Demographic and Social Characteristics and Management Preferences of Texas Freshwater Catfish Anglers

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Abstract: Results from statewide angler surveys conducted during 1987 through 1990 were combined to examine demographic and social characteristics and management preferences of Texas freshwater catfish anglers. Catfish anglers were grouped by their first-choice responses when asked to "Name the fish you most prefer to catch in fresh water in Texas." Anglers for blue catfish (*Ictalurus furcatus*), channel catfish (*I. punctatus*), and flathead catfish (*Pylodictus olivaris*), and those who provided a generic response "catfish" differed significantly ($P < 0.05$) in age, gender, self-rated skill, years of fishing experience, and frequency of fishing in the previous 12 months. Relative (rank) order of support for 6 regulations was similar among catfish angler groups; however, anglers for channel catfish and "catfish" indicated the greatest support for each regulation, whereas anglers for flathead catfish and blue catfish generally indicated the least support.

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Fishery managers increasingly are aware of the need to provide opportunities for anglers with diverse orientations toward recreational fishing. Toward this end, many management agencies conduct statewide surveys to determine angler attitudes, motivations, and preferences regarding fishing (e.g., McFadden et al. 1964, Hardin et al. 1987, Miranda and Frese 1987, Ditton et al. 1991); however, results from such surveys usually present only profiles of the "average" angler. These profiles are of limited use because they are difficult to apply to specific fisheries or issues and, to paraphrase Shafer (1969), there is no such thing as the average angler.

Several typologies have been constructed that categorize anglers according to social characteristics such as frequency of participation, gear and activity-setting preferences, and orientation toward catching fish (Bryan 1977, Ditton et al. 1992, Fedler and Ditton 1986, Holland and Ditton 1992). These typologies can be used to define and understand the behaviors, attitudes, and opinions of various angler groups

independently of the fisheries in which they participate. However, managers are more frequently interested in differences among anglers within a specific fishery or for a certain species. One possible way to obtain fishery- or species-specific information is to group anglers according to their species preferences (Wilde and Ditton 1991).

Catfishes are among the most popular and actively sought sport fishes in the United States; 36% of anglers nationwide and 58% of Texas anglers fish for various catfishes (U.S. Dep. Int., Fish and Wildl. Serv. 1988, 1989). Despite the popularity of catfish angling, only 1 previous study (Gill 1980), based on interviews with 28 anglers, has described social characteristics and opinions of catfish anglers. In this paper we use first-choice species preferences from statewide angler surveys to group catfish anglers into species-specific groups to: 1) describe differences in social and demographic characteristics, management preferences, and consumptive orientations among different Texas catfish angler groups; and 2) demonstrate the usefulness of anglers' species preferences as a means of exploring diversity among anglers. We also provide a possible explanation for group differences based on the concept of recreation specialization (Bryan 1977, 1979; Ditton et al. 1992).

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Methods

Data were collected from statewide angler opinion surveys conducted during 1987 through 1990 (Ditton et al. 1991, Ditton et al. 1994, Hunt et al. 1994). General fishing license sales receipts were used as the sampling frame. In 1987 and 1988, systematic random samples of 10,657 and 4,111 anglers, respectively, received a 23-question, self-administered mail questionnaire about their freshwater fishing activity. In 1989 and 1990, the surveys included questions regarding both saltwater and freshwater fishing; 5 questions were added to accommodate the increased scope of the surveys. Sampling was stratified in 1989 and 1990 so approximately 48% of the questionnaires were distributed to counties adjacent to the Gulf coast; sampling was at random within strata. Total numbers of questionnaires distributed in these years were 10,001 and 9,981, respectively. Response rates ranged from 62.0% to 66.4% throughout the study period. Freshwater anglers were defined as those respondents who reported spending $\geq$1 days fishing in fresh water in the previous 12 months and had $\geq$1 years of freshwater fishing experience. Other respondents were removed from the analysis. Copies of the questionnaires are included in Ditton et al. (1991), Ditton et al. (1994), and Hunt et al. (1994).

