



NOAA Technical Report NMFS SSRF-708

# Catch and Catch Rates of Fishes Caught by Anglers in the St. Andrew Bay System, Florida, and Adjacent Coastal Waters, 1973

Doyle F. Sutherland

March 1977

U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service

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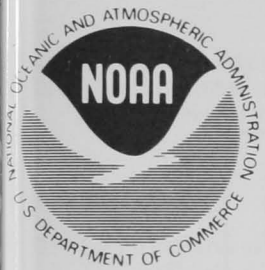
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# Catch and Catch Rates of Fishes Caught by Anglers in the St. Andrew Bay System, Florida, and Adjacent Coastal Waters, 1973

DOYLE F. SUTHERLAND<sup>1</sup>

## ABSTRACT

Anglers were interviewed on four fixed platforms in the St. Andrew Bay system and on charter boats that were fishing in the bay and adjacent coastal waters in 1973. They caught fishes of at least 54 species (not all were identified to species) in 31 families. The majority (58.0%) of the fishes that were caught from fixed platforms consisted of pinfish, *Lagodon rhomboides*, (18.2%); sea catfish, *Arius felis*, (12.2%); spotted seatrout, *Cynoscion nebulosus*, (10.0%); blue runner, *Caranx crysos*, (8.8%); and crevalle jack, *Caranx hippos*, (8.8%). On charter boats, king mackerel, *Scomberomorus cavalla*, comprised the majority of the catches (73.9%).

The average catch rates varied from 0.0 to 10.7 fish/h among anglers on fixed platforms and from 0.0 to 32.0 fish/h among charter boats. The greatest monthly average catch rates on fixed platforms were 2.2 fish/h in October at Deer Point Dam, 1.8 in October at Bailey Bridge, 1.8 in December at Hathaway Bridge, 2.3 in May at West Jetty, and 10.6 in September on charter boats. On the fixed platforms, the highest average catch rate for all months was 1.4 with squid and the lowest was 0.5 with fiddler crabs. Whole round scads and 00-squid spoons were used for bait by virtually all surveyed charter boats.

## INTRODUCTION

The St. Andrew Bay system and adjacent coastal waters (Fig. 1) attract many recreational anglers. The recreational fishery has not been previously assessed. A 1973 catch and catch rate survey of recreational fishing in the area was conducted to provide fishery managers with baseline estimates of fish availability to anglers for evaluating future trends. A companion study of the commercial and recreational fishing effort for fisheries in the area was also conducted in 1973 (Sutherland, manuscript in preparation).

Increased demand for food and sport fishes is a growing concern to fishery managers. In recent years, the landings in pounds of food fishes by anglers have amounted to about one-half the commercial landings (Deuel 1973; U.S. Department of Commerce 1976). In the eastern Gulf of Mexico, croakers exceeded all other species in numbers caught, followed by spotted seatrout, catfishes, sand seatrout, porgies, kingfishes, and grunts (Deuel 1973). Croakers and seatrouts are highly regarded by the public and are readily available to commercial and recreational fishermen in estuarine habitats. The number of recreational fishermen seeking those and other fishes is estimated to increase by 8-10% annually (Deuel 1973). The number of commercial fishermen is presumably limited by finfish availability and by social and economic factors that prevail in the area.

A relatively nonrestricted commercial fishery for shrimp and for food and bait fishes exists in the St. An-

drew Bay system and adjacent coastal waters. A daily bag and size limit on several species of fishes is imposed on recreational anglers.

Catch and effort data for commercial and recreational fishing in identifiable management areas are needed to achieve optimum biological yield and to resolve other resource management problems (Irby 1974). While commercial landings are documented annually, the information is of little value for management of identifiable areas, for the fishing location and fishing effort are omitted. Similarly, catch and catch rates obtained from anglers may or may not reflect the actual availability or abundance of fishes, for angling success depends on such factors as angling skill, method, bait, location, etc. Not

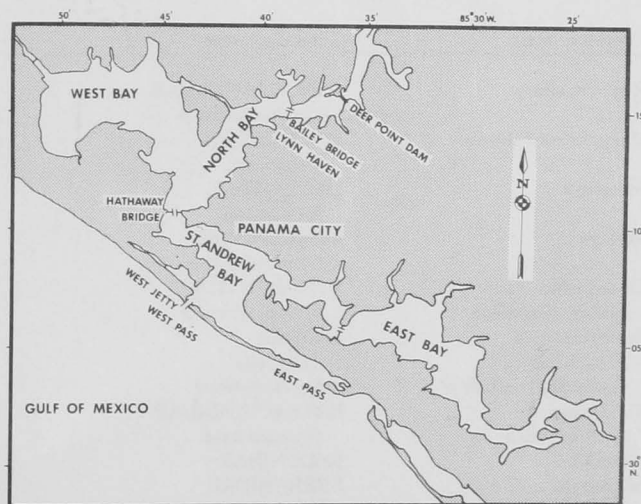


Figure 1.—St. Andrew Bay system, Fla., and adjacent coastal waters.

