

Angler Attitudes Toward Control of Freshwater Vegetation

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Management of freshwater resources for maximum recreational and economic benefits is often complicated by conflicts among diverse user groups. Programs for control of weedy, exotic freshwater plants are often especially contentious. Shoreline residents may view growths of freshwater vegetation as anywhere from an aesthetically unpleasing nuisance, to being an economic threat to home and property values; swimmers, water skiers, and boaters may view freshwater vegetation as an impediment to their enjoyment of recreational activities or, in the extreme, as dangerous, life-threatening entanglements. In contrast, anglers often express the opinion that aquatic plants are beneficial to the environment and improve fishing success by providing cover and foraging areas for both young and adults of important game species. Indeed, fishing magazines are often filled with articles devoted to "working the weed line."

An appreciation of the diversity in attitudes, desired outcomes, and opinions among users can allow managers to anticipate or avoid potential conflicts among, as well as within, different user groups. In the past, Texas freshwater anglers were often thought of as a homogeneous and cohesive group that opposed control of freshwater vegetation. In this paper, we use results from a mail survey of Texas freshwater anglers to examine differences among freshwater angler groups in their opposition toward control of freshwater vegetation.

MATERIALS AND METHODS

Data reported herein were collected as part of a 1989 mail survey of Texas licensed anglers (Hunt et al. *in press*). Using license sales receipts as a sampling frame, a stratified random sample of 10,001 individuals was chosen to receive a 28 question self-administered questionnaire. Questionnaires were completed between September and November, 1989. Prior to analysis, questionnaires were screened to remove respondents who reported spending no days fishing in freshwater in the previous 12 months and had zero years of freshwater fishing experience. This resulted in a final sample of 5,341 freshwater anglers.

Anglers were asked to indicate their support or opposition toward 17 regulations and programs used to manage freshwater fisheries. Among these was a question asking anglers to indicate their opposition or support toward removal of exotic freshwater vegetation. Responses were recorded on a five-part balanced Likert-type scale (1- strongly oppose; 2- oppose; 3- neutral; 4- support; 5- strongly support). We asked anglers to give first-, second-, and third-

choice responses to the statement, "Name the fish you most prefer to catch in freshwater in Texas." We used first-choice responses to define anglers' species preferences (Wilde and Ditton 1991). Anglers were also asked whether they belonged to a fishing club, if they participated in freshwater fishing tournaments, and whether they, or someone in their household, owned a motor boat.

We used multinomial response models (Agresti 1990) to test for differences among angler groups in their opposition to removal of freshwater vegetation. We used Pearson's goodness of fit statistic X^2 to assess differences between club and non-club members, tournament and non-tournament anglers, and boat owners and non-owners. All analyses were performed using SAS software (SAS Institute Inc., 1985).

RESULTS AND DISCUSSION

Twenty-two to 32% of anglers for all species opposed removal of exotic freshwater vegetation, 41 to 54% were neutral, and 22 to 35% supported removal (Figure 1). Differences among anglers for different species were statistically significant ($P < 0.001$); on average, anglers for largemouth bass (*Micropterus salmoides* Lacepede) indicated the greatest opposition toward control, whereas anglers for black crappie (*Pomoxis nigromaculatus* LeSueur) and channel catfish (*Ictalurus punctatus* Rafinesque) indicated the least opposition. Both tournament anglers and fishing club members indicated significantly greater ($P < 0.0001$) opposition to removal of freshwater vegetation (41% of both groups were opposed or strongly opposed) than did non-tournament anglers and non-club members (27 and 28%, respectively, opposed or strongly opposed removal).

