

Hunting and Non-hunting College Student's Perceptions of Wildlife and Each Other

M. Nils Peterson, North Carolina State University, Department of Forestry and Environmental Resources, Fisheries, Wildlife, and Conservation Biology Program, Turner House, Box 7646 Raleigh, NC 27695-7646

Christopher S. DePerno, North Carolina State University, Department of Forestry and Environmental Resources, Fisheries, Wildlife, and Conservation Biology Program, Turner House, Box 7646 Raleigh, NC 27695-7646

Christopher E. Moorman, North Carolina State University, Department of Forestry and Environmental Resources, Fisheries, Wildlife, and Conservation Biology Program, Turner House, Box 7646 Raleigh, NC 27695-7646

Kathryn A. Cunningham,¹ North Carolina State University, Department of Forestry and Environmental Resources, Fisheries, Wildlife, and Conservation Biology Program, Turner House, Box 7646 Raleigh, NC 27695-7646

Jared P. Milrad,² North Carolina State University, Department of Forestry and Environmental Resources, Fisheries, Wildlife, and Conservation Biology Program, Turner House, Box 7646 Raleigh, NC 27695-7646

Jason D. Riddle,³ North Carolina State University, Department of Forestry and Environmental Resources, Fisheries, Wildlife, and Conservation Biology Program, Turner House, Box 7646 Raleigh, NC 27695-7646

Toddi A. Steelman, Department of Forestry and Environmental Resources, North Carolina State University, Raleigh, NC 27695

Abstract: Hunting has shaped the history of wildlife conservation, but research exploring the relationship between hunting and conservation is new. A decline in the popularity of hunting has spurred research on hunting participation and recruitment, but less is known about how hunting influences societal negotiation of the appropriate roles for humans and wildlife. We addressed this need with a personally administered survey to 320 college students at North Carolina State University (NCSU). The survey sampled 17 courses in eight of the nine colleges at NCSU with 100% compliance rate. Hunters were more likely to view wildlife in utilitarian, dominionistic, and naturalistic ways than non-hunters who tended to view wildlife in moralistic, humanistic, and symbolic ways. Women were more likely to view wildlife in moralistic and humanistic ways than men who tended to view wildlife in utilitarian and scientific ways. Religious respondents were more likely to view wildlife in utilitarian ways than non-religious respondents who tended to view wildlife in scientific and humanistic ways. Non-hunters overestimated the importance of hunting for sport and understated the importance of collecting meat and managing wildlife as motivations for hunters. Hunters overestimated the importance of animal rights as a key motivation for not hunting among non-hunters. These results provide preliminary guidance for tailoring college level wildlife education materials based on hunting participation, religion, and gender. Such efforts could help correct misconceptions regarding motivations for hunting and choosing not to hunt among society's future decision makers.

Key words: hunters, non-hunters, wildlife, wildlife values

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Hunting has played a major role in wildlife management for millennia. Egyptian hunting records from 2,500 BC (Leopold 1933) and Genghis Khan's 13th century hunting preserves (Caughley 1985) demonstrate the deep roots of hunting in wildlife management. Recent declines in recruitment of hunters and popularity of hunting have motivated numerous studies examining the influence of socio-demographics on hunting (Stedman and Decker 1993, Miller and Graefe 2001, Zinn et al. 2002, Campbell and Mackay

2003, Li et al. 2003, Clendenning et al. 2005, Heberlein and Ericsson 2005, Peterson et al. 2008b). In the United States, hunting participation peaked in 1975 with 17,094,000 hunters nationwide, constituting ~8% of the American population (U.S. Department of the Interior and U.S. Department of Commerce 2002). By 2006, there were only 12.5 million hunters nationwide, constituting ~4% of the total U.S. population (U.S. Department of the Interior and U.S. Department of Commerce 2007).

1. Kathryn A. Cunningham, Division of Forestry, Natural Resources, 322 Percival Hall, West Virginia University, Morgantown, WV 26506

2. Jared Milrad, Northeastern University School of Law, 400 Huntington Avenue, Boston, MA 02115

3. Jason Riddle, University of Wisconsin—Stevens Point, College of Natural Resources, 800 Reserve St., Stevens Point, WI 54481

Assessing how hunters and non-hunters orient themselves to each other and to wildlife is critical for wildlife managers hoping to influence hunter behavior and ameliorate conflict regarding hunting. Identity negotiation refers to processes whereby people reach agreement regarding the appropriate roles for themselves and other entities in the environment (e.g., wildlife; Swann 1987). When entities, people or wildlife, act in ways incongruent with the expectations created during identity negotiation, conflict ensues (Swann and Ely 1984). For instance, if hunters view themselves as agents of ecosystem integrity, and non-hunters view hunters as brutal sport killers, collaborative conservation efforts will prove difficult. Although conflict can be beneficial when wildlife conservation requires breaking down old social stereotypes and structures, it typically makes wildlife management more expensive and time consuming (Snyder and Klein 2005). The first step toward ameliorating such conflicts is learning how hunters and non-hunters view each other's identities in relation to wildlife.