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all species of food or game fishes known to occur in St. Andrew Bay were caught by the interviewed anglers. The red snapper, *Lutjanus campechanus*, and tarpon, *Megalops atlantica*, are examples. The results from our catch and catch rate survey are presented below.

## METHODS

Anglers on four fixed platforms in the St. Andrew Bay system and charter boat captains or mates who fished in the bay, inlet, and adjacent coastal waters (Fig. 1) were interviewed for catch rate data. The fixed platforms were: 1) Deer Point Dam, 2) Bailey Bridge, 3) Hathaway Bridge, and 4) West Jetty. Only charter boatmen that trolled for nearshore pelagic fishes, chiefly Spanish and king mackerels, were interviewed, since charter boats in the demersal fishery generally fish beyond 25 km offshore. More importantly, charter boatmen are exceedingly reluctant to reveal the location of their demersal fishing grounds. Most of the interviewed charter boatmen fished within 25 km of West Pass.

The creel census was conducted twice weekly by rotating the visits among the fixed platforms and charter boats. On occasions when anglers did not use the scheduled fixed platforms, additional visits were made to the marinas to obtain catch rates from charter boats. None of the fixed platforms were used by anglers on survey days in January or the charter boats in January, February, and December. In the period February through December, catch rates were obtained on 23 visits to Deer Point Dam, Bailey Bridge, and Hathaway Bridge, and on 24 visits to West Jetty and charter boats.

The catch rates obtained in this survey were from daytime angling only. Of the anglers interviewed on fixed platforms few had started fishing prior to 0600 h. Peak fishing hours were from 0900 to 1100. Similarly, relatively few of the surveyed charter boats fished prior to 0600;

most fished during the hours 0600 to 1000. All fishing times were recorded to the nearest one-quarter hour. The survey ended at 1600 each day.

The fixed platforms were surveyed continuously throughout the day. The beginning time, catch, and kind of bait were recorded for each angler. Elapsed fishing time, additional catch, and bait changes were noted in repeated interviews of individual anglers. Fishes that were reportedly caught and returned to the water were classed as throwbacks; the number reported was accepted as accurate. Observed fishes were usually identified to species, but in some cases were identified only to family.

Charter boat captains attempted to schedule their first pelagic fishing trip each day to begin at 0600. Since most charters were for 4 h, peak fishing hours were from 0600 to 1000, although previously scheduled and nonscheduled trips departed and returned to the marinas throughout the day. Catch and effort data were obtained from as many of the returning charter boats as time and circumstance permitted.

## FISHES CAUGHT

Anglers caught at least 55 species of fishes in 31 families (Table 1): 31 species at West Jetty, 21 at Hathaway Bridge, 20 at Deer Point Dam, 13 at Bailey Bridge, and 23 on charter boats. Sciaenidae contributed the greatest number of species (seven) followed by Carangidae (six); other families were represented by three or four species. Eight species of fishes constituted 72.9% of the total catch on fixed platforms: finfish (18.2%), sea catfish (12.8%), spotted seatrout (10.0%), blue runner (8.8%), crevalle jack (8.8%), sand seatrout (5.9%), Atlantic croaker (4.8%), and lefteye flounder (3.6%). King mackerel constituted 73.9% of the total catch by charter boats.

Table 1.—Common and scientific names of fishes caught by anglers at four locations in St. Andrew Bay system, Fla., and in adjacent coastal waters, 1973

Common name	Scientific name	Deer Pt. Dam	Bailey Bridge	Hathaway Bridge	West Jetty	Bay and coastal waters
Requiem sharks	CARCHARHINIDAE <i>Carcharhinus</i> sp.			x	x	x
Hammerhead sharks	SPHYRNIDAE <i>Sphyrna</i> sp.		x			
Stingrays	DASYATIDAE <i>Dasyatis</i> sp.			x	x	
Morays	MURAEINIDAE <i>Gymnothorax</i> sp.	x		x		
Lizardfishes	SYNODONTIDAE <i>Synodus foetens</i>				x	x
Sea catfishes	ARIIDAE <i>Arius felis</i>	x	x	x	x	x
Sea catfish	<i>Bagre marinus</i>	x	x	x		
Gafftopsail catfish						
Toadfishes	BATRACHOIDIDAE <i>Opsanus beta</i>	x	x			
Gulf toadfish						
Needlefishes	BELONIDAE	x				
Sea basses	SERRANIDAE <i>Centropristis</i> sp.			x	x	
Sea bass	<i>Diplectrum formosum</i>			x		
Sand perch						x
Gag	<i>Mycteroperca microlepis</i>				x	x

Table 1.—Continued.