It would be reasonable to think that differences among angler groups contrasted above might be related to differences in boat ownership and consequent experiences with vegetation-related access problems. Boat ownership differed significantly ($P < 0.0001$) among anglers for different species (range 52 to 69%), between tournament (72%) and non-tournament (52%) anglers, and between fishing club members (77%) and non-club members (53%). Although boat owners and non-owners differed significantly ($P = 0.005$) in their opposition to removal of freshwater vegetation, these differences were of no practical significance: twenty-nine percent of boat owners opposed removal of freshwater vegetation, 42% were neutral, and 29% supported removal; among non-owners, 28% opposed removal of vegetation, 44% were neutral, and 27% supported removal. These results lead us to dismiss boat ownership as a factor in determining angler opposition toward removal of vegetation.

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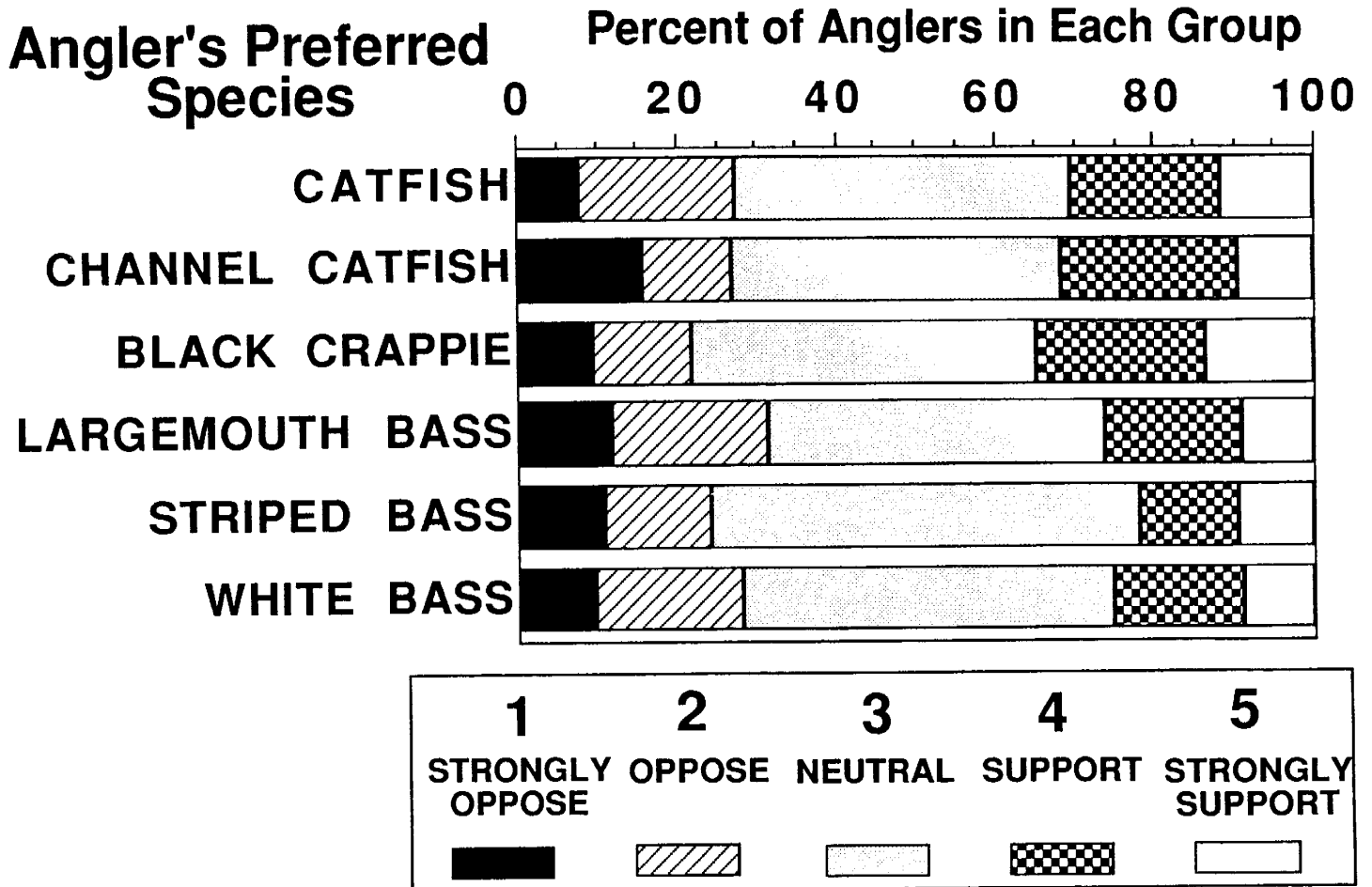


