

Attitudes, Practices, and Preferences of Licensed Fresh Water Anglers in Florida

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Abstract: The Florida Game and Fresh Water Fish Commission conducted a telephone survey of 602 licensed resident fresh water anglers to assess the effectiveness of agency programs and delineate future direction. Over 70% of license holders were primarily largemouth bass fishermen. Licensed anglers have a higher socioeconomic status than the general public. At least 60% of licensed bass anglers support restrictive regulations to improve bass fishing. Presented with 6 major fisheries programs, more licensed anglers felt lake restoration and largemouth bass management (37% and 22%, respectively) should receive primary emphasis. Of 10 fisheries research or management initiatives, only 2 were known to 50% or more of licensed anglers. Thirty percent of licensed anglers felt television and newspapers should be used more often to communicate fisheries information, and 18% felt more brochures should be used.

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Florida has undergone dramatic demographic changes in the last 10 years. Total population increased from 8.7 million in 1977 to 11.6 million in 1986 (Fla. Estimates of Population 1978, 1987). From 1980 to 1985, an average of 745 people moved to Florida each day (Fla. Estimates of Population 1986). About half the total migration in these 5 years was concentrated in the Miami-Fort Lauderdale-West Palm Beach, Tampa-Saint Petersburg, and Orlando metropolitan areas (9 of Florida's 67 counties).

The influx has increased pressure on fishery resources. Accelerated eutrophication has followed urban sprawl, and conflicts over agricultural, municipal, and recreational use of water supplies have resulted. As Florida becomes an increasingly

urban state, the demands of the angling public, urban and rural, are likely to change.

Concomitant with the population increase, the issue of protective fishing regulations has arisen, particularly for largemouth bass. Because of the magnitude and quality of Florida's fresh water aquatic resources (over 2 million acres of lakes, rivers, wetlands), the Florida Game and Fresh Water Fish Commission (FGFWFC) has been cautious in instituting restrictions on angler harvest; however, human population projections indicate greatly increased demand for fishing. It is important to gauge public sentiment toward protective regulations to focus future research and management efforts.

FGFWFC last conducted a statewide angler survey in 1977 (King et al. 1978). The changing demographics and their effects on fishing in the state mandated an updated study of the attitudes, practices, and perceptions of Florida anglers. Therefore, a similarly designed telephone survey of 1985-86 licensed anglers was conducted for FGFWFC by the Communication Research Center (CRC) of The Florida State University.

Our objectives were to (1) profile fishing habits, attitudes, perceptions, and socioeconomic status of Florida anglers; (2) document attitudes of largemouth bass anglers toward protective regulations; and (3) assess the level of awareness of FGFWFC programs and identify more effective methods of communication. This study was funded by the Federal Aid in Fish Restoration Project, Florida, F-30.

Methods

The state was divided into 3 areas based on the prevalent types of water bodies and fishing (Fig. 1). The panhandle and northern peninsula (Region I) is characterized by rivers, streams, and farm ponds. Central Florida (Region II) features natural lakes either within river systems, perched basin or of sinkhole origin. The southern part of the peninsula (Region III) is dominated by Lake Okeechobee, the Everglades, and numerous flood control canals.

In each region, counties were classified into 3 quantiles (small, medium, large) nearly equal in number based on total resident license sales for the 1985-86 fiscal year (Jul 1, 1985-Jun 30, 1986). Two counties from each size category were randomly selected from each region.

Survey responses follow a binomial distribution. The variance of any binomially distributed variable is greatest when half the respondents choose 1 answer $P = .5$. Using this worst case scenario, a sample size was chosen ($N = 600$) to yield results with a 95% confidence interval of no more than $\pm 4\%$ on a statewide basis. The sample was allocated proportionally by region and county. The number of licenses sampled from each county was proportional to its share of statewide license sales. Each county's allocation was divided proportionally among the 3 types of fishing licenses (annual fishing, 12 months fishing from date of purchase, fishing-hunting combination). To account for non-response and unlisted phone



Figure 1. Divisions of Florida for licensed angler attitude survey.

numbers, a minimum of 150% of the desired sample size was selected for each county based on experience with response in other surveys. For smaller counties, sample size was tripled.

