# Survey Questionnaire Wording and Interpretation: Implications for Policymakers

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*Abstract:* The ultimate success of natural resource decision-making depends upon knowledge gathered from several sources; e.g. biological data, institutional values and beliefs, and human dimensions information from affected constituents. Handfishing for catfish has been at the forefront of Missouri conservation since 2000. To determine the acceptability of handfishing to Missouri anglers we conducted a survey of licensed anglers in 2004. The objective of this study was to examine the effects of survey question wording on angler response and the potential for different policy outcomes resulting from the different wording. We designed two versions of a survey to gauge angler support for legalizing handfishing and to determine what impact, if any, different question wording had on levels of support for handfishing. Version 1 resulted in a 33% level of support for legalizing handfishing, while Version 2 resulted in 50% support. While both questions were designed to inform the same decision process, they elicited a different response distribution. While it is widely recognized that questionnaire wording affects response distribution, researchers continue to ask questions that can, at best, provide somewhat misleading findings, and, at worst, lead to erroneous policy outcomes.

*Key words:* attitude survey, catfish, handfishing, human dimensions, policy-making

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Development and implementation of natural resource policy is a complex process that can have multiple outcomes affecting the status of the resource and associated user groups. Although a set of decision-making theories exist (Meadows 1999, Chase et al. 2004), along with several useful models (Vroom and Jago 1988, Hunt and Haider 2001), each resource management issue is unique, often defying the direct application of existing theory. For example, overabundant urban deer (*Odocoileus* spp.) populations provide decision-makers a multifaceted management issue (Lauber and Knuth 2004) with potential actions ranging from lethal control using harvest or culling (Porter et al. 2004) to non-lethal options using fertility control (Hernandez et al. 2006, Merrill et al. 2006). In a similar fashion, forest management activities are driven by a range of impacts related to social, economic, and resource outcomes (Olson et al. 2004, Bormann et al. 2007).

Harvest management decisions for game animals and fishes can provide an additional set of unique decision-making situations. Establishment of hunting or fishing regulations can be impacted by issues including biological considerations (e.g., changes in harvest rates and population demographics; Johnson et al. 2002), participant safety, concerns related to hunter and angler satisfaction with regulations (Schulz et al. 2007), and issues related to traditions or ethics (Ortega y Gasset 1985, Posewitz 1994). The outcome and ultimate success of the natural resource decision-making process, however, depends upon reliable knowledge (Romesburg 1981) gathered from several sources; e.g., available biological data, institutional values and beliefs, and relevant human dimensions information from affected constituents (Fig. 1). Traditionally, natural resource policy was developed explicitly using scientific, biological information (i.e., scientific management), and implicitly using institutional value judgments and traditions. Only recently has human dimensions information been formally incorporated into the natural resource decision-making process (Decker et al. 2001). Depending upon the nature of the policy issue under consideration, each piece of input data may not necessarily be weighted equally.

In this paper, we examine how the natural resource decision-making process may be affected by small changes in the supporting information used to make a policy decision; in this case, survey questionnaire wording. Specifically, we examined how different versions of the same survey question could ultimately lead to dramatically different policy decisions related to establishing a new catfish handfishing season in Missouri.

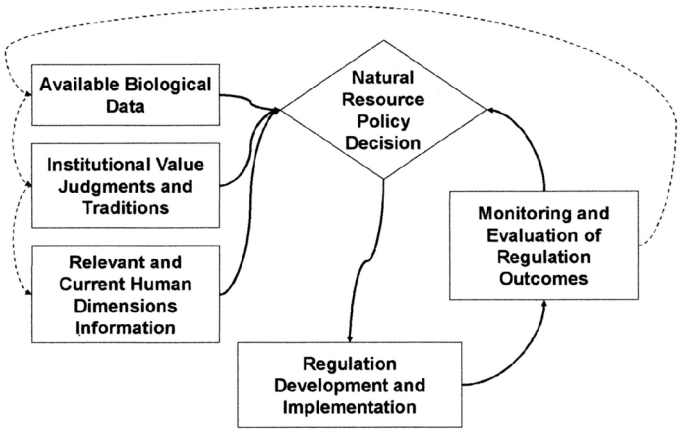


**Figure 1.** Harvest management decisions for game animals or fishes often involve information from three sources: available biological data, institutional value judgments and traditions, and relevant and current human dimensions data. Each piece of input information may be weighted differently in the decision-making process. The evaluation phase may require a reconsideration of the policy decision, or possibly, reconsideration of the original input information (dotted line).

Handfishing, also known as noodling, hogging, grabbing, grabbling, grappling, and under-banking, is a method of catching various species of catfish with one's hands (Reitz and Travnichek 2005, Morgan 2006). In the southeastern and midwestern states, the most often pursued species is the flathead catfish (*Pylodictus olivaris*) because of its sporting characteristics and flavor (Jackson 1999). No rods, reels, hooks, lines, bait, nor tackle are used.