Common name	Scientific name	Deer Pt. Dam	Bailey Bridge	Hathaway Bridge	West Jetty	Bay and coastal waters
Sunfishes	CENTRARCHIDAE					
Bluegill	<i>Lepomis macrochirus</i>	x				
Redear sunfish	<i>Lepomis microlophus</i>	x				
Bluefishes	POMATOMIDAE					
Bluefish	<i>Pomatomus saltatrix</i>				x	x
Cobias	RACHYCENTRIDAE					
Cobia	<i>Rachycentron canadum</i>					x
Jacks and pompanos	CARANGIDAE					
Blue runner	<i>Caranx crysos</i>	x	x	x	x	x
Crevalle jack	<i>Caranx hippos</i>	x	x	x	x	x
Horse-eye jack	<i>Caranx latus</i>			x		
Leatherjacket	<i>Oligoplites saurus</i>	x			x	x
Greater amberjack	<i>Seriola dumerili</i>					x
Florida pompano	<i>Trachinotus carolinus</i>				x	
Dolphins	CORYPHAENIDAE					
Pompano dolphin	<i>Coryphaena equisetis</i>					x
Dolphin	<i>Coryphaena hippurus</i>					x
Snappers	LUTJANIDAE					
Red snapper	<i>Lutjanus campechanus</i>					x
Gray snapper	<i>Lutjanus griseus</i>	x		x	x	
Vermilion snapper	<i>Rhomboplites aurorubens</i>				x	
Grunts	POMADASYIDAE					
Tomtate	<i>Haemulon aurolineatum</i>				x	
Pigfish	<i>Orthopristis chrysoptera</i>	x	x	x	x	
Porgies	SPARIDAE					
Sheepshead	<i>Archosargus probatocephalus</i>	x	x		x	
Pinfish	<i>Lagodon rhomboides</i>	x	x	x	x	x
Drums	SCIAENIDAE					
Silver perch	<i>Bairdiella chrysura</i>	x	x	x		
Spotted seatrout	<i>Cynoscion nebulosus</i>	x	x	x	x	x
Sand seatrout	<i>Cynoscion arenarius</i>	x	x	x		
Spot	<i>Leiostomus xanthurus</i>	x			x	
Atlantic croaker	<i>Micropogon undulatus</i>	x	x	x	x	
Black drum	<i>Pogonias cromis</i>	x	x		x	
Red drum	<i>Sciaenops ocellata</i>	x				x
Spadefishes	EPHIPPIDAE					
Atlantic spadefish	<i>Chaetodipterus faber</i>			x	x	
Parrotfishes	SCARIDAE				x	
Mulletts	MUGILIDAE					
	<i>Mugil</i> sp.				x	
Barracudas	SPHYRAENIDAE					
Great barracuda	<i>Sphyraena barracuda</i>					x
Cutlass fishes	TRICHIURIDAE					
Atlantic cutlassfish	<i>Trichiurus lepturus</i>					x
Mackerels and tunas	SCOMBRIDAE					
Wahoo	<i>Acanthocybium solanderi</i>					x
Little tunny	<i>Euthynnus alletteratus</i>			x	x	x
King mackerel	<i>Scomberomorus cavalla</i>					x
Spanish mackerel	<i>Scomberomorus maculatus</i>			x	x	x
Billfishes	ISTIOPHORIDAE					
Sailfish	<i>Istiophorus platypterus</i>					x
Searobins	TRIGLIDAE					
	<i>Prionotus</i> sp.				x	
Lefteye flounders	BOTHIDAE					
	<i>Paralichthys</i> sp.			x	x	
Triggerfishes and Filefishes	BALISTIDAE					
Gray triggerfish	<i>Balistes capriscus</i>			x	x	x
Planehead filefish	<i>Monacanthus hispidus</i>			x		
Boxfishes	OSTRACIIDAE					
Scrawled cowfish	<i>Lactophrys quadricornis</i>			x		
Puffers	TETRAODONTIDAE					
Southern puffer	<i>Sphoeroides nephelus</i>			x		
Porcupinefishes	DIODONTIDAE					
Striped burrfish	<i>Chilomycterus schoepfi</i>			x	x	



## VARIATION IN CATCH RATES BY BAIT TYPE

Intangible differences in angling experience are recognized as a source of variation in catch rates among anglers participating in a mixed-creel sport fishery (Cailouet and Higman 1973). The anglers interviewed on the fixed platforms in the St. Andrew Bay system were particularly diverse in their selection of fishing tackle and bait and in their method of fishing. Many of the anglers were visitors who had little saltwater fishing experience or knowledge of the available species of fishes. Most still-fished with dead shrimp or squid on the bottom. The experienced anglers, in contrast, selected baits that they regarded as most effective in catching a particular species of fish. Inexperienced anglers' catches consisted mostly of demersal fishes, while experienced anglers' catches consisted of both demersal and pelagic fishes.

The relative importance of bait type to angler success (catch rate) and bait preference of 10 species of fishes were investigated. According to the catch rate data, squid was the most effective of the eight bait types used by anglers on fixed platforms. The effectiveness of that

particular bait may be attributed in part to its leather-like toughness and its appeal to pinfish, a species that was usually available at all the platforms. Because of its toughness, it is less easily removed from the hook by "nibblers" thus increasing fishing time by reducing the time spent rebaiting, although my personal observations and experience indicate that fresh dead shrimp will attract more species of fish at a faster rate than will squid. The highest average catch rate in any month (November) was achieved by anglers using dead shrimp. That average was 4.47 fish/h (Table 2), but the catches consisted mostly of pinfish, sea catfish, and unidentified throwbacks.