Total numbers of each license type sold were obtained for each county. From this sequence, a series of N random numbers was drawn. The N_1, N_2, N_3, \dots licenses were drawn from copies filed at the county tax collector's office. The name, address, city, state, and zip code were transcribed from each license copy. Licenses were discarded only if they were totally illegible. A total of 965 names were collected for the first sample.

Initial attempts to locate phone numbers from directories revealed fewer than 50% were listed. To obtain numbers and to increase participation, a letter from the FGFWFC was sent to each licensee explaining the purpose of the survey. A prepaid postcard was included for each angler to verify his/her name and address and provide a phone number and the best time to call.

About 375 of the 965 people returned postcards following the original mailing. A follow-up letter and postcard to non-respondents prompted approximately 80 additional returns. Because the CRC still had received only 455 phone numbers, an additional sample of 641 license holders was drawn from those counties with incomplete samples. Two mailings for this sample resulted in 206 additional returns.

A preliminary questionnaire was developed by FGFWFC biologists and refined by the CRC. Appropriate questions used in the 1977 survey were repeated. Pretesting in October 1986 indicated the form and length of the questionnaire were satisfactory. Data were collected from November 1986 through February 1987 using trained interviewers and phone facilities at the CRC. There were 57 questions, and the survey required 12 to 15 minutes to complete. At least 5 attempts were made to contact each license holder. Data were compiled, verified, and summarized by the CRC.

Results and Discussion

A total of 602 anglers were interviewed. The return rate was 47% for the first sample and 32% for the second. This is considerably less than the 70% observed by Gotie et al. (1984) in a telephone survey of New York hunters and trappers. Of the anglers who returned cards, 91% were successfully contacted and interviewed. This completion rate was comparable to the N.Y. results. Although regional results are presented, their confidence intervals are greater than $\pm 4\%$ making statistical inference tenuous at best. Confidence intervals for questions directed to largemouth bass anglers were $\pm 5\%$ because there were 430 rather than 602 respondents.

The majority (71%) of licensed anglers described themselves as primarily largemouth bass fishermen (Table 1). This is the most significant single result from the survey. This segment of licensed anglers was much larger than the 28% reported in Kentucky (B. T. Kinman and R. D. Hoyt, unpubl. rep. 69, Kentucky Dep. Fish and Wildl. Resour. 1984) and 16% in Arkansas (K. L. Heller and T. Peterson, unpubl. rep., Ark. Game and Fish Comm. 1985). Ten percent of anglers were panfishermen (*Lepomis* spp.) with no other category greater than 6%.

The large percentage of largemouth bass anglers may be an artifact of the low response rate. Our sample may have overrepresented anglers avid enough about their sport to return the postcard and whose attitudes may differ from the remainder of the angling public. However, King et al. (1978) also found a majority of largemouth bass anglers among Florida fishermen licensed in 1976. J. Milon et al. (unpubl. rep., Univ. Fla., Gainesville 1986) observed similar results in a study of licensed anglers in North Central Florida. Florida exempts cane pole fishermen from license requirements in their county of residence and does somewhat bias our survey results. Cane poles are used extensively by panfishermen, and this exemption accounts in part for the preponderance of bass fishermen. Although the percentage may be somewhat inflated by differential response, we believe that most licensed anglers in Florida prefer to fish for largemouth bass.

Most anglers fished close to home: 64% drove <25 miles one way with 84% travelling <50 miles. The number of times fished in the last year varied uniformly with about as many anglers fishing <5 times as >50 times. Most anglers (74%) fished between 3 and 8 hours on a trip. Generally, habits of Florida anglers were similar to those in Kentucky (Kinman and Hoyt, unpubl. rep. 1984) and Arkansas (Heller and Peterson, unpubl. rep. 1985).

