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## Perceptions of recreational fisheries conservation within the fishing industry: Knowledge gaps and learning opportunities identified at east coast trade shows in the United States

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### ABSTRACT

The recreational angling community is comprised of diverse stakeholders, including the trade sector responsible for the manufacturing, distribution, and sales of tackle, boats, and clothing, angler-based travel, revenue-generating popular media, and angling services. Through marketing and promotion, fishing companies compete for customers by convincing anglers as to what success means when they go fishing. If the angling trade can influence the social norms in the recreational angling community, then this could hold true for norms related to the conservation of recreationally targeted fishes and their habitats. We questioned whether individuals working within the fishing trade are adequately informed about best practices for recreational fisheries conservation, since these perceptions could, in turn, influence the values portrayed in the marketing and promotion of fishing. For this study we surveyed fishing trade employees during five industry and consumer shows to evaluate their perceptions about recreational fisheries conservation and where they believe their consumers learn about these issues. Across events, respondents believed that commercial fishing and habitat loss were the greatest threats to recreational fisheries. Specific to the angling event, physical injury when handling (e.g., during hook removal) and duration of the fight were selected as having the greatest impacts on fish, with between 74 and 91% of respondents indicating that they felt impacts were species-specific. Respondents believed that their customers received information on best practices and conservation predominantly from peer-to-peer interactions, social media, and fishing magazines. They also indicated that one of the primary roles of the angling trade when it comes to recreational fisheries conservation is to convey best practices in marketing and promotion. Overall, the trade sector appears to be an important mechanism for reaching anglers, yet more work is needed to ensure that the conservation information they share is consistent with science-based best practice.

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### 1. Introduction

Globally, recreational angling is an industry that generates hundreds of billions of dollars in economic activity (World Bank 2012). The industry functions through the use of fishing equipment (e.g., reels, rods, tackle, bait) and associated services (e.g., boats, fuel, lodging, guide services) so participants can try to catch fish. Such goods and services related to recreational fishing can range from being basic and relatively inexpensive (e.g., handline and baited

hook, do-it-yourself), to elaborate, equipment-intensive, high-tech, and costly (e.g., offshore powerboat equipped with sophisticated GPS and sonar along with a highly-trained crew), and the selection of goods and services is often species- and location-dependent, varying with the skill and knowledge base of the recreational angler (Arlinghaus et al., 2007). As many recreational anglers will also attest, the accumulation of fishing gear is as much a hobby and obsession as is the actual activity of going fishing (McGuane, 2001).

Manufacturers and conveyers of goods and services maintain viable businesses by competing for the attention of consumers through marketing and promotion that emphasizes some benefit of using one company's products versus another (Petty et al., 1983; de Mooij and Hofstede, 2010; Micu et al., 2011). For many

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sports and recreational activities, the potential rewards of brand selection are often associated with athletic achievements based on improving skills that result in greater accuracy, speed, distance, and scores (Carlson et al., 2009). Marketing and promotional campaigns often use professional athletes to endorse products and draw consumers away from the competition (Stevens et al., 2003; Bush et al., 2004). Such tactics are also reflected in the recreational fishing trade, except that angler success is predominantly contingent on the probability of actually catching a fish. As such, recreational angler success, and essentially consumer/customer satisfaction, is largely contingent on access to and abundance of healthy recreational fish stocks (Arlinghaus, 2006; Schuett et al., 2010), and can be independent of angler skill, the type of gear used, and if the angler is catching to keep or practicing catch-and-release.

Although the foundations of recreational fisheries conservation and management largely fall on the shoulders of government agencies (Lackey, 1998; note, in some jurisdictions fisheries management is privatized as individuals and angling clubs maintain fishing rights such as in Europe [see Arlinghaus, 2006]), it is ultimately the decisions and behaviors of individual anglers that influence how fish and their habitats are treated (Arlinghaus et al., 2007). Recreational anglers may be willing to take risks by breaking laws and ignoring regulations rather than allowing other anglers to reap the benefits in open access recreational fisheries (Cox et al., 2002). Communications among anglers and related social networks can influence the perceived benefits of adopting best practices for recreational fisheries, including catch-and-release as a conservation tool (Arlinghaus, 2006; Arlinghaus et al., 2007). Nevertheless, even government agencies charged with setting and achieving management objectives can inaccurately communicate how anglers should be interfacing with their catch (Pelletier et al., 2007).