Anglers were asked to give first-, second-, and third-choice responses to the

statement, "Name the fish you most prefer to catch in fresh water in Texas." We used first-choice responses as a proxy for anglers' species preferences (Wilde and Ditton 1991). Among all respondents, 14% gave responses that were classifiable as flathead catfish, blue catfish, or channel catfish; responses such as "catfish," "bullhead," and those otherwise not confidently assignable to any 1 catfish species were grouped into a generic category of "catfish" anglers. Henceforth, we refer to subgroups of respondents as flathead catfish anglers, blue catfish anglers, channel catfish anglers, and "catfish" anglers, respectively.

Questionnaires included a series of questions which sought information on angler participation in freshwater fishing. First, anglers were asked to provide the number of days spent fishing in fresh water in the previous 12 months and number of years of experience fishing in fresh water. Second, anglers were asked whether they belonged to a fishing club, participated in freshwater fishing tournaments, and whether they, or someone in their household, owned a motor boat. Third, anglers were asked to rate their skill compared with that of other freshwater anglers on a 3-point scale (1—less skilled, 2—equally skilled, 3—more skilled).

Overall orientation toward catching fish was investigated with a 5-point Likert-type scale (1—strongly disagree, 2—disagree, 3—neutral, 4—agree, 5—strongly agree) developed by Graefe (1980) to understand 4 sub-dimensions of catch: number of fish caught, species and size of fish caught, disposition of catch, and general orientation toward catching "something." We used 5 statements that dealt with consumption and disposition of fish caught (I usually eat the fish I catch, I want to keep all the fish I catch, I'm just as happy if I don't keep the fish I catch, I catch fish for sport and pleasure rather than food, and I'm just as happy if I release the fish I catch) to construct an index to assess differences among catfish angler groups in their consumptive orientation because previous studies (Gill 1980, Hudgins 1984) indicate catfish anglers generally place greater importance on eating fish than do anglers for other species. We reversed scores for the last 3 statements so greater scores for all statements would denote greater propensity to keep and eat fish caught; we then summed scores across all 5 statements. Scores ranged from 5 to 25; we divided these into 5 levels of increasing consumptive orientation (5 to 8 = very low, 9 to 12 = low, 13 to 17 = moderate, 18 to 21 = high, 22 to 25 = very high). Our index is similar to that of Fedler and Ditton (1986); however, their use of "consumptive orientation" encompasses all catch related (as opposed to appreciative) aspects of fishing, whereas ours is narrower and focuses on anglers' orientations toward the actual consumption of fish.

Angler support for 14 regulations and programs used to manage freshwater fisheries was measured on a 5-point balanced Likert-type scale (1—strongly oppose, 2—oppose, 3—neutral, 4—support, 5—strongly support). Herein, we present results for 6 regulations commonly used to manage freshwater fisheries. Three of these regulations (minimum length limits, creel limits, and prohibitions on certain fishing gears) are in current use in Texas; questions regarding the remaining 3 regulations are asked in a more hypothetical context.

We used analysis of variance to test for differences among catfish angler

groups in age, income, years fishing in fresh water, and number of days fishing in ponds, lakes, rivers, and total fresh water; least significant differences (LSD) were used to assess pairwise differences among groups. Differences among angler groups in gender, boat ownership, participation in fishing tournaments, and membership in fishing clubs were assessed with Pearson's X^2 statistic. We used multinomial response models (Agresti 1990) to test for differences among angler groups in their support for regulations, self-rated skill level, and in consumptive orientation. When we found significant ($P < 0.05$) heterogeneity, all pairwise combinations were contrasted to determine which were different. All statistical analyses were performed with SAS (SAS Inst. Inc. 1985).