Handfishing has been at the forefront of Missouri conservation issues for the last several years with a contingent of people requesting a handfishing season in Missouri waters (Reitz and Travnicheck 2005, Morgan 2006). In 2004, handfishing for catfish was legal in 11 other states (Reitz and Travnichek 2005). However, limited information existed concerning the impacts of handfishing on Missouri catfish populations. Handfishing proponents have met with Missouri Department of Conservation (MDC) biologists, administrators, and commissioners on numerous occasions to lobby for a handfishing season. During the same time, Missouri state legislators also expressed an interest in the handfishing issue as a result of their constituents' requests. Prior to considering legalization of handfishing in Missouri, however, MDC policymakers requested more information; specifically, (1) information about the attitudes of Missouri's anglers concerning the issue of handfishing, and (2) biological information regarding catfish harvest, catfish movement, angler exploitation rates, nest success, and population dynamics in tributary steams of the Missouri and Mississippi rivers. In this article, we will focus on the collection and interpretation of human dimensions information using very similar questionnaires with a differently worded question.

## Methods

During 2004, we conducted a self-administered, mail-back survey to solicit the opinions and attitudes of active resident anglers, particularly catfish anglers, on the subject of handfishing in Missouri. Specifically, our primary objective was to gauge support for a handfishing season and its acceptability to other anglers. We administered the survey following recommendations by Dillman (2000) with regard to sampling, survey design, and mailing schedule. We randomly selected 12,000 individuals (6,000 for each version) that purchased a 2003 resident fishing or a resident combination fishing and hunting permit. We conducted the first mailing of the survey on 12 August 2004, and completed data collection on 12 November 2004.

The survey consisted of two versions to determine if and how the level of support and opposition to legalizing handfishing (as signified by a 'support' or 'oppose' response) was affected by the way the question was worded. A short introductory paragraph describing the activity of handfishing was provided prior to the legalization question to give respondents information regarding handfishing and to inform them that the impact handfishing might have on Missouri catfish populations was unknown. Version 1 used a simple support or oppose question with no qualifying information included, while Version 2 contained some qualifying information and duplicated language used in a telephone survey conducted by the University of Tennessee at Knoxville for the University of Missouri at Columbia as part of the National Survey on Recreation and the Environment (2004). Response options for both versions were 'support,' 'oppose,' 'undecided,' and 'no opinion.'

Wording for the legalization question for Version 1 read: "Would you support or oppose allowing handfishing for catfish in Missouri?"

Wording for the legalization question for Version 2 read: "Would you support or oppose a regulated season for handfishing in Missouri as long as it does not harm the catfish population?"

Respondents to Version 1 had to make their own judgments on the acceptability of handfishing based on the information provided them. Alternatively, respondents to Version 2 may have been led to believe, to some degree, based on question wording, that the biological effects of handfishing were known or could be minimized.

We conducted simple frequencies, cross tabulations, and Chi-square tests to identify significant differences in response between treatments (SAS 2003). We tested the null hypothesis that there would be no difference in opinions between groups (versions) using techniques for categorical data analysis. We conducted chi-square ($X^2$) tests using loglinear models to provide standardized

Pearson residuals ($r_{pi}$) by cell to determine whether or not significant differences in responses existed between groups (Agresti 2002). These tests were made within the PROC GENMOD procedure in SAS (SAS 2003). Where significant differences ($\alpha = 0.05$) were observed, a cell-by-cell analysis using cell Chi-square and Pearson's standardized residuals ($r_{pi}$) was conducted to identify the specific nature of dependence. Cells containing residuals with absolute values of two or greater indicated a lack of fit with the null hypothesis within that cell (Agresti 2002). We used odds ratios (with 95% confidence intervals) to quantify the magnitude of any differences between groups.

## Results

We obtained 5,119 useable survey responses: 2,537 for Version 1, and 2,582 for Version 2. Overall response rate was 47.7%, with 93.9% (Version 1) and 93.2% (Version 2) of anglers reporting to have fished in the past 12 months. Of those that reported fishing, 68.1% (Version 1) and 68.0% (Version 2) said they fished for catfish at least one day in the past 12 months. We found no significant differences in the demographic makeup or angling behavior of respondents.

Response to the Version 1 and Version 2 legalization question differed significantly ($X^2 = 129.3$, DF = 3, $P < 0.0001$) between the two survey versions. In Version 1, anglers were essentially split in their opinions with 33.4 % of anglers in support of, 33.1% in opposition to, and 33.5% having no opinion or undecided about whether or not handfishing should be allowed in Missouri. In Version 2, 49.8% of all anglers supported a regulated season for handfishing as long as it did not harm the catfish population, while 21.8 % were in opposition, and 28.4% were undecided or did not have an opinion (Table 1). Odds ratio analysis indicated that anglers responding to Version 2 were 1.64 (95% CI = 1.36 – 1.97) times more likely to support the legalization of handfishing than were anglers responding to Version 1, while Version 1 respondents were 1.39 (95% CI = 1.14 – 1.69) times more likely than Version 2 respondents to oppose legalization. An analysis of standardized residuals indicated that the difference in 'support' responses contributed most to the Chi-square value (absolute value > 2), followed by 'oppose' and 'undecided' responses.

