snapper	0.00	0.13	0.11	0.02	0.30	0.24	0.21	0.40	0.66	0.16

Table 10.—Mean catch per boat hour by month for five most abundant species caught by trolling off each Gulf of Mexico area during 1983 charterboat survey.

Area and species	Mean catch per boat hour											
	January	February	March	April	May	June	July	August	September	October	November	December
Southwest Florida												
Spanish mackerel	—	—	—	0.56	—	—	—	1.33	0.00	1.47	1.00	—
Crevalle jack	—	—	—	0.00	—	—	—	0.00	0.00	0.98	1.00	—
Ladyfish	—	—	—	0.00	—	—	—	0.00	0.00	0.56	0.00	—
Blue runner	—	—	—	0.00	—	—	—	0.00	0.00	0.46	0.00	—
Bluefish	—	—	—	1.00	—	—	—	0.00	0.00	0.00	0.00	—
West Florida												
Spanish mackerel	—	—	—	0.64	1.14	1.56	1.73	1.47	1.77	2.33	2.35	0.03
Little tunny	—	—	—	0.28	0.26	0.55	0.29	0.66	0.92	0.64	0.36	3.39
Blue runner	—	—	—	0.28	1.20	0.51	0.11	0.08	0.55	0.28	0.03	0.00
King mackerel	—	—	—	0.51	0.25	0.22	0.18	0.12	0.10	0.20	0.53	3.13
Great barracuda	—	—	—	0.23	0.07	0.34	0.19	0.21	0.27	0.02	0.00	0.00
Northwest Florida												
Blue runner	—	—	0.00	0.00	7.68	6.39	0.01	0.05	0.02	0.01	0.00	—
King mackerel	—	—	0.00	0.00	0.01	0.35	1.82	2.47	2.34	0.68	0.03	—
Atlantic bonito	—	—	0.00	0.00	2.84	2.74	0.17	0.06	0.04	0.19	0.53	—
Little tunny	—	—	0.00	0.00	0.35	1.29	0.95	0.44	0.36	0.53	0.09	—
Spanish mackerel	—	—	0.00	1.07	1.70	0.38	0.18	0.07	0.06	0.12	0.56	—
Alabama												
Spanish mackerel	—	—	—	1.73	0.98	1.41	1.21	2.13	3.50	0.22	0.27	—
Little tunny	—	—	—	0.00	0.68	0.76	0.65	1.22	1.36	1.46	1.09	—
Blue runner	—	—	—	0.00	0.42	1.34	0.43	0.38	0.32	0.01	0.00	—
King mackerel	—	—	—	0.00	0.08	0.15	0.86	0.89	0.75	0.14	0.00	—
Atlantic bonito	—	—	—	0.02	0.58	0.65	0.38	0.02	0.00	0.05	0.18	—
Mississippi												
Spanish mackerel	—	—	—	11.33	9.86	11.84	10.57	2.86	2.01	0.08	—	—
Blue runner	—	—	—	0.00	0.36	0.65	0.81	0.63	0.15	0.00	—	—
Red drum	—	—	—	0.00	0.26	0.23	0.19	0.76	0.71	0.73	—	—
Little tunny	—	—	—	0.00	0.14	0.57	0.63	0.51	0.15	0.23	—	—
Crevalle jack	—	—	—	0.24	0.06	0.29	0.25	0.39	0.29	0.58	—	—
Louisiana												
Spanish mackerel	0.00	0.00	—	—	1.31	0.01	1.68	3.34	6.45	3.99	0.26	—
Dolphin	0.00	0.00	—	—	8.13	1.23	1.99	1.94	0.00	0.00	0.00	—
King mackerel	2.03	2.49	—	—	0.00	0.00	0.00	0.82	2.10	1.34	1.16	—
Little tunny	0.08	0.19	—	—	0.31	0.00	0.13	0.52	0.58	0.66	0.52	—
Blue runner	0.00	0.00	—	—	0.00	0.05	0.11	0.29	0.23	0.66	0.10	—
North Texas												
King mackerel	—	—	—	0.50	1.43	2.27	2.90	2.43	0.91	0.14	0.00	—
Dolphin	—	—	—	0.00	2.92	0.82	0.08	3.17	0.07	0.00	0.00	—
Little tunny	—	—	—	0.00	0.10	0.61	1.84	1.18	0.40	0.36	0.00	—
Spanish mackerel	—	—	—	0.00	0.10	0.08	0.15	0.85	0.73	0.50	1.00	—
Greater amberjack	—	—	—	0.00	0.51	0.60	0.45	0.00	0.00	0.43	0.00	—
South Texas												
King mackerel	—	—	—	0.15	0.25	0.53	0.71	0.92	0.71	0.40	0.29	0.20
Little tunny	—	—	—	0.87	0.37	0.14	0.13	0.16	0.46	0.30	0.38	1.20
Crevalle jack	—	—	—	0.23	0.51	0.31	0.13	0.08	0.06	0.02	0.23	0.00
Dolphin	—	—	—	0.02	0.05	0.11	0.17	0.15	0.14	0.14	0.01	0.00
Blackfin tuna	—	—	—	0.01	0.05	0.02	0.06	0.07	0.34	0.02	0.07	0.00