The experienced angler seeking spotted seatrout, a highly prized food and game fish, generally fished with either live shrimp or artificial lures. The catch rates indicate live shrimp was 3.6 times more effective than lures (Table 3). The comparatively fast moving pelagic fishes such as blue runner and crevalle jack apparently preferred fast moving baits, as the highest catch rates were obtained by anglers using artificial lures.

The fishes that were caught and the percentage composition of the catch from each platform are presented in

Table 2.—Variation in catch rates of saltwater fishes caught by interviewed anglers on fixed platforms in the St. Andrew Bay system, Fla., 1973, by bait type and month. (hrs = hours of angling, c/h = average catch per hour.)

Month	Bait type															
	Fish								Shrimp				Artificial lure		Fiddler crab	
	Squid		Live		Dead		Cut		Live		Dead		hrs	c/h	hrs	c/h
Feb.	2.25	0.00	—	—	—	—	—	—	23.50	0.51	15.00	0.00	16.00	0.12	10.00	0.10
Mar.	13.00	0.85	0.25	0.00	—	—	4.00	0.75	4.25	0.94	31.25	1.06	19.25	0.00	15.25	0.72
Apr.	19.00	1.42	3.50	0.86	—	—	—	—	—	—	68.75	1.64	23.25	0.26	12.75	0.24
May	12.00	3.83	6.50	4.31	—	—	17.00	0.94	—	—	66.25	1.36	31.50	0.98	—	—
June	30.75	1.72	19.50	0.51	7.50	0.00	9.50	0.10	—	—	83.00	0.96	5.50	3.09	4.00	3.25
July	52.50	1.41	—	—	2.25	0.44	47.75	0.67	1.50	0.00	120.75	0.69	7.50	0.27	3.00	0.00
Aug.	82.25	1.08	—	—	—	—	18.25	0.27	2.00	0.00	151.00	0.84	19.75	0.05	—	—
Sept.	7.00	1.14	0.25	0.00	1.00	0.00	1.50	0.00	11.75	0.59	72.00	0.40	21.00	0.38	—	—
Oct.	34.75	1.12	7.25	1.10	—	—	6.00	0.50	7.00	3.28	115.25	1.29	6.00	2.50	3.50	0.00
Nov.	15.00	1.07	3.75	0.53	5.00	2.00	21.25	1.22	25.50	1.10	21.50	4.47	42.00	2.74	10.00	0.33
Dec.	—	—	0.75	0.00	—	—	1.00	1.00	16.50	1.82	10.25	0.88	27.25	1.47	—	—
Total	268.50		41.75		15.75		126.25		92.00		755.00		219.00		58.50	
Average	1.35		1.22		1.08		0.69		1.13		1.07		1.08		0.53	

Table 3.—Average catch per hour of 10 saltwater fishes caught by interviewed anglers on fixed platforms in the St. Andrew Bay system, Fla., 1973, by bait type. (Hours of angling.)

Species	Bait type						
	Squid (268.50)	Fish			Shrimp		Lures (219.00)
		Live (41.75)	Dead (15.75)	Cut (126.25)	Live (92.00)	Dead (755.50)	
Pinfish	0.38	0.00	0.00	0.03	0.03	0.16	0.00
Sea catfish	0.24	0.00	0.00	0.03	0.00	0.13	0.00
Spotted seatrout	0.00	0.02	0.00	0.00	0.71	0.04	0.20
Blue runner	0.10	0.00	0.06	0.10	0.00	0.09	0.12
Crevalle jack	0.04	0.00	0.00	0.00	0.00	0.01	0.41
Sand seatrout	0.00	0.00	0.00	0.09	0.00	0.06	0.00
Atlantic croaker	0.04	0.02	0.00	0.02	0.00	0.06	0.01
Flounder	0.01	0.14	0.00	0.02	0.00	0.00	0.11
Tomtate	0.03	0.00	0.00	0.00	0.16	0.00	0.00
Spadefish	0.02	0.00	0.00	0.00	0.00	0.04	0.00

Tables 4-8. The monthly average catches per hour from fixed platforms are shown in Table 9.

## CATCH AND CATCH RATES

### Deer Point Dam

At Deer Point Dam 236 interviewed anglers caught 20 species of fishes and unidentified throwbacks (Table 4) in 401.0 h of angling (Table 9). In the February-December period, the catch rate averaged 1.0 fish/h of angling and ranged from 0.0 to 10.7 fish/h by individual anglers (Fig. 2).

The platform was frequently used by skilled anglers seeking spotted seatrout, particularly during the fall and early winter months. As a result of that effort, the spotted seatrout was the most commonly caught fish, amounting to 21.0% of the total catch. Pinfish and throwbacks comprised 39.3% of the total catch.

### Bailey Bridge

The catch at Bailey Bridge consisted of 13 species of fishes (Table 5). They were caught by 99 interviewed anglers in 147.5 h of angling for an average catch rate of 1.2 fish/h in the 11-mo period of February through December (Table 9). Individual catches ranged from 0.0 to 6.5 fish/h (Fig. 2).