**Table 1.** Angler responses to two different versions of a 2004 survey question regarding the legalization of handfishing in Missouri.

| | Version 1 | | Version 2 | |
|---|---|---|---|---|
| Response | All anglers *n* (%) | Catfish anglers *n* (%) | All anglers *n* (%) | Catfish anglers *n* (%) |
| Support (legalization) | 702 (33.37) | 541 (34.88) | 1,062 (49.84) | 797 (51.45) |
| Oppose (legalization) | 697 (33.13) | 554 (35.72) | 464 (21.77) | 355 (22.92) |
| Undecided | 388 (18.44) | 281 (18.12) | 312 (14.64) | 231 (14.91) |
| No opinion | 317 (15.07) | 175 (11.28) | 293 (13.75) | 166 (10.72) |
| Total | 2,104 | 1,551 | 2,131 | 1,549 |

## Discussion

There is little doubt that survey questions and their related messages are often misunderstood or have a high degree of variability in their interpretation, particularly when they contain words that may not have the same connotation to all individuals or when they have conditional or speculative phrases (Belson 1981). Not surprisingly, responses to survey questions can be affected by the format and wording of the questions asked. For example, markedly different responses have been found when survey respondents are asked about "assistance to the poor" vs. "welfare" (Smith 1987, Rasinski 1989). Questions with a defined set of responses, or close-ended questions, have been found to elicit very different responses from fill-in-the-blank or open-ended questions (Glendall and Hoek 1990). Responses may also be affected by the order in which questions are asked, other questions on the survey (Glendall and Hoek 1990), the overall length of the survey (Dillman 2000), or qualifying phrases (Glendall and Hoek 2002). In our example, not only can question wording predictably influence survey response patterns, it can also impact the policy decision relying on the survey information; specifically the introduction of the qualifying phrase "as long as it does not harm the catfish population."

Overall, our results indicated that support for the legalization of handfishing differed significantly between versions of the question; i.e., 33.4% of all anglers and 34.9% of catfish anglers in Version 1, and 49.8% and 51.5% respectively in Version 2 (Table 1). There was no clear respondent preference regarding the legalization of handfishing in Version 1, while results from Version 2 indicated support for legalization as the most common response among all anglers and comprised the majority of responses of catfish anglers.

While both questions were designed to answer the same research question, they elicited a very different distribution of response, especially important within the context of a policy decision process. The wording of the legalization question resulted in different responses between versions, with the inclusion of the words "regulated season" and "as long as it does not harm the catfish population" producing significantly more support for legalization than a question without such hypothetical addendums (i.e., at the time, it was not known if handfishing could be conducted in Missouri without negatively impacting catfish populations). This increased support was evident across the board for all anglers regardless of past and present residency, whether or not they had heard of or participated in handfishing, and whether or not they were catfish anglers.

Based in part on results from angler surveys, policymakers established an experimental handfishing season on three selected Missouri streams. Survey data indicated relatively strong support for legalization in Version 2 (51.5% of catfish anglers) and no strong opposition to handfishing in either version. In reality, however, data from the two versions (Table 1) resulted in conflicting interpretations of the information concerning attitudes and opinions about handfishing, particularly among affected stakeholders.

## Management Implications

At the start of any resource decision-making process, each of three input information sources is considered (Fig. 1). In our case, initial policy decisions were based upon pertinent human dimensions information concerning potential user-group conflicts and angler attitudes toward handfishing in general. Data collected from our surveys indicated that handfishing would likely be accepted by anglers. Based partly on these data, MDC implemented an experimental season to determine what impact, if any, handfishing would have on catfish populations. After two years of collecting biological information, however, emerging data about overall harvest rates and reproductive impacts became more significant factors in a decision to rescind the experimental season. In this case, initial decisions depended on the information that was available at the time and changed as new information was introduced. During the process, the relative value of institutional value judgments and traditions also played a role in the decision making process. However, value judgments are always difficult to quantify, and traditions usually have already formed the historical context of regulations.

Resource managers, as well as other policymakers, are becoming aware of the need to implement programs that offer a wide diversity of recreational opportunity to meet stakeholder expectations (Gartner and Lime 2000). Our results indicate that a sizable segment of Missouri anglers may support the legalization of handfishing for catfish in Missouri as determined by representative surveys of affected constituents. However, this estimate can differ significantly, as was demonstrated by results from Version 1 and Version 2 of the survey. Version 2, with majority support for handfishing by catfish anglers, could lead policymakers down the path of legalization, believing that this was what the constituents wanted and under a key assumption that ". . . it does not harm the catfish population." Conversely, results from Version 1, indicating less conclusive support for handfishing, may provide reason for pause in the decision making process (Fig. 1). We believe that potentially different policy outcomes could be realized given the effects of survey questionnaire wording observed in this study.

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