Given how marketing and promotion campaigns are meant to capture the attention of recreational anglers, perceived values upheld within the fishing trade could influence angler attitudes and behavior when it comes to fisheries conservation and who is responsible for sustaining recreational fish stocks (as shown in other sports, Lear et al., 2007; Moutinho et al., 2007; Dionisio et al., 2008). For instance, research quantifying the impacts of catch-and-release has shown that air exposure can impact physiology, post-release activity, and increase mortality (Cooke and Suski, 2005; Cooke et al., 2013a), yet photos depicted in advertisements in the fishing industry frequently show fish being held out of water, often by fishing celebrities, even if they are predominantly a catch-and-release species (Cook et al., 2015). Such rules of behavior, or 'social norms' (Fehr and Fischbacher 2004), related to best practices for recreational fisheries conservation could be linked to how members of the fishing trade perceive their role within the angling community, however this linkage has yet to be assessed.

For this study we surveyed employees of the fishing trade as they attended industry and consumer tradeshows to evaluate their perceptions about recreational fisheries conservation and where they believe their consumers learn about best practices. Given the scale and diversity of the fishing industry, we acknowledge that perceptions likely differ by region, country, and fishing type, but do believe that modern platforms for marketing and promotion (e.g. Internet), the crossover of recreational anglers that participate in a range of recreational fisheries, and the globalization of the recreational fishing trade, all help to break down barriers to communications for companies targeting recreational anglers. As such, identifying knowledge gaps within a specific country or region could still provide a foundation for guiding the communications of best practices for recreational fisheries conservation from the fishing industry to their customers.

## 2. Methods

In-person written surveys were conducted during one industry tradeshow (Florida) and four consumer shows (New Jersey) between July 2014 and May 2015. Respondents were selected haphazardly while surveyors circulated through the shows, and only individuals that could clearly identify themselves as employees of fishing gear manufacturing companies, retailers, and service providers were asked to participate. A pilot version of the survey was circulated to company employees ( $n = 10$ ) not attending the tradeshows to get feedback on terminology and identify any questions that were potentially confusing to respondents; responses from the pilot survey were not included in the data accumulated from the trade and consumer shows.

The survey was comprised of 15 questions (12 closed-ended, 3 yes/no) asking respondents about: 1) perceived threats to recreational fisheries, and 2) where they feel their customers get information about best practices for recreational fisheries conservation (Appendix A). Information was also obtained about whether they were recreational anglers themselves, their role in the company, and their history in the fishing industry. To avoid resampling, all individuals were first asked whether they had taken the same survey before. All closed-ended questions included an 'Other (please specify)' option to provide respondents with the flexibility to add a topic that was not already listed (Strauss, 1987). For two questions that focused on threat perceptions and impacts of recreational fisheries, respondents were able to select up to two of the options provided, thus in some cases the total number of answers for these questions could exceed the number of respondents. For questions related to respondent perceptions, we ranked the frequency of responses from highest (1) to lowest (depended on the number of categories), and when two or more categories had the same frequency, they received the same rank. Mean ranks ( $\pm 1$  SD) were then calculated and used to compare trends in responses by industry employees across trade and consumer events. Ranks were compared for each question among tradeshows using a two-way contingency table and Chi square test comparing the distribution of scores. All analyses were performed using JMP 10.0.0 (SAS Institute, Cary, NC, USA) and the level of significance ( $\alpha$ ) for all tests was 0.05.

## 3. Results

A total of 180 individuals completed the survey. However, ten surveys were excluded from the analyses because the response to the question about their current job indicated that they were not actually employed by a company involved in the fishing trade. Of the 170 remaining surveys, 24 respondents (14%) indicated that their role in their current company was something other than the categories provided, however, based on the roles they indicated we were able to assign them to existing categories. Not all respondents answered each of the 15 questions in the survey. Thus, some sample sizes reported below differ from the total number of respondents surveyed. Three respondents did not complete the entire back page of the survey, representing only 0.5% of the all survey questions. An additional 14 survey questions were left blank (0.55%), with nine of these being a question about the roles the respondents played when working for other fishing industry companies. No questions were skipped regarding the respondent's perceptions and beliefs regarding recreational fisheries conservation and the role of the industry.

A total of 18.2% of respondents ( $n = 31$ ) identified themselves as sales representatives, 13.5% ( $n = 23$ ) in product development, 12.9% ( $n = 22$ ) as sales managers, 12.4% ( $n = 21$ ) in media (print, online, video, photographers, writers), 10.0% ( $n = 17$ ) as upper

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