Table 11.—Mean catch per boat hour by month for five most abundant species caught by other than trolling off each Gulf of Mexico area during 1983 charterboat survey.

Area and species	Mean catch per boat hour											
	January	February	March	April	May	June	July	August	September	October	November	December
Southwest Florida												
Seatrout	—	—	—	3.18	0.96	1.33	1.58	1.33	0.55	0.82	0.86	0.39
Red grouper	—	—	—	0.15	0.14	0.45	0.87	1.84	1.26	2.13	1.28	0.69
Gray snapper	—	—	—	0.11	0.06	0.09	0.10	0.39	0.69	0.87	1.14	0.73
Grunts	—	—	—	0.42	0.20	0.13	0.39	0.39	0.39	0.54	0.55	0.57
Ladyfish	—	—	—	0.79	0.26	0.20	0.24	0.27	0.15	0.16	0.66	0.69
West Florida												
Spotted seatrout	—	—	0.00	0.51	0.10	0.28	0.31	1.52	0.86	1.22	0.42	0.90
Gag	—	—	2.27	0.16	0.58	0.37	0.14	0.41	0.38	0.15	0.40	0.31
Ladyfish	—	—	0.00	0.51	0.39	0.24	0.22	0.26	0.30	0.88	0.27	0.27
Black sea bass	—	—	0.91	0.18	0.17	0.05	0.03	0.01	0.13	0.12	1.53	1.09
Spanish mackerel	—	—	0.00	0.01	0.15	0.01	0.04	0.01	0.08	0.76	1.94	0.00
Northwest Florida												
Red snapper	—	—	3.60	3.12	2.36	3.19	3.54	4.64	5.14	5.15	7.08	—
Vermilion snapper	—	—	2.60	1.60	1.86	2.52	2.88	4.92	6.59	3.42	4.95	—
Porgies	—	—	4.80	3.95	3.27	2.16	2.47	3.45	3.00	2.26	0.88	—
Gray triggerfish	—	—	0.00	1.84	1.71	1.96	2.20	2.35	3.50	3.99	3.88	—
Greater amberjack	—	—	0.60	0.68	1.45	2.23	1.25	1.05	1.44	0.70	0.90	—
Alabama												
Red snapper	—	—	—	6.19	4.88	6.70	8.45	9.11	12.94	13.54	9.05	—
Gray triggerfish	—	—	—	2.31	3.43	1.82	1.90	1.55	1.94	3.06	1.70	—
Greater amberjack	—	—	—	0.14	1.23	1.89	0.76	0.57	0.38	0.51	0.48	—
Grunts	—	—	—	0.66	0.15	0.25	0.08	0.17	0.31	0.10	1.00	—
Vermilion snapper	—	—	—	0.00	0.08	0.22	0.09	0.26	0.41	0.27	0.43	—
Mississippi												
Kingfish	—	—	—	0.00	14.75	0.00	0.00	0.00	—	0.00	—	—
Spotted seatrout	—	—	—	0.00	0.00	4.41	4.14	2.66	—	6.20	—	—
Red snapper	—	—	—	9.67	1.88	0.00	0.71	3.33	—	0.00	—	—
Sand seatrout	—	—	—	0.00	1.19	0.00	1.43	0.00	—	0.80	—	—
Sharks	—	—	—	0.00	0.00	0.00	3.57	0.00	—	0.00	—	—
Louisiana												
Atlantic croaker	11.29	11.97	13.20	12.51	3.51	4.48	8.12	11.42	13.33	23.01	19.64	21.45
Red snapper	2.19	3.39	5.07	4.51	13.66	10.55	15.65	16.02	20.63	10.45	6.57	2.86
Sand seatrout	0.00	1.55	0.00	0.00	1.73	1.09	1.80	5.31	6.25	13.47	28.22	43.51
Seatrout	14.67	15.35	18.64	20.05	0.58	1.28	0.38	0.00	0.00	1.90	13.42	22.39