Figure 1. Opposition to, and support for, removal of freshwater vegetation indicated by Texas freshwater anglers. Sample sizes are: catfish- 661; channel catfish- 63; black crappie- 471; largemouth bass- 2072; striped bass- 74; and white bass- 103.

We believe the greater opposition toward vegetation removal indicated by largemouth bass anglers, tournament anglers, and fishing club members (78 and 79%, respectively, of these latter two groups indicated largemouth bass was their preferred species) derives from their association of largemouth bass with freshwater vegetation. Wilde and Ditton (1991) found differences in angler support for several regulations and management programs that were related to anglers' knowledge of the potential effects or importance of these regulations and programs on their preferred species. These anglers frequently seek largemouth bass in proximity to vegetation; removal of vegetation may decrease the ability of anglers to locate fish and possibly lead them to conclude that fewer fish are present.

Tournament anglers and fishing club members may be further polarized against removal of freshwater vegetation as the result of a controversial vegetation control program in Lake Conroe, Texas. Grass carp (*Ctenopharyngodon idella* Cuvier and Valenciennes) were introduced into Lake Conroe in 1981 and within two years had eliminated aquatic vegetation from the lake (Klussmann et al. 1988). Although there was no evidence of any change in the abundance of largemouth bass larger than 24 cm (Klussmann et al. 1988), many tournament anglers and fishing club members believe the fishery was negatively affected.

Our results are of interest to managers of public waters for at least two reasons. First, managers should anticipate heterogeneity among anglers in their opposition toward vegetation control programs. Greatest opposition should be expected from anglers whose preferred fishery will experience the greatest real or perceived adverse effects; information and education programs can be directed toward these anglers to assuage their concerns. Second, anglers who participate in fishing tournaments or who belong to fishing clubs are often well organized, vocal, and are commonly believed to represent the views of average anglers. As a result, these angler groups often have been successful in their efforts to influence decisions made by lake and fishery managers. Tournament anglers and fishing club members represent small proportions of the freshwater angling community (8 and 14%, respectively, in Texas) and our results show that opinions of these anglers regarding removal of freshwater vegetation are not representative of those of non-tournament anglers and non-club members.

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LITERATURE CITED

- Agresti, A. 1990. Categorical Data Analysis. John Wiley & Sons, Inc. New York.
- Hunt, K. M., R. B. Ditton, R. Riechers, S. Gutreuter, M. Osborn, and G. C. Matlock. In press. Demographics, participation, attitudes, expenditures, and management preferences of Texas anglers, 1989. Mgmt. Data Ser., Texas Parks and Wildlife Department. Austin, TX.
- Klussmann, W. G., R. L. Noble, R. D. Martyn, W. J. Clark, R. K. Betsill, P. W. Bettoli, M. F. Cichra, and J. M. Campbell. 1988. Control of aquatic macrophytes by grass carp in Lake Conroe, Texas, and the effects on the reservoir ecosystem. Texas Agricultural Experimental Station. College Station, TX.
- SAS Institute. 1985. SAS User's Guide: Statistics. SAS Institute. Cary, NC.
- Wilde, G. R., and R. B. Ditton. 1991. Diversity among anglers in support for fishery management tools. *In*: Cooper, J. L. and Hamre, R. H., eds., Warmwater Fisheries Symposium I, Rocky Mountain Forest and Range Experiment Station, General Technical Report RM-207, pp. 329-335.