Results

Catfish angler groups differed significantly ($P < 0.05$) in several demographic and social characteristics (Table 1). Channel catfish anglers were the oldest and most experienced anglers, followed by flathead catfish, "catfish," and blue catfish anglers. All angler groups were predominantly male, but "catfish" anglers included the greatest proportion (26%) of female anglers. Flathead catfish anglers rated themselves as the most skilled, anglers for blue catfish and channel catfish were intermediate in self-rated skill, and "catfish" anglers rated their skill lowest. Flathead catfish and blue catfish anglers fished the greatest number of days in the previous 12 months; number of days fishing was considerably less for channel catfish anglers and

Table 1. Demographic and social characteristics of Texas freshwater catfish anglers, 1987–1990. Catfish angler groups with different upper case superscripts are significantly ($P < 0.05$) different.

	Anglers' preferred species			
	Blue catfish $N = 60$	Channel catfish $N = 274$	Flathead catfish $N = 133$	"Catfish" $N = 2,987$
Age (years)	36.9^{C}	44.8^{A}	41.6^{AB}	39.8^{BC}
Experience (years)	24.6^{B}	32.7^{A}	30.4^{A}	25.4^{B}
Gender (% males)	83.3^{AB}	85.3^{A}	87.9^{A}	73.9^{B}
Income ($ × 1,000)	26.4	28.2	28.1	30.5
Self-rated skill	1.9^{A}	1.8^{B}	2.1^{A}	1.6^{C}
Total freshwater fishing (days)	39.6^{AB}	31.9^{BC}	41.9^{A}	26.5^{C}
Days fishing in:				
Ponds[1]	9.0	8.5	6.0	5.8
Lakes[1]	21.6	18.9	18.3	14.9
Rivers[1]	15.9^{A}	9.1^{B}	22.1^{A}	9.0^{B}
Boat owners (%)	52.7^{AB}	50.9^{B}	65.7^{A}	49.7^{B}
Tournament anglers (%)	1.8	4.5	3.8	4.5
Fishing club members (%)	2.0	3.1	1.5	2.3

[1] Includes only those anglers who reported fishing in these waters; in principle, days fishing in ponds, lakes, and rivers should sum to total days of freshwater fishing but do not because of partial non-responses.

"catfish" anglers. Blue catfish, channel catfish, and "catfish" anglers fished primarily in lakes, whereas anglers for flathead catfish fished most frequently in rivers and streams. Flathead catfish anglers were more likely to own boats than were other catfish anglers. There were no differences among angler groups in tournament participation or membership in fishing clubs; <5% of anglers for all catfish species fished in tournaments or belonged to fishing clubs.

Catfish angler groups differed significantly ($P < 0.05$) in their support for 5 of the 6 regulations listed in Table 2. In general, channel catfish anglers indicated the greatest support for regulations, whereas flathead catfish anglers indicated the least support. Although the level of support for each regulation varied among angler groups, all groups indicated the greatest support for minimum length limits (75% to 83%) and daily creel limits (57% to 72%). Prohibiting certain sport fishing gear, closing certain areas to fishing, and closed seasons had less support and a greater proportion of neutral responses; 32% to 54% of anglers supported and an additional 19% to 32% were neutral in their support for these regulations. More anglers opposed than supported a prohibition on the use of certain baits; 25% to 31% of anglers supported this regulation, whereas 34% to 50% were opposed.

Frequency distributions of consumptive-index scores for all catfish angler groups were shifted toward the high end of the scale (Table 3), but there were significant differences ($P = 0.0038$) among groups. Flathead catfish and blue catfish angler groups had the greatest proportions of anglers with high or very high consumptive orientations, whereas the channel catfish and "catfish" angler groups included proportionally fewer anglers with high or very high consumptive orientations. Fewer than 30% of anglers in any catfish angler group were low or very low in their consumptive orientation.

Discussion

Our results show considerable diversity among catfish angler groups in several managerially important characteristics including their frequency of fishing, where they fish, their support and preferences for different regulations, and their consumptive orientation. Previous studies (Duttweiler 1976, Smith 1980, Graefe 1981, Ditton 1985) have shown little diversity among anglers for different species in social and demographic characteristics for at least 3 reasons: anglers may fish for more than 1 species, they often fish for no particular species, and there may be no correspondence between anglers' preferred species and those for which they actually fish. Although these limitations must be acknowledged, our results and those of Wilde and Ditton (1991) show anglers' species preferences can be used to detect meaningful differences among anglers for different species in demographic and social characteristics and in management preferences, and provide a natural framework for incorporating angler opinion into fishery management programs.

