

# Evaluating Poaching Deterrents in the Southeast

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*Abstract:* Any deviation (poaching) from hunting or fishing regulations damages natural resources and negatively impacts both consumptive and non-consumptive wildlife users. This study explored deterrents to rule-breaking rooted in normative and traditional regulatory models, and evaluated factors influencing legitimacy of regulations by poachers. Hunters and anglers in North Carolina who had broken regulations ( $n=60$ ) were asked to rate the importance of poaching deterrents including sanctions (penalties issued for breaking rules), enforcement of regulations by wildlife officers, and normative social pressure. Respondents rated the known presence of game wardens as the most effective deterrent to poaching and rated factors associated with normative pressure as the least important. Respondents regarded regulations intended to promote wildlife conservation as the most legitimate and regulations that promoted fair chase and humane treatment of animals as among the least legitimate justifications for regulations. Public safety, humane treatment of animals, and environmental protection were more strongly supported as justifications for hunting regulations than for fishing regulations. Our findings highlight the importance of visible law enforcement, large penalties, and forming a clear nexus between regulations and sustainable game populations. Similarly there is a need to frame fair chase and humane treatment of animals as legitimate reasons for regulations, with the latter being particularly necessary for fishing regulations.

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*Key Words:* poaching, deterrents, southeast, hunting, angling

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Breaking any hunting or fishing regulation in the process of taking wildlife (also known as poaching) can have negative consequences for both wildlife and sportspersons, including a decline in species richness, genetic diversity, and reported satisfaction by non-poaching consumptive wildlife users (Edirisinghe 2003, Gigliotti and Taylor 1990). Poaching can threaten wildlife resources and wildlife related recreation for both consumptive and non-consumptive wildlife users (Muth 1998, Sethi and Hilborn 2008). These adverse consequences make reducing poaching a priority for both wildlife conservation and law enforcement agencies (Beattie et al. 1977, Kahler and Gore 2012).

Emerging literature on poaching suggests both normative and traditional models explain rule-breaking (Hatcher et al. 2000, Kahler and Gore 2012). Four primary factors influence consumptive wildlife users' decisions to comply with hunting and fishing regulations: perceived legitimacy of regulations, sanctions, enforcement, and peer pressure. Under normative compliance theory, perceived legitimacy of regulations corresponds to one's level of compliance (Kuperan and Sutinen 1998). Higher trust in regulations and perceived legitimacy have been shown to explain higher voluntary compliance of regulations (Stern 2008). Moreover, when

sportspersons believe regulations have significant impacts and a foundation in biology they see the regulations as more legitimate (Nielsen and Mathiesen 2000).

Additionally, sanctions imposed on rule-breakers have been shown to deter consumptive wildlife users from engaging in poaching activities, especially when sanctions are seen as outweighing potential gains from poaching (Kuperan and Sutinen 1998). Although receiving fines and jail time have been shown to be significant deterrent to future rule breaking (Furlong 1991, Nielsen and Mathiesen 2000), the fear associated with these potential negative consequences creates an important deterrent by itself (May 2005). Credible enforcement (including wildlife officer presence) heightens the deterrent effect associated with penalties and fear of penalties (Stern 2008). The frequency of wildlife officer patrol has also been shown to decrease the amount of poaching instances (Jachmann and Billiouw 1997). Finally, social pressure has been shown to increase compliance among consumptive wildlife users (Kuperan and Sutinen 1998, Nielsen 2003). Concern about social disapproval and an ill reputation among peers discourages illegal behaviors by increasing one's sense of responsibility to comply (May 2005, Jones et al. 2008).

Despite the critical role hunting and fishing play for wildlife conservation and rural economies throughout the southeast (Dalrymple et al. 2010), most research on poaching in recent decades has focused in international contexts (Duffy 1999, Jones et al. 2008, Kahler and Gore, 2012). Further, little if any research has addressed the degree to which deterrents are similar among hunters and anglers or has evaluated the perspectives of sportspersons who break regulations but have not been caught. To effectively manage and develop regulation and compliance strategies in the southeast, wildlife managers must develop an understanding of effective deterrents. We begin addressing the need for this understanding with a survey study in North Carolina. Specifically, we studied poachers' views of normative and traditional methods of compliance as well as factors that influenced poachers' views on wildlife regulation legitimacy.