Bailey Bridge, like Deer Point Dam, was a favored platform for spotted seatrout anglers, particularly in late summer through early winter. Of the fishes that were caught, 37.1% consisted of this species. Pinfish, sea catfish, and throwbacks comprised 36.6% of the catch.

### Hathaway Bridge

The old Hathaway Bridge with its removed center span serves as two public fishing piers. Located alongside U.S. Route 98, it is easily found by visiting anglers. The majority of the interviewed anglers were thought to be visitors to this area.

The catch by both resident and nonresident anglers consisted of 27 species of fishes (Table 6). The number of interviewed anglers was the highest and the average catch rate the lowest of the surveyed platforms. On that platform, 436 interviewed anglers fished 757.0 h and averaged 0.9 fish/h during a 10-mo period, March through December (Table 9). Individual catch rates ranged from 0.0 to 10.2 fish/h.

Pinfish, sea catfish (usually discarded), and throwbacks accounted for 55.0% of the catch. The sand seatrout, one of the more popular fishes at the Hathaway Bridge, was available throughout most of the year and accounted for 12.6% of the total catch.

### West Jetty

The West Jetty, accessible through St. Andrew State Park and by boat, is used extensively by both resident and nonresident anglers. Located at the inlet to St. Andrew Bay, the jetty provides the angler with a platform to fish for estuarine and oceanic fishes simultaneously. The rocky jetty and strong current through the inlet is the nemesis of the inexperienced angler, particularly those that attempt to fish for bottom fish. For that kind of fishing, a heavy weight, which is frequently fouled in the rocks on retrieval, is required. Many of the anglers who

Table 4.—Monthly catch of fishes by 236 interviewed anglers at Deer Point Dam, 1973. (No anglers were present at Deer Point Dam on survey days during January.)

Species	Month (number of anglers)											Sum	Percent
	F(10)	M(15)	A(28)	M(13)	J(32)	J(28)	A(21)	S(13)	O(20)	N(28)	D(28)		
Spotted seatrout		6	3		16	2		7	1	24	29	88	21.0
Pinfish			7	8	14				31	19	8	87	20.7
Throwback*			1	8	3	25	22	2	6	5	6	78	18.6
Sea catfish			2	1	3	26	9		13			54	12.8
Bluegill			27									27	6.4
Silver perch			11	3	6						1	21	5.0
Spot			11	2	5							18	4.3
Blue runner				1	9							10	2.4
Atlantic croaker			2	2	2	2				1		9	2.2
Crevalle jack									2		5	7	1.7
Pigfish				1					2	1		4	1.0
Black drum					2	1						3	0.7
Gray snapper									1	1	1	3	0.7
Red drum	1									1		2	0.5
Leatherjacket				1	1							2	0.5
Sheepshead		1										1	0.2
Redear sunfish			1									1	0.2
Gafftopsail catfish									1			1	0.2
Sand seatrout											1	1	0.2
Needlefish*									1			1	0.2
Moray*									1			1	0.2
Total	1	7	65	27	61	56	31	9	59	52	51	419	99.9

\*Species unknown.