The sub-group of Texas freshwater anglers who indicated catfish (all species combined) was their preferred species fished an average of 27.8 days in 1987 (Ditton et al. 1991). Catfish angler groups in our study (1987–90) fished from 26.5 to 41.9

Table 2. Proportions (%) and sample sizes (N) of Texas freshwater catfish anglers indicating various levels of opposition to, or support for, regulations used to manage freshwater fisheries and mean levels of support. Regulations are listed, from top to bottom, in order of descending overall support. Angler groups with different upper case superscripts are significantly ($P < 0.05$) different.

Anglers' Preferred Species	N	Strongly oppose	Oppose	Neutral	Support	Strongly support	Mean support
			Minimum length limits				
Blue catfish^{A}	53	5.7	5.7	13.2	41.5	34.0	3.9
Channel catfish^{A}	266	1.9	5.3	9.4	41.3	42.1	4.2
Flathead catfish^{A}	131	7.6	5.3	12.2	32.8	42.0	4.0
"Catfish"^{A}	2,736	3.4	4.7	14.0	40.5	37.4	4.0
			Daily creel limits				
Blue catfish^{AB}	53	9.4	5.7	15.1	41.5	28.3	3.7
Channel catfish^{A}	263	5.3	11.0	11.0	38.8	33.8	3.8
Flathead catfish^{B}	130	10.8	14.6	17.7	31.5	25.4	3.5
"Catfish"^{B}	2,723	7.7	12.6	14.2	41.1	24.4	3.6
			Prohibiting the use of certain sport fishing gear				
Blue catfish^{AB}	53	7.6	13.2	30.2	28.3	20.8	3.4
Channel catfish^{B}	262	6.5	11.8	27.9	30.2	23.7	3.5
Flathead catfish^{A}	130	12.3	20.0	26.9	24.6	16.2	3.1
"Catfish"^{B}	2,700	6.6	11.6	29.6	32.2	20.0	3.5
			Close certain areas to fishing				
Blue catfish^{AB}	53	13.2	13.2	32.1	28.3	13.1	3.2
Channel catfish^{B}	263	11.4	13.3	22.8	31.9	20.5	3.4
Flathead catfish^{A}	131	19.9	16.0	22.9	28.2	13.0	3.0
"Catfish"^{B}	2,711	9.9	13.1	26.0	34.6	16.4	3.3
			Closed seasons				
Blue catfish^{AB}	53	18.9	22.6	18.9	30.2	9.4	2.9
Channel catfish^{B}	263	13.7	19.0	22.1	28.9	16.3	3.2
Flathead catfish^{A}	130	22.3	20.0	25.4	17.7	14.6	2.8
"Catfish"^{B}	2,710	11.9	18.3	27.2	30.6	12.1	3.1
			Prohibiting the use of certain baits				
Blue catfish^{AB}	53	13.2	20.8	35.9	18.9	11.3	2.9
Channel catfish^{AB}	263	13.7	26.6	30.4	20.2	9.1	2.8
Flathead catfish^{A}	127	21.3	29.1	24.4	14.2	11.0	2.6
"Catfish"^{B}	2,701	11.7	22.7	34.1	21.5	10.0	3.0

Table 3. Consumptive orientations of Texas freshwater catfish anglers, 1987–1990. Included are sample sizes (*N*), proportions (%) of anglers with different orientations and mean scores for each angler group. Angler groups with different upper case superscripts are significantly ($P < 0.05$) different.

