

Characteristics of Respondents and Nonrespondents to Mail and Telephone Angler Surveys

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Abstract: We conducted a screener telephone survey of 5,209 anglers in Mississippi to recruit participants for a statewide, 5-year, longitudinal angler survey that will administer a total of 10 surveys (waves), 2 per year. Of these 5,209 anglers, 4,393 agreed to participate in future surveys. Of these 4,393 anglers, 52% responded to a mail survey and 76% participated in a telephone survey. Twenty-four demographic and fishing preference variables were selected from the initial screener survey to compare data from respondents and nonrespondents. A greater percentage of respondents to both surveys were generally caucasian, married, in higher income brackets, and tended to be employed full-time. A greater percentage of respondents to both surveys fished more days and preferred to fish for black bass (*Micropterus* spp.) than did the original screener population. Although the telephone survey produced higher response rates, the similar sociodemographic characteristics between mail and telephone survey respondents indicated both survey methods obtained information from similar types of anglers. Furthermore, even though significant differences occurred between respondents and nonrespondents for several variables, the magnitude of these differences was small enough to conclude that information from respondents to both surveys will be useful for fisheries management purposes.

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Fisheries managers are recognizing the importance of understanding the needs and preferences of anglers in making sound management decisions. Angler surveys have been used to collect data on fishing activity (Thompson and Hubert 1990, Tarrant

et al. 1993), angler satisfaction (Spencer 1993), fish population structure (Gablehouse and Willis 1986), and economic valuation (Weithman 1993).

Constituent information can be obtained by mail, telephone, and personal contact surveys (Babbie 1992). Personal contact surveys (e.g., creel surveys) have been used to collect fishery information such as angler catch and effort. Personal contact surveys have high response rates and, because anglers are interviewed while or immediately after fishing, low recall bias. However, the time required to obtain extensive socio-demographic, attitude, preference, and behavior data may not be compatible with surveys designed to measure catch and effort. Also, inability to contact the same anglers over time makes it difficult to measure changes in angler attitudes, preferences, and opinions through creel surveys.

Mail surveys allow for contacting large numbers of anglers at relatively low cost (Babbie 1992). They have been used to obtain background demographic information, data on fishing activity and preferences, opinions about the status of fishery resources, and expenditures. Mail surveys typically allow researchers to collect more data per survey than personal contact methods and allow the researcher to integrate open-ended questions into the survey (Brown 1991). They are hampered by the additional time, cost, and inconvenience of additional mailings or telephone contacts to obtain high response rates. Response rates of previous mail surveys of anglers have ranged from 36% (Tarrant et al. 1993) to 87% (Horn 1978).

Telephone surveys, although more expensive than mail surveys, are easy to administer and have been shown to have higher response rates (Babbie 1992). Telephone surveys usually can be administered in a shorter period of time but are restricted by the length, number, and type of questions that can be asked and are limited to people owning telephones (Brown 1991, Babbie 1992).

The failure of some people to complete surveys is a major problem in survey research. Following the procedures of Dillman (1978), response rates should be 40%–60% for surveys of the general public and 60%–75% for surveys with a moderately specific audience (Brown and Wilkins 1978, Brown 1991). Obtaining a high response rate is important to ensure that the respondents adequately represent the overall population. If the respondents do not represent the population being described, the survey results will be biased.

We are conducting a panel survey of randomly selected licensed anglers who fish inland waters in Mississippi to obtain information that can be used to develop an effective fisheries management plan that addresses anglers' preferences, concerns, and behaviors. Previous studies of nonresponse bias raise questions about the accuracy of angler surveys (Tarrant et al. 1993). The purpose of this study was to evaluate nonresponse bias of mail and telephone surveys for a statewide survey of anglers fishing inland waters in Mississippi.

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Methods

A random sample of approximately 6,500 people who purchased a 1993 Mississippi sportsman, combination hunting and fishing, or freshwater fishing license was contacted by telephone in August–October 1994 to identify anglers willing to participate in a 5-year panel study. Of these 6,500 license holders, 5,209 completed an initial survey (screener survey) for this project and 4,393 agreed to participate in the 5-year panel study. The license structure in Mississippi requires hunters to purchase either a sportsman license or a combination hunting and fishing license to legally hunt. The main reason screener surveys were not completed for approximately 1,300 license purchasers was these individuals only hunted. Although the number was not quantified, only a few license purchasers in the initial sample frame who did fish declined to complete the screener survey. The screener survey focused on demographic, fishing preference, and fishing activity variables.