## Methods

We administered a questionnaire between February and April 2013 using purposive sampling of hunters and anglers in North Carolina who had admitted to breaking a hunting or fishing regulation. We used the tailored design method for survey development (Dillman 2007). Prior to distribution to the targeted sample, questionnaires ( $n=45$ ) were pretested with consumptive recreation users who were associated with the North Carolina State University College of Natural Resources. Additionally, we used cognitive interviews with a convenience sample of 15 sportspersons in Raleigh, North Carolina, to inform questionnaire development during pre-testing (Willis 2005). Because no sampling frames existed for hunters and anglers who had broken regulations but had not been caught, we identified study participants through social networks of the authors and upperclassmen in the North Carolina State University Fisheries, Wildlife, and Conservation Biology program. In an attempt to ease apprehensions and establish trust with participants (Gavin et al. 2010), researchers administered the questionnaires in person and presented participants with a letter from the North Carolina Wildlife Resources Commission (NCWRC) stating that questionnaire responses would not lead to prosecution.

The questionnaire included both demographic questions and questions focused on participants' views on normative and traditional models of compliance (Hatcher et al. 2000, Kahler and Gore 2012, Nielson 2003). To understand views on legitimacy of regulations, participants were given a list of reasons why one might support hunting and fishing regulations: making hunting or fishing more sporting, promoting humane treatment of wildlife, providing opportunities for tourists to catch fish or bag game animals, restoring a depleted fish or wildlife population, promoting

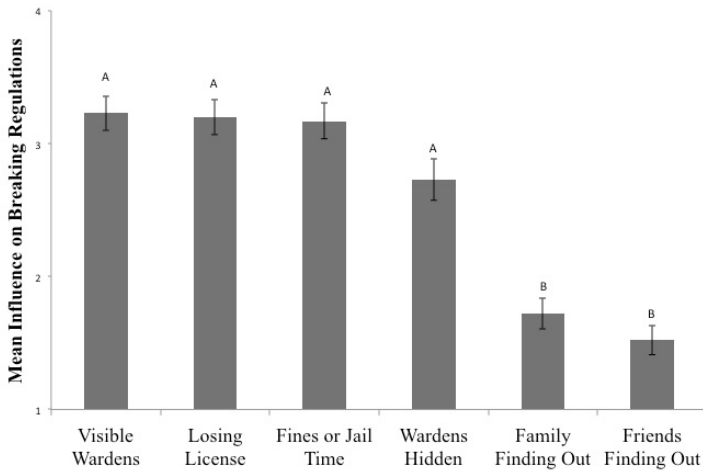
public safety, protecting the environment, and generating money for wildlife or fishery management. Participants ranked their support for each underlying justification for regulations on a seven-point Likert-type scale where 1 = strongly oppose, 4 = neutral, and 7 = strongly support. Participants were asked to indicate how much they were deterred from breaking regulations (on a four-point Likert-type scale where 1 = no influence at all and 4 = a lot of influence) by: knowing game wardens were hiding out of sight, seeing game wardens on patrol, concerns about losing license privileges, concerns about receiving fines or jail time, concerns about friends finding out, and concerns about family finding out. We used SPSS 21.0 software (SPSS Inc. 2012) for all statistics. We compared both perceived importance of poaching deterrents and perceived legitimacy of regulation justifications using ANOVAs with Bonferroni post-hoc tests. We compared perceived legitimacy of regulation justifications between hunting and fishing regulations using  $t$ -tests. A significance level of  $P \leq 0.05$  was used for all tests.

