

Influence of Survey Method on Estimates of Statewide Fishing Activity

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Abstract.—We observed differences in estimates of angler participation in Wyoming between a survey in which anglers were asked to keep records of their fishing activity in 1986 and recall surveys by mail or telephone between 1980 and 1985. In the 1986 survey, residents who purchased annual licenses reported fishing an average of 5.6 d/year, and nonresidents who purchased annual licenses reported fishing an average of 6.3 d/year. In contrast, these values were 14–21 d/year for residents and 15–16 d/year for nonresidents during the three years (1980, 1984, and 1985) when recall surveys by mail or telephone were used to estimate participation.

Surveys are a popular means of assessing statewide fishing activity (USFWS and USBC 1982; Marcus et al. 1985; Baur and Rogers 1986). Decisions regarding allocation of natural resources and management funds among alternative recreation activities are often based on survey results (Fisher et al. 1986), and estimates of statewide fishing activity are often made by mail or telephone surveys, which rely on angler recall of fishing over a 6–12-month period.

Our purpose here is to describe differences in results obtained with different approaches to angler surveys for estimating statewide fishing pressure. During an evaluation of sport fisheries in Wyoming by telephone survey, we observed that survey design has a substantial influence on estimates of fishing activity. We compared estimates based on recall of fishing participation during the previous year to estimates based on angler records maintained during a study year.

Methods

We conducted a telephone survey during 1986 and early 1987 according to the guidelines of Dillman (1978). We selected a telephone survey because of generally low and declining response rates to mail surveys in Wyoming (Marcus et al. 1985), difficulty in reaching anglers by mail, ability to obtain clarification of responses during a tele-

phone call, and belief that personal contact would make anglers more willing to participate. We sought to sample 0.5% of the anglers who purchased annual fishing licenses. These were composed of 65% residents and 35% nonresidents (about 1,250 anglers). The number of participating anglers we sought in each of five fisheries management districts was in direct proportion to the number of fishing licenses sold in each district in previous years.

Records of people who purchased annual fishing licenses in 1985 were obtained from the Wyoming Game and Fish Department. The licenses were chosen at random and poststratified by license category (resident or nonresident) and district. Phone numbers of license recipients were obtained from local directories and through directory assistance. If a phone number could not be obtained, an alternate license recipient was chosen. Phone contacts began in February 1986.

During the initial phone contact, anglers were asked how often they fished in 1985 and if they planned to purchase a Wyoming license in 1986. If anglers planned to purchase a license, they were asked to participate in the study. Individuals unwilling to participate were replaced by others from the list of license purchasers. Anglers who agreed to participate were sent a confirming letter that outlined the information we wished them to provide about their fishing: date, name of water body, length of trip, number of anglers in the party, and species and lengths of fish caught. Among the anglers who agreed to participate, residents were re-

¹ The Unit is jointly supported by the University of Wyoming, the Wyoming Game and Fish Department, and the U.S. Fish and Wildlife Service.

contacted three times during the year and nonresidents twice. When recontacted, the anglers were asked to relate the requested information for each day they fished in Wyoming since our previous contact with them.

Anglers who purchased tourist fishing licenses (for 1, 5, or 10 d) were handled differently. Copies of all tourist licenses sold in each month are returned to the Wyoming Game and Fish Department, Cheyenne, by the 10th day of the following month. A random sample stratified in the manner of the annual license purchasers was drawn every 3 months during 1986. Purchasers of tourist licenses were contacted once and asked for information about their fishing in Wyoming on the day(s) for which the license was purchased.

Data were entered into a data-base management program, converted to an SAS data set, and summarized with SAS/PC (Joyner 1985). Our estimates of fishing activity were based on formulas given by Cochran (1977).

Results and Discussion

Altogether, 1,181 licensees—601 annual residents, 189 annual nonresidents, and 391 tourists—participated in the telephone survey. The total was 0.42% of the anglers licensed (281,189 licenses) in 1986. The average number of fishing days reported by annual license purchasers in 1985 was 20.6 d for residents and 15.9 d for nonresidents who participated in our study (Table 1). During the 1986 study period, when these same anglers were asked to maintain records of their fishing and to periodically report specific fishing days, reported fishing averaged 5.5 d for residents and 6.3 d for nonresidents. Purchasers of tourist licenses reported fishing an average of 1.8 d.