Anglers' preferred species	Consumptive Orientation						
	N	Very low	Low	Moderate	High	Very high	Mean
Blue catfish[AB]	60	15.0	8.3	38.3	25.0	13.4	15.6
Channel catfish[B]	274	14.6	11.3	43.1	26.3	4.7	14.8
Flathead catfish[A]	133	8.3	9.0	40.6	32.3	9.8	16.2
"Catfish"[B]	2,987	17.9	10.9	38.2	25.3	7.6	14.8

days per year with an overall mean of 27.7 days, weighted by sample sizes. Ditton et al. (1991) and our estimates are considerably higher than those presented in the 1985 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (U.S. Dep. Int., Fish and Wildl. Serv. 1989), which reported Texas catfish anglers fished an average of 16.0 days in 1985. Results from the 1985 National Survey were corrected for non-response bias, whereas our results and those of Ditton et al. (1991) were not. Although our estimates of fishing frequency are biased upward because we did not adjust for non-response, there is probably little effect on estimates of the relative frequency of fishing in different waters and among different catfish angler groups.

Results for blue catfish, channel catfish, and flathead catfish anglers apply to specific Texas fisheries; however, this is not the case for "catfish" anglers. These anglers may represent a composite of anglers for blue catfish, channel catfish, and flathead catfish, plus other species, or they may represent a group of generalized anglers who indiscriminately fish for any catfish species. Our results support the second explanation. If "catfish" anglers were a composite group, we would expect group means to be consistently intermediate to means for other angler groups. However, in many characteristics, "catfish" anglers are at 1 end of the range of variation. For example, "catfish" anglers have the greatest proportion of females, lowest self-rated skill level, and fished the fewest days in the previous 12 months. Because channel catfish is the most widely distributed and abundant catfish species in Texas, has the most generalized habits, and requires little special technique to catch, it is the species most likely to be caught by "catfish" anglers. Therefore, we believe results for "catfish" anglers are applicable to channel catfish fisheries. Results for "catfish" and channel catfish anglers should be combined and appropriately weighted to produce profiles representative of the total population of Texas channel catfish anglers.

Several of the differences among catfish angler groups are consistent with the concept of recreation specialization (Bryan 1977, 1979; Ditton et al. 1992), which Bryan (1977) defined as "a continuum of behavior from the general to the particular, reflected by equipment and skills used in the sport and activity setting preferences."

Bryan identified 4 types of anglers along this continuum; at 1 extreme were occasional anglers, followed by generalists, technique specialists and, at the other extreme, technique and setting specialists. The location of anglers along this continuum is reflected in a number of attributes including frequency of participation, years of experience, skillful use of equipment, commitment to the sport, and importance of and orientation toward catch (Ditton et al. 1992). Based on number of days fishing per year, which Graefe (1980) found was a surrogate measure of level of specialization, we suggest flathead catfish and, to a lesser extent, blue catfish angler groups include greater proportions of more specialized anglers than do channel catfish and "catfish" angler groups. Anglers for flathead catfish were among the most experienced catfish anglers, included a greater proportion of individuals with a high self-rated skill level, and were more likely to own boats (an indicator of financial commitment to angling). These anglers also had the highest consumptive orientation, a possible surrogate measure for resource dependency. In contrast, channel catfish and "catfish" angler groups include the lowest proportions of individuals with high self-rated skill levels, were the least likely to own boats, and had the lowest consumptive orientations.

If fishing frequency is a proxy for level of specialization among catfish anglers, we would expect flathead catfish and blue catfish anglers to display greater acceptance of and support for rules, regulations, norms, and procedures associated with angling than channel catfish and "catfish" anglers (Ditton et al. 1991); instead, anglers for flathead catfish and blue catfish generally indicated less support. Angler support for regulations and management activities may be based, in part, on anglers' perceptions of how these regulations and activities will affect fisheries for their preferred species (Wilde and Ditton 1991). High consumptive orientations of flathead catfish and blue catfish angler groups suggest the norm for these anglers is consuming the fish they capture. Therefore, among catfish anglers, especially those for flathead catfish and blue catfish, we suggest opposition toward restrictive regulations increases directly with level of specialization.

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