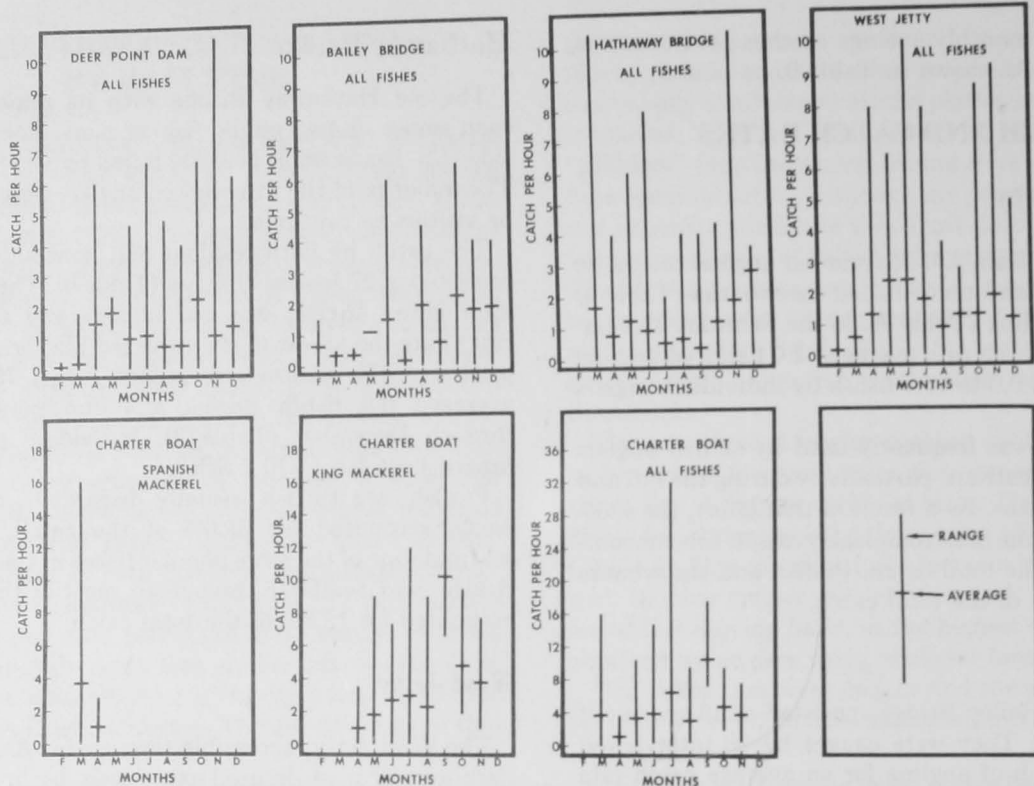


Figure 2.—Monthly range and average catch per hour of fishes by anglers on fixed platforms and charter boats in St. Andrew Bay system, Fla., and adjacent coastal waters, 1973.

were questioned about their fishing activity were not included in this survey, because most of their effort was spent replacing terminal tackle lost in the rocks.

The largest number (31) of species of food and game fishes that were caught from all platforms was available at the jetty (Table 7). The highest average catch rate from all platforms was also at the jetty. In the period February-December, an average catch rate of 1.3 fish/h was achieved by 419 fishermen in 748.0 h of angling (Table 9). The average catch rate for individuals ranged from 0.0 to 10.0 fish/h (Fig. 2).

### Charter Boats

Charter boat anglers used similar tackle, baits, and fishing methods. Most trolled four lines, two weighted and two unweighted, irrespective of the number of anglers onboard. A 00-squid spoon or a similar spoon was commonly used for Spanish mackerel, and tandem rigs consisting of three 5/0-hooks baited with a whole round scad were standard for king mackerel. Because of the high degree of standardization, the catch and effort could be averaged (Ricker 1958) to derive meaningful indices of

Table 5.—Monthly catch of fishes by 99 interviewed anglers at Bailey Bridge, 1973. (No anglers were present at Bailey Bridge on survey days during January.)

Species	Month (number of anglers)											Sum	Percent
	F(7)	M(11)	A(4)	M(2)	J(8)	J(14)	A(14)	S(5)	O(6)	N(19)	D(9)		
Spotted seatrout	6						7	5	7	10	30	65	37.1
Throwback*					1		29		6	3		39	22.3
Pinfish			3	1						11		15	8.6
Sea catfish				1	1	2	5			1		10	5.7
Sheepshead		5	2							3		10	5.7
Black drum					9							9	5.1
Atlantic croaker								8	1			9	5.1
Silver perch				3	3			1				7	4.0
Sand seatrout										6		6	3.4
Pigfish					1							1	0.6
Gafftopsail catfish					1							1	0.6
Crevalle jack											1	1	0.6
Hammerhead*					1							1	0.6
Gulf toadfish									1			1	0.6
Total	6	5	5	5	17	2	41	5	23	35	31	175	110.0

\*Species unknown.

Table 6.—Monthly catch of fishes by 436 interviewed anglers at Hathaway Bridge, 1973. (No anglers were present on Hathaway Bridge on survey days during January and February.)

Species	Month (number of anglers)										Sum	Percent
	M(15)	A(30)	M(36)	J(29)	J(115)	A(85)	S(37)	O(53)	N(34)	D(2)		
Throwback*	24		27		50	40	2	7	8	1	157	22.8
Sea catfish	3		5	5	15	62	16	14		2	122	17.5
Pinfish	2	17		3	3	17		30	30		102	14.6
Sand seatrout	8		4	1	3		3	46	23		88	12.6
Blue runner			42	19	3		1	10	5		80	11.5
Atlantic spadefish				8		27					35	5.0
Sand perch								6	10		16	2.3
Pigfish								2	13		15	2.2
Spanish mackerel							1		11		12	1.7
Atlantic croaker	1		1		2		4	1			9	1.3
Spotted seatrout			9								9	1.3
Moray*		1			1			4	2		8	1.1
Crevalle jack									7		7	1.0
Silver perch				2					3		5	0.7
Gray triggerfish						1		4			5	0.7
Southern puffer								4	1		5	0.7
Gafftopsail catfish								2	1		3	0.4
Little tunny						1			2		3	0.4
Striped burrfish			1	1							2	0.3
Seabass*				2							2	0.3
Stingray*								2			2	0.3
Gray snapper								1			1	0.1
Planehead filefish								1			1	0.1
Horseye jack				1							1	0.1
Shark*						1					1	0.1
Gulf toadfish								1			1	0.1
Scrawled cowfish								1			1	0.1
Flounder*								1			1	0.1
Total	38	18	89	42	77	149	27	137	116	3	696	99.4

\*Species unknown.

the availability of Spanish and king mackerel to charter boat anglers.

