



Research article

Peer pressure on the riverbank: Assessing catch-and-release anglers' willingness to sanction others' (bad) behavior

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ABSTRACT

Given the well-documented impacts of angler behavior on the biological fitness of angled and released fish, optimizing the conservation value of catch-and-release angling hinges on the extent to which anglers are willing to adopt recommended best practices and refrain from harmful ones. One potentially powerful mechanism underlying adoption of best practices is the social pressure anglers can apply to one another to enforce community norms and values. Past work in other domains demonstrates that forms of interpersonal communication—including social sanctioning—can foster context-appropriate social norms and increase cooperative behavior; yet to date, little research has examined these dynamics in the context of species conservation. We conducted in-person and online surveys to explore the role of social sanctioning in the context of an internationally renowned wild steelhead (*Oncorhynchus mykiss*) fishery in British Columbia, Canada. We investigated how diverse social-psychological and demographic factors influence anglers' past and future sanctioning propensity. Results highlight that perceived capacity to influence the angling practices of others and professed concerns about one's own reputation were strongly predictive of both past and future sanctioning. Furthermore, while anglers reported relatively low-levels of past sanctioning behavior, most anglers simultaneously expressed a strong desire to sanction others in the future. Identifying ways to increase the social desirability and visibility of sanctioning actions could assist resource managers in promoting adoption and maintenance of best practices. More broadly, our findings underscore a significant yet underappreciated role for wildlife users and enthusiasts in cultivating a shared conservation ethic to help ensure biological conservation.

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1. Introduction

Catch-and-release (C&R) angling constitutes the majority of recreational angling activity, as ~60% of the world's 47.1 billion fish caught annually are released (Cooke and Cowx, 2004). As our understanding of the fate of fish released by anglers has grown over the past few decades, a stark pattern has emerged illustrating how variability in angling behavior (e.g., air exposure, handling) plays a key role in determining the outcome of the angling event for the fish (Arlinghaus and Cooke, 2009; Cooke and Schramm, 2007; Cooke et al., 2013a; Muoneke and Childress, 1994). While general and species-specific tenets for C&R best practices have been recommended to optimize the survival and biological fitness of angled and released fish (for review see Brownscombe et al., 2017), a

strong limiting factor to the realized conservation value of C&R angling is the extent to which recreational anglers are willing to accept, adopt and engage in appropriate (best) practices and refrain from harmful ones. Put another way, C&R angling is a tool that relies on individual-level human decision-making to achieve conservation and management goals (Cooke et al., 2013c; Fulton et al., 2011). Indeed, more broadly speaking, “conservation means behavior” (Schultz, 2011).

Recreational C&R fisheries may be conceptualized as paradigmatic common pool resource dilemmas as competition for fish and the picture-perfect angling moment can fuel uncooperative and socially (as well as biologically) suboptimal angling behavior (Hardin, 1968; Ostrom, 2014). Individual motivation for compliance may be further attenuated by the lack of formal monitoring and enforcement capabilities common to expansive recreational fisheries (Sutinen, 1993). Thus, the transition to and adoption of C&R best practices will likely occur when the majority of recreational anglers meaningfully share and hold similar beliefs and values

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(Arlinghaus, 2006; Biel and Thorgensen, 2007). Recent work by Chapman et al. (2018) and others suggest that one underappreciated mechanism to facilitate the broader adoption of C&R best practices, and ultimately, the cultivation of a shared conservation ethic, is anglers' willingness and ability to monitor and advocate for best practices within their angling community (Granek et al., 2008). This is important because prior research indicates that various forms of interpersonal communication, including informal social sanctions (e.g., admonishing bad angling behavior), can shift normative perceptions and shared values, and, in turn, can increase cooperative behavior (Balliet, 2010; Cialdini, 2009; Ostrom et al., 1992; Ostrom, 2014).

1.1. Interpersonal communication and cooperation

The importance of interpersonal communication, and social sanctioning in particular, in fostering cooperative behavior and facilitating situation-appropriate social norms has been illustrated in classic social dilemma and game theory experiments for decades (Balliet, 2010; Balliet et al., 2011; Ostrom et al., 1992; Ostrom, 2014). In fact, much of this research demonstrates that significant increases in cooperative behavior and total yield occur when participants are permitted to communicate (e.g., administer sanctions) between rounds of decision-making (Balliet, 2010; Ostrom et al., 1992). The communication of topic-relevant information relayed to defectors (or cooperators) can help establish social expectations and norms of cooperation (Ostrom, 2014) by realigning transgressors' behavior toward the acceptable norm (e.g., admonishment) or by reinforcing the appropriateness of a compliant action (e.g., praise). Nolan (2013) and others have extended this work in the context of environmental behavior, arguing that in order to achieve a culture of environmental conservation, concerned individuals must be willing to confront or sanction others' environmental transgressions (Maki and Raimi, 2017; Nolan, 2017; Swim and Bloodhart, 2013). For example, Swim and Bloodhart (2013) found that verbally admonishing individuals following elevator use increased the likelihood of subsequently using the stairs, while Schultz et al. (2007) demonstrated how impersonal expressions of disapproval can help above-average energy consumers reduce their consumption rates.