## Results

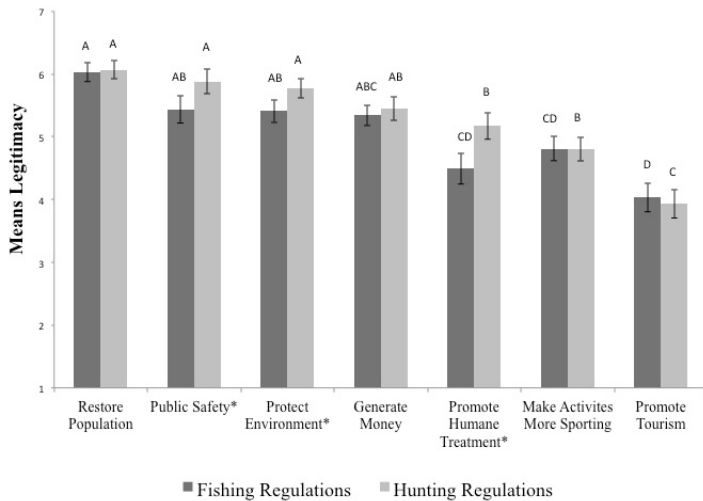
Of the 60 participants surveyed, the average age was 32 (min: 18 years old, max: 87 years old), 85% were white and 95% were male. Half identified as participating in both hunting and angling (53%) whereas 15% were only anglers and 32% were only hunters. While all respondents had broken at least one hunting or fishing regulation in the past, only 16.7% had been cited for breaking a hunting regulation and 11.7% had been cited for breaking a fishing regulation. Respondents estimated that 64.9% percent of all anglers had violated a fishing regulation and that 35.1% of anglers frequently violate fishing regulations, while respondents estimated 67% of hunters had violated a hunting regulation and 39% of hunters frequently violate hunting regulations.

Visible game wardens ( $= 3.23$ ,  $SE = 0.13$ ; based on a four-point Likert-type scale), concerns over losing a hunting or fishing license ( $= 3.20$ ,  $SE = 0.13$ ), and fines or jail time ( $= 3.17$ ,  $SE = 0.13$ ) were the highest ranked deterrence factors among respondents (Figure 1). On average, hidden game wardens were ranked as having some influence ( $= 2.73$ ,  $SE = 0.16$ ) over compliance, but were not statistically different from visible game wardens, losing licenses, or incurring fines or jail time. Family finding out about respondents being caught breaking a regulation ( $= 1.72$ ,  $SE = 0.11$ ) and friends finding out about respondents being caught breaking a regulation ( $= 1.52$ ,  $SE = 0.11$ ) were less important than the other drivers of deterrence (Figure 1).

Hunters and anglers linked legitimacy to regulations in similar ways (Figure 2). Restoring depleted fish and wildlife populations (fishing regulation  $= 6.03$ ,  $SE = 0.15$ , hunting regulation  $= 6.07$ ,  $SE = 0.15$ ; based on the seven-point Likert-type scale), pub-



**Figure 1.** Relative importance of potential poaching deterrents reported by North Carolina poachers in 2013 ( $n = 60$ ). Respondents rated each potential deterrent on a scale of 1 = “no influence at all” to 4 = “a lot of influence.” Different letters above bars indicate significantly different means ( $\alpha \leq 0.05$ ).



**Figure 2.** Poachers’ views on the legitimacy of regulation justifications reported by North Carolina poachers in 2013 ( $n = 60$ ). Respondents rated each factor based on how it would influence support for hunting or fishing regulations on a scale of 1 = “strongly oppose” to 7 = “strongly support.” Different letters above bars indicate significantly different means ( $\alpha \leq 0.05$ ) for views of the legitimacy of each regulation’s justification and asterisks indicate significant differences between hunting and fishing regulations.