A mail survey, designed and implemented following procedures of Dillman (1978), was first sent in November 1994 to the 4,393 anglers who agreed to participate in future surveys. Each participant received a cover letter, survey questionnaire, and a postage-paid return envelope. The cover letter, in addition to providing information about the purpose of the survey, informed the survey recipients that substantial prizes (incentives) donated by fishing tackle companies would be awarded by random drawing to survey respondents. This mail survey addressed fishing preference, fishing frequency, fishing related expenditures, and the size and number of preferred fish species needed for a good day of fishing. The survey was 12 pages long and required an estimated 25 minutes to complete. Post card reminders were sent using first class mail to encourage participation and to check for incorrect addresses. Three additional mailings containing a cover letter, the questionnaire, and a postage-paid return envelope were sent to respondents at monthly intervals to encourage them to return their survey. Following these rigorous methods has shown to produce the highest response rates in previous survey research (Dillman 1978, Brown and Wilkins 1978). Any angler failing to return a completed mail survey was considered a nonrespondent.

A telephone survey was administered to the same 4,393 anglers by the Mississippi State University Survey Research Unit in spring 1995. This survey focused on fish consumption advisories and boating expenditures. Telephone calls to participants were originally made on weekdays from 1700 hours to 2100 hours and on weekends from 0900 hours to 1700 hours (Saturday) or 1300 hours to 2100 hours (Sunday). Participants were asked upon contact if they had time to complete the survey. If the participant answered no, the surveyor inquired about another day and time when the survey could be completed. Up to 10 telephone calls were made at different days and times to establish contact with participants. Anglers who chose not to complete the survey upon contact and anglers that surveyors were unable to contact after 10 attempts were considered nonrespondents.

Twenty-four demographic and fishing preference variables were selected from the initial screener survey to use in comparing respondents and nonrespondents within each survey method. Differences in responses between respondents and nonrespon-

dents from the mail and telephone surveys were tested by chi-square analyses ($\alpha = 0.05$) for categorical variables; continuous variables were tested by *t*-tests ($\alpha = 0.05$).

Results

Response rates were 52% for the mail survey and 76% for the telephone survey. Fifty percent of respondents to the screener survey completed both surveys.

Sixteen variables were found to be significantly different between respondents and nonrespondents for the mail survey (Table 1). Respondents to the mail survey fished an average of 2 more days in 1994 than did the screener survey sample. A smaller percentage of mail survey respondents stated they fished less often in freshwater than in the previous year than nonrespondents. A greater percentage of mail survey respondents preferred to fish for black bass, preferred to fish at lakes/reservoirs and rivers/streams, and fished from boats than did nonrespondents. A greater proportion of catfish (*Ictalurus* spp.) and sunfish (*Lepomis* spp.) anglers, pond anglers, and shore anglers did not respond to the mail survey. A larger proportion of mail survey respondents than nonrespondents had attended a Mississippi Department of Wildlife, Fisheries and Parks (MDWFP) public hearing and were familiar with the Sport Fish Restoration Fund. Analyses of sociodemographic variables showed a larger percentage of mail survey respondents were caucasian male anglers, were more often married, had more years of formal education, and were employed full-time than were nonrespondents. The distribution of household income for mail survey respondents was significantly different from nonrespondents, although the median household income was the same as that of the screener population (\$30,000–\$40,000).

Nine variables differed significantly between respondents and nonrespondents to the telephone survey (Table 1). The mean age when telephone survey respondents began fishing was significantly younger than for nonrespondents. Although similar to the mail survey respondents, the significant difference obtained for the telephone survey was due to the larger sample size. Telephone survey respondents fished an average of 2 more days in 1994 than nonrespondents. The telephone survey respondents represented a larger proportion of black bass anglers and anglers fishing from boats. The percentages of telephone survey respondents that had attended a MDWFP public meeting or were aware of the Sport Fish Restoration Fund were similar to those of nonrespondents. Higher percentages of telephone survey respondents than nonrespondents were caucasian, married, had more years of formal education, and were employed full-time.

Discussion

The mail survey response rate (52%) was in the acceptable range (40%–60%) for general population surveys (Dillman 1978) and the mid range for other mail angler surveys (e.g., 87%, Horn 1978; 36%, Tarrant et al. 1993). Higher response rates from mail angler surveys generally have resulted from surveying specialized angler groups (e.g., 66% for Texas saltwater boat anglers, Ditton and Fedler 1983), anglers targeting

Table 1. Characteristics for anglers completing an initial screener survey, a mail survey, and a telephone survey.