Fishing is open year-round in Wyoming, so re-

call of fishing from the previous year involved recall periods as long as 12 months. In a mail survey of Wyoming anglers conducted in early 1985, which depended on recall of 1984 fishing (Marcus et al. 1985), average participation reported for 1984 was 17.6 d by resident anglers and 15.0 d by nonresidents who purchased annual fishing licenses. These estimates are similar to those we obtained for 1985, when we asked our survey participants for estimates of their previous year's fishing efforts in early 1986. Similarly, the average number of days fished by resident Wyoming anglers, as estimated from national fishing and hunting surveys, was 17.3 d in 1980 (USFWS and USBC 1982) and 13.8 d in 1985 (USFWS and USBC 1988). National survey estimates were based on telephone surveys conducted in 1981 and 1986, and required recall of the previous year's fishing efforts. Similar results have been obtained in Missouri in a 6-year telephone survey started in 1983 by the Missouri Department of Conservation (A. S. Weithman, Missouri Department of Conservation, personal communication).

Our 1986 estimates of fishing participation may have been biased because we probably selected for "heads of households." We found it difficult to obtain telephone numbers for people who did not have a phone listed in their name; thus, young adults, many elderly people, and transient laborers may have been excluded, and all of these groups may participate in fishing at a different rate than "heads of households." We also found that anglers who fished often were reluctant to participate in the survey, keep records, or spend long periods on the telephone relating their information to us. Anglers who fished less often appeared to be more willing to participate and to recall their fishing trips.

Sociological research has indicated shortcomings of surveys in which recall of minor events, such as fishing experiences, is requested (Hornville and Jowell 1978; Marsh 1982; Strube 1987). Recall of the frequency of such events is often faulty, and respondents tend to report events not within the study period and to exaggerate socially desirable activities (Marsh 1982, 1984; De Maio 1984). Upward biases in reported participation have been observed in other areas of outdoor recreation, such as waterfowl hunting (Atwood 1956; Sin 1981). It has been recommended that the time period over which respondents are asked to recall events be reduced, or that people be asked to maintain written records of their activities, to ensure more accurate data (Hornville and Jowell 1978; Fowler

TABLE 1.—Comparison of estimates of days of fishing during different years by residents and nonresidents who purchased annual fishing licenses in Wyoming.

Source	Year	Average days of fishing	
		Residents	Nonresidents
This study ^a	1986	5.5	6.3
This study ^b	1985	20.6	15.9
Marcus et al. (1985) ^b	1984	17.6	15.0
USFWS and USBC (1982) ^b	1980	17.3	
USFWS and USBC (1988) ^b	1985	13.8	

^a Telephone survey involving prior contact with and record keeping by anglers.

^b Mail or telephone survey involving recall of the previous year's fishing by anglers.

1984). Even respondents who keep poor records report more accurately than they would have if they had not been asked to keep records at all (Sudman and Bradburn 1974).

Despite possible biases due to selection for heads of households and the reluctance of some avid anglers to participate, we believe that a bias associated with recall of an entire year's fishing may be inflating fishing activity estimates derived from surveys requiring such recall. An after-the-fact, unannounced survey may be most useful for short-term special seasons, such as for salmon in the Pacific Northwest, when one call supplies the needed data, the fishing experience is discrete and readily remembered, and there is no need for the angler to keep written records (Gotie et al. 1984). Managers are urged to evaluate their angler-survey methods carefully.

Acknowledgments

We thank the telephone survey crew for their diligent efforts; Lyman McDonald and Robert Cochran for statistical advice; staff of the Wyoming Game and Fish Department for assistance in obtaining license records; and S. Weithman of the Missouri Department of Conservation for advice on design of the survey. The study was funded by the Wyoming Game and Fish Department.

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