Anglers on 125 charter boats caught 19 species of fishes (Table 8). The major fishing was devoted to king mackerel, and that fish comprised the greatest proportion of the catch (73.9%). Six species of fishes comprised 93.4% of the total catch. In addition to king mackerel, they were: dolphin (5.9%), Spanish mackerel (5.0%), little tunny (3.6%), blue runner (3.0%), and bluefish (2.0%). The greatest number of species of fishes was caught in May (12), June (11), and July (11). Only the Spanish mackerel was caught in March and the king mackerel in November.

The Spanish mackerel is usually among the first pelagic fishes to appear in local waters in the spring. In 1973, the first catch was on 16 March. During the period 16-30 March, the catch rates showed considerable variability among the boats. Catch rates of 0.0 to 16.0 fish/h were made by individual boats. The average for all boats was 3.7 fish/h (Fig. 2). Through the period 4-17 April the catches were less variable with ranges of 0.5 to 2.9 fish/h. The average for all boats was 1.1 fish/h, which suggests a 70% decline in available fish from the 16-30 March period.

The first catch of king mackerel in coastal waters off St. Andrew Bay was on 24 April and the last on 15 November. The dates more accurately reflect the beginning and the end of the fishing season rather than the ar-

rival and departure of the fish. An occasional report was received of a catch of king mackerel prior to 24 April and after 15 November. Unfavorable weather and sea conditions often limit charter boat fishing trips into coastal waters in early spring and winter. The reluctance of charter boatmen to pursue a particular fish for their clients unless reasonably assured of the availability of fish is also an important factor. In season, 21% of the surveyed charter boats failed to catch a king mackerel in May, 4% failed in June, 14% failed in July, and 13% failed in August; none failed to catch one or more in late April, September, October, and early November.

According to the catch rate data, king mackerel increased in availability from an average of 1.0 fish caught per hour trolling in late April to 10.2 fish/h through September (Fig. 2). In September, the average catch rate for individual boats ranged from 7.1 to 17.5 fish/h. From the September high the catch rate declined rapidly to an average of 4.8 in October and to 3.8 in early November. The charter boat fishing season ended by mid-November because of cold weather, rough sea, and lack of clients.

## DISCUSSION

On-site interviews are acknowledged as being the most reliable method of obtaining angler's catch and catch rates. Bias due to recall, vanity, and other reasons are

Table 7.—Monthly catch of fishes by 419 interviewed anglers at West Jetty, 1973. (No anglers were present at West Jetty on survey days during January.)

Species	Month (number of anglers)											Sum	Percent
	F(24)	M(22)	A(44)	M(25)	J(36)	J(53)	A(44)	S(29)	O(85)	N(44)	D(13)		
Throwback*			67	76	29	99	22	14	47	10		364	36.8
Crevale jack					1			1	33	91	3	129	13.1
Pinfish			4	1	7	14	28	4	32	5		95	9.6
Flounder*			1	1				3	25	20	8	58	5.9
Blue runner				13	21	13	6		1			54	5.5
Atlantic croaker									48	4		52	5.3
Tomtate		8							19	7	5	39	4.0
Sea catfish			15			1	6	1		1		24	2.4
Inshore lizardfish										4	18	22	2.2
Little tunny			1		16	1						18	1.8
Spanish mackerel	1		2		1			3		10		17	1.7
Mullet*									16			16	1.6
Gray snapper						1			2	8	2	13	1.3
Pigfish			1	3		2			4	2	1	13	1.3
Sheepshead	6	6	1									13	1.3
Spot							10					10	1.0
Gag grouper		1	6				2					9	0.9
Florida pompano			4	3								7	0.7
Bluefish	1			2				2			1	6	0.6
Sea robin*											4	4	0.4
Stingray*			2						2			4	0.4
Gray triggerfish			1						2			3	0.3
Vermilion snapper			1			2						3	0.3
Leatherjacket				3								3	0.3
Black drum		1		1								2	0.2
Spotted seatrout			1	1								2	0.2
Parrotfish*					1					1		2	0.2
Needlefish*								1			1	2	0.2
Shark*			1									1	0.1
Atlantic spadefish				1								1	0.1
Striped burrfish				1								1	0.1
Seabass*					1							1	0.1
Total	8	16	108	106	77	133	74	28	232	163	43	988	99.9

\*Species unknown.

Table 8.—Monthly catch of fishes by anglers on 125 charter boats, 1973. (No charter boats fished on survey days during January, February, and December.)

Species	Month (number of charter boats)									Sum	Percent
	M(6)	A(13)	M(14)	J(24)	J(14)	A(31)	S(7)	O(12)	N(4)		
King mackerel		25	79	235	172	299	258	266	9	1,343	73.9
Dolphin			56	36	3	12	1			108	5.9
Spanish mackerel	61	26	4		1					92	5.0
Little tunny			5	13	6	36	4	1		65	3.6
Blue runner			8	43	1	3				55	3.0
Bluefish					38					38	2.0
Amberjack*			27			7				34	1.8
Gray triggerfish				12		14	1	4		31	1.7
Ladyfish						9				9	0.5
Cobia		1	1	4			2			8	0.4
Great barracuda			3	1		3				7	0.4
Gag grouper			4	3						7	0.4
Crevale jack		3	1	1			1			6	0.3
Shark*			3		2					5	0.3
Red drum					3					3	0.2
Wahoo			1							1	<0.1
Sailfish				1						1	<0.1
Sand perch				1						1	<0.1
Sea catfish					1					1	<0.1
Inshore lizardfish					1					1	<0.1
Atlantic cutlassfish					1					1	<0.1
Total	61	55	192	350	229	383	267	271	9	1,817	100.0

\*Species unknown.