Variable	Screener	Mail	Telephone
Mean age anglers began fishing	12.6	8.7	8.7 ^a
Percent of anglers that prefer to fish freshwater	83.1	84.1	84.3
Mean days fresh water fished in 1994	49.4	51.5 ^a	51.2 ^a
Percent anglers stating they fished less often in fresh water than previous year	46.8	44.6 ^a	45.9
Percent anglers stating they fished less often in salt water than previous year	20.9	22.2	21.2
Mean 1-way miles to fishing location	40.5	38.5	38.4
First fishing preference			
Bass	47.6	51.2 ^a	49.8 ^a
Catfish	16.0	13.3 ^a	14.3 ^a
Crappie	22.9	22.9 ^a	22.4 ^a
Sunfish	11.6	10.8 ^a	11.7 ^a
Other	1.9	1.7 ^a	1.8 ^a
Water most preferred to fish			
Lakes, reservoirs	53.2	55.7 ^a	54.1
Ponds	15.6	13.9 ^a	15.2
Rivers, streams	23.7	24.0 ^a	23.8
Spillways	3.9	3.2 ^a	3.5
No preference	3.5	3.1 ^a	3.3
Style of fishing			
Power boat	65.9	70.6 ^a	67.4 ^a
Non-power boat	11.9	12.9 ^a	13.0 ^a
Shore	18.3	13.3 ^a	15.9 ^a
Other	3.7	3.2 ^a	3.7 ^a
Percent anglers that have attended a MDWFP public hearing	7.1	8.5 ^a	7.8
Percent of anglers that are familiar with the Sport Fish Restoration Fund	16.9	19.6 ^a	18.8
Including self, mean number in household	3.3	3.0 ^b	3.1
Mean number of dependents under 18	1.1	0.8 ^b	0.9
Percent of anglers that are male	87.9	90.4 ^a	88.7
Mean age	45	46 ^b	45
Percent of anglers that are caucasian	86.9	91.8 ^a	88.3 ^a
Percent of anglers that are married	81.9	85.9 ^a	83.9 ^a
Mean years of formal education	13	14 ^b	13 ^b
Percent of anglers employed full-time	78.1	82.2 ^a	81.7 ^a
Median 1993 gross household	30-40	30-40 ^a	30-40 ^a

^aSignificantly different ($P < 0.05$) from nonrespondents, chi-square test.

^bSignificantly different ($P < 0.05$) from nonrespondents, *t*-test.

specific fish species (e.g., 87% for muskellunge, *Esox masquinongy*, anglers, Horn 1978; 71% for trout, Salmonidae, anglers, Gigliotti and Peyton 1993), or anglers fishing a specific area (e.g., 69% for Lake Ontario anglers, Connelly et al. 1996). The response rates we obtained were for a generalized population, licensed anglers statewide. Other statewide angler surveys also obtained moderate response rates (66%, Riechers et al. 1991; 62%, Fisher 1996). Although mail surveys may be effective and even work well for some publics and certain types of anglers, they may not

obtain a high response rate when administered to a general angling public with diverse sociodemographic characteristics and fishing behaviors.

The telephone survey response rate was higher than the mail survey and above the acceptable range for surveys of a general audience (Dillman 1978). Furthermore, telephone survey responses were more similar to those of the entire screener survey population than were the mail survey responses and fewer significant differences between respondents and nonrespondents were observed for the telephone survey than for the mail survey.

Clearly, better data were obtained with the telephone survey. However, the cost of the telephone survey (approximately \$35,000) was considerably more than the cost of the mail survey (approximately \$14,000). The telephone survey was completed in a shorter time span (10 weeks) than the mail survey (3–4 months). The protracted completion time for the mail survey resulted from multiple mailouts to nonrespondents, delays in sending and receiving mail, and data entry time. Because we chose to limit our telephone survey to 10 minutes, we were able to collect more information with our mail survey.

Although more expensive, telephone surveys are more desirable for obtaining focused information (i.e., relatively brief questionnaires). However, even for those variables that significantly differed between respondents and nonrespondents, the response values for respondents to mail and telephone surveys generally were only 3%–6% different from responses from the screener survey population and likely are of little fishery management significance. For example, respondents to the mail survey fished an average of only 2 more days in 1994 than the original sample of anglers from the screener survey and anglers' preferred species was skewed by a 3% increase in black bass anglers and a 3% decrease in catfish anglers. Similar differences were observed for other fishing activity variables and significant sociodemographic variables. Even though these variables differed significantly between respondents and nonrespondents, we do not consider these differences significant in terms of application to fisheries management activities.

Achieving a high response rate is the best method for reducing the effects of nonresponse bias (Fisher 1996). However, using accepted survey procedures (Dillman 1978) enhanced by administering surveys to consenting anglers and awarding incentives for participation still does obtain high response rates from a general population of anglers. We suggest that long-term education efforts to persuade anglers that their participation contributes to sustained and enhanced fishing opportunities possibly is the best solution. In addition, specific education efforts should focus on non-white and female anglers and anglers who prefer to fish for catfish, sunfish, and at ponds (i.e., low-response groups). Obtaining angler information at the point of sale for licenses likely would increase response rate (100% response rate, if mandatory) and, obviously, reduce (or eliminate, if mandatory) nonresponse bias. For example, responses to 50 survey questions could be obtained if the questions were divided into 10 sets of 5 questions each and each license purchaser was asked, at random, 1 set of 5 questions. This surveying method would result in obtaining 100 responses to each of 50 questions per 1,000 license purchasers.

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