A large majority (84%) preferred to fish from a boat. This was true even in urbanized south Florida where there are a number of narrow canals. Sixty percent preferred lake fishing and 23% chose rivers and streams. In south Florida, 29% of the anglers fished in canals indicating their importance in providing urban fishing opportunities.

Most fishermen (68%) spent less than \$25 on a typical trip. The average trip cost was \$26.51¹ for all anglers and \$26.79 for largemouth bass anglers. The ques-

¹ Average calculated using the midpoint for all categories except "more then \$100" where \$100 was used.

Table 1. Fishing practices of licensed fresh water anglers in Florida. Numbers represent percent of anglers choosing each category (DK/NA = don't know/no answer).

	Statewide	Region		
		I	II	III
Preferred species:				
Largemouth bass	71	65	69	86
Panfish (<i>Lepomis spp.</i>)	10	21	7	4
Black crappie	6	3	8	5
Catfish	3	3	4	0
Striped bass	1		1	0
<i>Morone</i> hybrid	1	0	2	1
no preference	5	5	5	3
DK/NA	3	2	4	2
Number of miles traveled one way:				
<10	29	30	30	26
10-25	34	39	31	36
26-50	21	21	19	23
51-100	10	5	13	9
>100	5	5	6	4
DK/NA	1			2
Number of times fished in last year:				
<5	21	22	23	15
5-20	30	32	29	30
20-50	28	28	26	29
>50	21	18	22	26
Number of hours fished per trip:				
<2	13	10	17	9
3-5	46	49	45	46
5-8	28	30	26	36
>8	12	10	12	14
DK/NA	1	1	0	1
Prefer to fish in:				
Lake	60	32	65	57
Pond	5	9	3	5
River/creek	23	36	25	6
Reservoir	2	2	1	3
Canal	9	1	4	29
DK/NA	1		2	
Average cost per trip:^a				
<\$10	27	31	27	22
\$10-\$25	41	47	39	37
\$26-\$50	20	16	22	20
\$51-\$100	8	5	8	11
>\$100	5	1	4	10

^aCost includes bait, tackle, food, gas, and lodging.

tion did not address expenditures for durable goods such as boats, motors, rods, reels, tackle boxes, etc. No data are available on expenditures by unlicensed anglers, making an estimate of the total economic contribution of fresh water fishing precarious. However, expenses of licensed and unlicensed largemouth bass fishermen are probably comparable. Using the estimate of 22,952,500 trips by all Florida bass anglers (U.S. Dep. Int. 1982), bass fishing directly generated \$620 million to the Florida economy. Non-resident participation is included in the estimated number of trips, but we estimated expenses from residents only. Expenditures of out-of-state fishermen are likely to be greater. Accordingly, we consider this to be a conservative estimate of the value of bass fishing to the Florida economy.

Socioeconomically, licensed anglers are white (93%), male (82%) with a median age of 42. Sixty percent were not born in Florida. Income levels were widely distributed, but the largest percentage of anglers (50%) earned between \$25,000 and \$50,000 annually. Statewide, 33% of the population has an annual income <\$10,000 whereas only 6% of the licensed anglers earned <\$12,000 (Fla. Stat. Abstr. 1986). Only 4% of Floridians earned >\$50,000 compared to 15% of licensed fishermen. We did not survey educational level, but its positive correlation with income implies that licensed anglers are better educated than the general public. Heller and Peterson (unpubl. rep. 1985) observed similar results for education levels of Arkansas anglers.

Although largemouth bass fishing is considered more intensive than many types of angling, 80% of all anglers listed "fun and relaxation" as their primary reason for fishing (Table 2). This was the response most often given by Kentucky (Kinman and Hoyt, unpubl. rep. 1984) and Arkansas anglers (Heller and Peterson, unpubl. rep. 1985). Nearly half of Florida anglers generally perceive their trips to be successful.