Although the effectiveness of social sanctions in buttressing cooperative behavior are well-known, it is unclear how or if these behaviors will manifest in the context of recreational C&R fisheries. Prior research indicates angler-to-angler interactions as a primary channel through which communication about responsible angling practices occurs (Nguyen et al., 2012), while exchanges over social media represent another avenue to signal one's commitment to best practices (e.g., #Keepemwet Fishing; Danylchuk et al., 2018). Thus, there may be a clear opportunity to leverage preexisting communication channels among anglers. These oftentimes rudimentary and even transient interactions that exist between anglers can play a powerful role in shaping individual behavior and beliefs, particularly when expressing the approval or disapproval of others' actions or intentions. Nevertheless, realizing the potential benefits of angler-to-angler communication hinges on individuals' willingness to engage with one another, yet research has only recently begun to examine the determinants of such action (Chapman et al., 2018; Maki and Raimi, 2017; Nolan, 2013, 2017).

1.2. Predicting engagement

In recognizing the potential of interpersonal communication to cultivate and maintain the adoption of C&R best practices, Chapman et al. (2018) modeled anglers' intentions to sanction others in a golden dorado (*Salminus brasiliensis*) fishery on the

Juramento River in Argentina. Results revealed that younger anglers who expressed higher environmental concern compared to others, who identified angling as important to their lifestyle, and who were more open to engaging in zero air exposure angling events were the most willing to admonish other anglers' C&R transgressions (Chapman et al., 2018). Left unexamined by Chapman et al. (2018) are two other sets of factors previously identified as potentially important drivers of sanctioning behavior: perceived efficacy and contextually salient social factors (Nolan, 2013). When considering the question of what may motivate recreational anglers to express disapproval or approval of others' [in] appropriate actions or intentions, prior research indicates that particular emphasis should be given to the explicit social implications of engagement (e.g., perceived norms) as well as the degree to which individuals perceive the result of these socially costly behaviors—sanctioning and C&R best practices—as effective in achieving desired conservation outcomes (Nolan, 2013).

One critical factor that may influence the degree to which anglers sanction others is whether anglers maintain the belief that cooperative behavior and ecological outcomes can be improved by sanctioning and/or through evidence-based C&R best practices, respectively (Nolan, 2013; Noorgard, 2011). Research from a variety of fields suggests that individuals' willingness to take on a behavior is predicated on their perceived capacity to take action as well as their beliefs about the efficacy of the action in achieving desired outcomes (Bandura, 1986; Ajzen, 1991; Witte, 1992). Among a college sample, Nolan (2013) found that the perceived effectiveness of a sanctioning act significantly predicted individuals' willingness to impose a range of social sanctions on others' recycling behaviors. Thus, in the present context, if individuals perceive social sanctioning as an effective way to increase cooperative, evidence-based C&R angling behavior, they should be more willing to sanction. Likewise, a perception of evidence-based C&R best practices as an effective conservation angling practice in reducing threats to steelhead is also likely to increase sanctioning behavior.

Another factor that may influence individuals' willingness to sanction others in this context is a belief that their opinions about C&R best practices are shared by other anglers. Research on social norms reveals that people's behavior is often heavily influenced both by their understanding of what is socially acceptable (e.g., injunctive norms) and by what most other people are doing (e.g., descriptive norms; Cialdini, 2009). Social norms are instrumental in shaping environmental decisions (e.g., Schultz, 1999) and pro-social behaviors more generally (Krupka and Weber, 2009), and they have been recognized as influential in both the social dilemmas (Ostrom, 1990; Biel and Thorgensen, 2007) and recreational fisheries literature (van Poorten et al., 2011; Stensland et al., 2013; Bova et al., 2017; Danylchuk et al., 2017). Thus, we anticipate that anglers who perceive that the majority of other anglers are aware of and/or use C&R best practices should express a higher propensity to sanction. Sanctioning propensity may also be predicted by a somewhat distinct social influence: anglers' professed concern over their reputation within the angling community. Status motives have been demonstrated to increase pro-environmental behaviors, especially when behaviors are publically observable and costly (Griskevicius et al., 2010). Provided that interpersonal sanctioning offers individuals a means to publically express their commitment to C&R best practices (i.e., either by educating transgressors or else praising cooperators), anglers highly concerned about their own reputation should be more motivated to engage. In order to broaden our understanding of individuals' motivations to sanction for conservation, the factors introduced here and those previously identified by Chapman et al. (2018) and others were examined in the context of a highly revered, wild steelhead C&R fishery located in the Bulkley River in British Columbia (BC), Canada.

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