lic safety (fishing regulation = 5.44, SE = 0.22, hunting regulation = 5.88, SE = 0.19), and protecting the environment (fishing regulation = 5.41, SE = 0.18, hunting regulation = 5.77, SE = 0.15) were perceived as the most legitimate reasons for hunting and fishing (Figure 2). Generating money for wildlife and fisheries management (fishing regulation = 5.34, SE = 0.16, hunting regulation = 5.45, SE = 0.20) was also perceived as highly legitimate, but was not statistically different from promoting humane treatment of fish and wildlife (fishing regulation = 4.49, SE = 0.24, hunting regulation = 4.80, SE = 0.19) and promoting fair chase (mak-

ing activities more sporting) (fishing regulation = 4.81, SE = 0.19, hunting regulation = 4.80, SE = 0.19) which were perceived as less legitimate reasons for regulations. Promoting hunting or fishing related tourism (fishing regulation = 4.03, SE = 0.23, hunting regulation = 3.93, SE = 0.22) was seen as the least legitimate justification for hunting regulations, but was not statistically different than promoting humane treatment and fair chase for fishing regulations (Figure 2). Public safety, environmental protection, and promoting humane treatment for animals were all supported more as justifications for hunting regulations than as justifications for fishing regulations (Figure 2).

**Discussion**

Our results highlight several key insights about poaching. First, normative social pressure appeared less important to poachers than the visible presence of law enforcement and stiff penalties for breaking laws. Although social pressure has been identified as important poaching deterrent in international contexts (May 2005, Jones et al. 2008), this effect was not identified in North Carolina. The relatively low importance of normative social pressure as a poaching deterrent may be explained in part by respondents believing poaching was pervasive, and hence not normatively proscribed. Respondents in our sample believed most other consumptive wildlife participants had broken a hunting or fishing regulation and believed more than one third of all consumptive wildlife participants frequently violated some regulations. Nielsen and Mathiesen (2000) noted that peer pressure to conform to regulations erodes if compliance, or perceptions of compliance, becomes too low. Essentially, if hunters or anglers are accustomed to rule breaking, or believe everyone else is already breaking rules, social pressure may not act as a deterrent. Additionally, respondents may be operating in social circles where poaching is more frequent, so social norms may not be perceived by poachers as a deterrent to engage in the activity. This highlights the need to reconsider regulations that are perceived as illegitimate or impossible to enforce, or change to perceptions of those regulations, thereby promoting the belief that most sportspersons follow regulations.

Our findings that fear about being caught (e.g., visible law enforcement) and existence of stiff penalties are important poaching deterrents for poachers reflects previous research findings in developing nations (Kahler and Gore 2012, Kuperan and Sutinen 1998). The dominance of penalties and enforcement over social norms as deterrents in our study may reflect less social capital in North Carolina than in hunting or fishing dependent communities in developing nations. Social capital refers to the value of social relationships; so increasing social capital makes community norms more important relative to penalties from outside a community

(Bourdieu 1985, Ostrom 1990). This potentiality merits further research in other contexts and with larger samples of hunters.

Because wildlife conservation and safety were perceived as the most legitimate reasons for regulations, these factors should be explicitly tied to regulations when possible. Whereas poachers viewed wildlife conservation (e.g., restoring populations, protecting the environment and generating money for wildlife and fisheries management) and safety as highly legitimate reasons for regulations, fair chase (making hunting and fishing more sporting), humane treatment of animals, and promoting hunting or fishing tourism were relatively less legitimate justifications. Further, humane treatment of fish was less important than humane treatment of hunted animals. This may reflect pervasive beliefs that wildlife management should not broach moral issues (Peterson et al. 2007), and a tendency to exclude fish from typical concerns about humane treatment (Cooke and Sneddon 2007). Although regulations addressing welfare of fish may be seen as less legitimate, they could be linked to the more broadly supported wildlife conservation justifications because regulations that improve welfare (e.g., those impacting hook type, bait, air exposure, fishing during extreme weather or reproductive periods) also typically benefit fish populations (Cooke and Sneddon 2007).

Although our findings highlight several important attributes of poaching deterrents and perceptions of regulation legitimacy by poachers, the small sample size and purposive sampling mean results should be viewed as exploratory and as a call for future research. Key questions to address in future research include whether penalties remain as more important poaching deterrents than social norms (and why), whether hidden game wardens remain less important as deterrents than visible game wardens (and why), and whether regulations justified by conservation objectives are seen as more legitimate than animal welfare and fair chase related regulation (and why).

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