Despite this perception of success, 52% of fishermen feel fishing has declined in the past 10 years. This is greater than in Kentucky and Arkansas where 44% and 33% of fishermen, respectively, felt fishing declined over the last 5 years (Kinman and Hoyt, unpubl. rep. 1984, Heller and Peterson, unpubl. rep. 1985). Pollution (38%) and too many fishermen (24%) were given most often as the reasons for the decline in Florida. In central Florida where eutrophication of large natural lakes is a common problem, 63% believe fishing has declined. By contrast, in northwest Florida where development has been limited, only 42% feel fishing is worse now than 10 years ago. Among those who feel fishing has improved, only in northwest Florida did a majority attribute this to improved fisheries management. Through the rest of the state, responses were more evenly distributed between fish management, law enforcement, environmental protection, and nature.

Bass fishermen prefer quality to quantity: 83% prefer to catch a reduced number of larger fish over a limit of smaller ones (Table 3). The majority of all fishermen (60%) support catch and release, corroborating results found in Kentucky (Kinman and Hoyt, unpubl. rep. 1984) and Arkansas (Heller and Peterson, unpubl. rep. 1985). Many bass fishermen want trophy fish, but there was no consensus as to

Table 2. Attitudes and perceptions of licensed fresh water anglers in Florida. Numbers represent percent of anglers choosing each category (DK/NA = don't know/no answer).

	Statewide	Region		
		I	II	III
Primary reason for fishing:				
Fun and relaxation	80	77	81	80
To be outdoors	7	7	6	8
Catch enough for a meal	8	10	8	7
Tournaments or competition	2	2	2	2
Catch a trophy to mount	2	4	2	2
DK/NA	1	1	2	1
Fishing trip is successful:				
Seldom	23	22	22	26
Occasionally	29	28	29	29
Often	23	25	22	21
Almost always	23	25	23	23
DK/NA	2	1	4	1
Over the last 10 years, fishing:				
Declined	52	39	59	53
Remained the same	26	28	25	27
Improved	15	26	10	15
DK/NA	7	7	7	6
Reasons for decline in fishing:				
Pollution	38	38	38	40
Too many fishermen	24	25	24	23
Vegetation problems	17	19	19	11
Lack of regulations	12	13	12	14
Inadequate law enforcement	7	6	7	8
DK/NA	2	0	0	4

Table 3. Attitudes and preferences of largemouth bass anglers in Florida. Numbers represent percent choosing each category.

	Percent
Restrictive regulations:	
Favor reduced bag limit	60
Favor trophy bass management	62
Would travel >50 miles to fish a trophy lake with bag limit of 1 fish over 6 lbs.	62
Knew there was no statewide minimum length	36
Would prefer to catch:	
6-10 1-pound bass	17
2-3 3-pound bass	50
1 bass >8 pounds	33
Which minimum length is most effective?:	
12 inches	32
14 inches	43
11 inches	17
18 inches	8
What is minimum trophy size?:	
>6 lbs.	10
>8 lbs.	30
>10 lbs.	42
>12 lbs.	18

trophy size which the fishermen defined as varying from 6 to 12 pounds. Bass clubs and organizations have called for minimum length limits to improve fishing; however, only 36% of bass anglers were aware that there is no statewide minimum length limit for bass. There was considerable disparity over which minimum size would be "most effective." A majority of bass fishermen (64%) were aware of the concept of slot limits in fisheries management.

These results should serve as a mandate to intensify research efforts into regulation management for enhancement of bass fishing. This survey supports earlier findings that keeping fish is not a foremost consideration by bass fishermen (Kinman and Hoyt, unpubl. rep. 1984, Heller and Peterson, unpubl. rep. 1985). The preferences of most Florida license holders justify research on other dimensions of largemouth bass management as well.

A large majority (79%) felt that FGFWFC should base its decisions on public opinion and scientific research, a marked increase from 43% in 1977. In that year, 37% felt that scientific research alone should be the basis for decisions compared to 16% of licensed anglers in 1986. There were no overwhelming mandates for FGFWFC to place more emphasis on any game fish, although increased research on and management of largemouth bass was supported by more anglers (53%) than other fresh water fish species (Table 4). Overall, 63% rated FGFWFC's performance as at least satisfactory, similar to the 65% rating from 1977. This varied from 74% in north Florida to 57% in south Florida.