Table 9.—Monthly average catch per hour (c/h) of fishes by interviewed anglers on fixed platforms in St. Andrew Bay system, Fla., 1973. (No anglers were observed on fixed platforms in January or on Hathaway Bridge in February.)

Month	Deer Point Dam			Bailey Bridge			Hathaway Bridge			West Jetty		
	No. of anglers	Hours fishes	Average c/h	No. of anglers	Hours fished	Average c/h	No. of anglers	Hours fished	Average c/h	No. of anglers	Hours fished	Average c/h
Feb.	10	13.25	0.08	7	8.50	0.71	—	—	—	24	48.50	0.16
Mar.	15	27.25	0.26	11	15.25	0.33	15	22.00	1.73	22	28.75	0.56
Apr.	28	57.75	1.12	4	15.50	0.32	30	26.75	0.67	44	83.50	1.29
May	13	16.50	1.64	2	4.50	1.11	36	73.75	1.21	25	45.00	2.36
June	32	58.50	1.04	8	12.25	1.39	29	48.00	0.88	36	65.25	1.18
July	28	50.75	1.10	14	14.25	0.14	115	133.00	0.58	53	74.75	1.78
Aug.	21	44.00	0.70	14	21.75	1.89	85	203.00	0.73	44	79.75	0.93
Sept.	13	12.75	0.71	5	7.25	0.69	37	71.00	0.38	29	21.75	1.29
Oct.	20	34.50	1.71	6	10.50	2.19	53	112.25	1.22	85	181.25	1.28
Nov.	28	46.50	1.12	19	20.50	1.71	34	64.50	1.80	44	84.25	1.93
Dec.	28	39.25	1.30	9	17.25	1.80	2	1.75	1.71	13	35.25	1.22
Total	236	401.00		99	147.50		436	756.00		419	748.00	
Average			1.04			1.19			0.92			1.32

minimized. Such data may or may not provide an accurate measure of the availability of fishes, however. Several factors affect angling success. Among those are the species that are sought, fishing location, bait (method), and angling effort.

In 2,053.5 h of angling from fixed platforms in the St. Andrew Bay system, at least 55 species of fishes were caught by the interviewed anglers. Other food or game fish known to occur in the system were not caught. The tarpon (*Megalops atlantica*), red snapper (*Lutjanus campechanus*), and snook (*Centropomus* sp.) are examples. Those fishes are not believed to be abundant, but an occasional catch would be expected. Perhaps, more importantly, none of the interviewed anglers were aware of their presence or directed their efforts specifically for them.

The caught fishes were not distributed equally throughout the study area, judging from the percentage composition and number of species landed from each platform. The spotted seatrout appeared to be available in greater number at Deer Point Dam than at the other locations. The percentage of the total catch was 21.0% at Deer Point Dam, 0.2% at West Jetty, and 0.0% in coastal waters. In contrast, the crevalle jack comprised 0.3% of the catch in coastal waters, 13.1% at West Jetty, and 1.6% at Deer Point Dam. All dolphin, amberjack, great barracuda, wahoo, and Atlantic cutlassfish were caught in coastal waters, and all tomate and gray and vermilion snappers were caught at the West Jetty.

The catch rates also differed by bait type. The highest average catch rate achieved by all anglers on fixed platforms for all months was with dead squid (1.4 fish/h), closely followed by live bait fish (1.2 fish/h), live shrimp (1.1 fish/h), and dead shrimp (1.1 fish/h). The average catch rate with cut fish and fiddler crabs was 51% and 39%, respectively, of that achieved with dead squid.

According to the data on bait preference, significantly higher catch rates could have been obtained by using the bait preferred by available fishes. The highest average catch rate for spotted seatrout, for example, was 0.7

fish/h with live shrimp. That rate was 3.6 times greater than with lures and 17.8 times greater than with dead shrimp. The highest average catch rate for crevalle jacks was with lures. That rate, 0.4 fish/h, was 10.2 times greater than with squid, the next most effective bait.

It seems apparent that the catch and catch rates obtained by this creel census are of limited value for indexing the availability of fishes to anglers on fixed platforms. The data do provide a general measure of species availability and angling success by a diverse group of anglers that probably constitute the majority of all anglers. The catch rates of Spanish and king mackerels by charter boat anglers, however, are viewed as reliable measures of their availability and relative abundance. The reliability resulted from the selection of a sample of anglers having considerable experience angling for those fishes. The captains and mates on those boats are, of course, professional anglers; their fishing methods are similar and their effort competitive.

## ACKNOWLEDGMENTS

I thank F. A. Kalber, G. R. Huntsman, and J. B. Higman for reviewing this manuscript.

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