Gray triggerfish	0.14	0.65	0.82	0.33	3.13	1.24	0.57	0.83	0.64	1.28	0.64	0.54
North Texas												
Red snapper	—	—	—	7.67	5.46	6.71	4.30	8.74	9.66	13.57	14.24	16.62
Bluefish	—	—	—	0.03	0.00	0.66	0.05	1.71	1.71	0.98	0.62	0.69
Gray triggerfish	—	—	—	0.67	0.32	0.45	0.03	0.36	0.42	0.57	0.35	0.31
King mackerel	—	—	—	0.00	0.14	1.27	0.23	0.27	0.19	0.00	0.03	0.00
Little tunny	—	—	—	0.00	0.37	0.21	0.50	0.59	0.44	0.00	0.00	0.00
South Texas												
Red snapper	—	—	—	2.53	1.55	0.08	10.00	7.63	1.26	3.17	0.26	0.00
Spotted seatrout	—	—	—	0.00	1.07	2.03	0.00	0.00	0.00	1.38	0.98	4.57
Sand seatrout	—	—	—	0.00	1.11	0.20	0.00	0.00	0.00	0.64	1.15	5.71
Seatrout	—	—	—	0.89	0.00	0.00	0.00	0.00	0.58	0.00	2.07	0.00
Red drum	—	—	—	0.26	0.48	0.28	0.00	0.00	0.23	0.74	0.21	1.57

Discussion

Caution must be exercised in generalizing from the 1983 data for several reasons: 1) Effort distribution by fishing zone and fishing method may not be representative of the overall fishery for any particular area; 2) our classification of methods other than trolling includes bottom fishing, drift fishing (where the bait is allowed to "drift" with the prevailing current), and fly-lining, where such methods can produce catches of pelagic species; 3) the CPH from any area within the surveyed area could reflect seasonal target species preferred by charterboat clients rather than actual species abundance; 4) although obvious species identification errors were corrected, the geographical scope of the survey area undoubtedly caused some confusion as to the common names of certain species. For example, "albacore" in North Carolina could be either little tunny, *Euthynnus alletteratus*; skipjack tuna, *E. pelamis*; or the true albacore, *Thunnus alalunga*. Thus, there may be some species misidentifications in other areas. These and other problems are being rectified for future surveys as project personnel and captains become more familiar with survey objectives and methods.

Our success in 1983 indicates that charterboat CPH is obtainable and may be used in indicating the abundance of

surveys, on the other hand, using a small segment of the recreational fishery (charterboats), can contribute to the management of these fisheries by establishing long-term data sets which reflect the relative abundance of any species in time and space.

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