Seventy percent of the fishermen were aware of the Division of Fisheries, up from 55% in 1977. However, most Division projects were not widely known: fewer than 50% of licensed anglers were aware of 8 of 10 major fisheries programs (Table 5). Although fish stocking has received less emphasis recently, it is the most widely known management program. In spite of the magnitude and publicity of lake draw-downs, only half the anglers were aware of such efforts. More fishermen (37%) felt this management tool should receive primary emphasis over other major fisheries programs (Table 6).

Outdoor magazines (32%) were the most commonly reported source of fishing information (Table 7). Despite using television infrequently, 30% of fishermen feel this medium along with newspapers (30%) and brochures (18%) should receive

Table 4. Emphasis licensed anglers feel FGFWFC should place on various sport fish. Numbers represent percent of anglers choosing each sport fish.

	More	About same	Less	DK/NA
Largemouth bass	53	37	6	4
Black crappie	29	55	8	8
Panfish (<i>Lepomis spp.</i>)	22	57	14	7
Striped bass	44	37	6	13
<i>Morone</i> hybrid	41	35	9	15
Peacock bass	26	26	9	39
Snook	47	25	8	20

Table 5. Awareness by licensed Florida anglers of Florida Game and Fresh Water Fish Commission Programs. Numbers represent percent of anglers choosing each program.

	Statewide	Region		
		I	II	III
Division of Fisheries	70	69	70	70
Fish Attractor Program	27	33	27	20
Lake Restoration with Drawdowns	50	52	51	46
Urban Pond Program	18	22	19	13
Boat Ramp Construction	29	33	29	25
Fish Stocking	56	57	56	55
Aquaculture Technical Assistance	19	16	21	17
Commercial Fisheries Investigation	47	45	46	51
Experimental Protective Regulations	30	33	29	28
Peacock Bass Introduction	16	10	18	20
Triploid Grass Carp	39	38	42	33

Table 6. Programs licensed fresh water anglers in Florida feel should receive primary emphasis from the Florida Game and Fresh Water Fish Commission. Numbers represent percent of anglers choosing each program.

	Statewide	Region		
		I	II	III
Public access and fish attractors	14	13	17	9
Habitat management using lake drawdowns	37	41	35	36
Largemouth bass management	22	16	21	30
Panfish management (<i>Lepomis spp.</i>)	4	5	4	4
Management of <i>Morone spp.</i>	4	5	4	2
Introduction of new species of fish	9	8	9	9

Table 7. Principal sources of fishing information for licensed fresh water anglers in Florida. Numbers represent percent of anglers choosing each information source.

	Statewide	Region		
		I	II	III
Newspaper	15	19	11	21
Radio	1		1	1
Television	5	10	4	1
Outdoor Magazines	32	28	32	38
FGFWFC Pamphlets	3	3	5	1
Fishing Clubs/Friends	28	24	30	23
Other	15	15	16	12
No Answer	2	2	2	2

Table 8. Information sources licensed fresh water anglers in Florida feel the Florida Game and Fresh Water Fish Commission should use more. Numbers represent percent of anglers choosing each information source (DK/NA = don't know/no answer).

	Statewide	Region		
		I	II	III
Brochures	18	22	16	18
Newspapers	30	32	29	30
Local radio	3	3	4	1
Television	30	27	31	31
Slide shows	6	4	8	7
Movies	7	11	5	7
Other	4	1	5	3
DK/NA	3	2	3	3

more emphasis as an information source from FGFWFC (Table 8). Most fishermen enjoy FGFWFC information and would like more. In view of the specialized interests and socioeconomic standing of license holders, FGFWFC should disseminate more technical information through television and quality brochures.

The habits and preferences of the large number of unlicensed fishermen are unknown. Efforts should be undertaken to assess this segment of the fishing public and its potential impact on Florida resources. While the unlicensed fishermen should not be ignored, license fees provide financial support for Florida fisheries projects, and the needs of the license holder must remain foremost.

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