How one orients him or herself to others is a key element of identity (Swann 1987). Within wildlife science, Kellert's (1978) wildlife orientations provide a foundation for research addressing how people orient themselves toward wildlife. Although the specific categories changed and were used in various combinations over time, they included: (1) utilitarian—wildlife existed to be used efficiently to meet human interests; (2) dominionistic—wildlife were objects humans exerted mastery, physical control, and dominance over; (3) naturalistic—wildlife gave humans satisfaction through direct experience or contact; (4) moralistic—wildlife were entities eliciting strong affinity, spiritual reverence, and ethical concern; (5) humanistic—wildlife elicited strong emotional attachment and love in ways similar to humans; (6) aesthetic—wildlife were attractive and beautiful representations of nature; (7) negativistic—wildlife were a source of fear, aversion, disdain, and alienation from nature; and (8) scientific/ecologicistic—wildlife represented a window to understanding how nature works (Manfredo 2008). Kellert's (1978) research indicated most hunters identified with wildlife in utilitarian or naturalistic ways, but sport hunters had dominionistic views of wildlife. Utilitarian hunters usually came from rural settings and had family members who participated in farming practices, whereas naturalistic hunters were young, had a high socioeconomic status and education, and were interested in enjoying wildlife and the outdoors (Kellert 1978). According to Kellert (1978), most non-hunters or anti-hunters viewed wildlife moralistically, were predominately women, lived in urban areas, had few regular interactions with animals, and lacked family traditions in farm-related activities. Recent research, however, indicates people in the United States are creating more humanistic and moralistic identities for wildlife as education levels increase (Li et al. 2003).

Research has addressed differences between self identity of hunters and identities generated for hunters by non-hunting groups (Minnis 1997, Heberlein and Willebrand 1998). Hunters often express their role as maintaining a natural balance, enacting a natural role as a predator or as sportspersons (Peterson 2004). Non-hunting groups can view the role of hunters as degrading society as a whole, both morally and ethically, by promoting the human inclination towards killing or violence (Minnis 1997, Heberlein and Willebrand 1998). No research that we are aware of has addressed what hunters think motivates non-hunters to not hunt and what non-hunters think motivates hunters to hunt. We begin addressing this need with a study assessing how hunting and non-hunting college students at North Carolina State University (NCSU) orient themselves toward wildlife and view each other's motivations in relation to hunting.

Students at a large land-grant university in the Southeast are a valuable target population because: (1) they are likely to influence wildlife management agencies as educated adult citizens; (2) as a generally young population, they can provide significant insights into how identity negotiation related to hunting will be expressed in the future, particularly in areas with relatively high percentages of college graduates; (3) they host a higher percentage of hunters and students with other tangible ties to the land (e.g., farmers and ranchers) than non-land-grant universities. Hence, we sought to determine how hunting participation, wildlife value orientations among hunters and non-hunters, and perceptions between the two groups could affect the course of wildlife management and the development of regulatory legislation.

Methods

We assessed the identities hunters and non-hunters gave each other and wildlife using a personally administered survey in classrooms at NCSU in Raleigh, North Carolina, during February and March 2006 (NCSU Human Subjects Approval No. 1084-09). We used a combination of systematic and convenience sampling. We sampled one course from each of the eight colleges on NCSU's main campus (Table 1; The College of Textiles is not located on the main campus) and then sampled students from an additional nine courses via convenience sampling. Founded in 1887, NCSU is a land-grant institution with approximately 30,000 students, 1,800 faculty members, and nine colleges (NCSU 2006). In fall 2003, NCSU reported the following student demographics: 77.3% Caucasian, 9.8% African American, 5.4% Asian, 5.0% International, 2.0% Hispanic, and less than 1.0% Native American (NCSU 2003). During the same period, NCSU was 56.7% male and 43.3% female (NCSU 2003).

We assessed orientations toward wildlife using Kellert's (1978)

list of wildlife orientations as a general framework (Table 2). We asked students ‘which best describes your views about wildlife’ and instructed them to check up to three of the eight items. Each item was accompanied by a description: utilitarian (wildlife exists to be used), aesthetic (appreciate natural beauty), moralistic (animal welfare/rights), negative (disdain, aversion from wilderness), scientific (interest in, understanding of ecology), dominionistic (wildlife exists to be conquered), humanistic (love of nature), naturalistic (love being outdoors), symbolic (source of spiritual con-

nection). Only two respondents chose the negative orientation, so it was not used in analysis.

We accessed the congruence between identities hunters and non-hunters negotiated for each other with five questions. First we asked respondents ‘have you ever gone hunting’, then we asked hunters ‘why do you hunt,’ asked non-hunters ‘why do people hunt,’ asked hunters ‘why do non-hunters not hunt,’ and asked non-hunters ‘why do you not hunt.’ Options for why people hunted were: sport, wildlife management, family tradition, food, and other. Options for why people did not hunt were: no interest, concern for animal rights/welfare, not part of family tradition, and other. None of the “other” options generated sufficient answers for analysis ($n < 9$ for all). We dummy-coded religion as a binary variable from responses to the following open ended question: ‘please identify your religion, if any.’ Because sample size for many of the 20 individual religions was extremely small, we limited inferences to those not affiliated with organized religion, and those affiliated with organized religion. The binary variable divided respondents by whether they indicated affiliation with an organized religion or did not, and lumped diverse groups. However, the broad distinction between religious and non-religious groups has played a significant role in predicting environmental attitudes in previous studies (Peterson and Liu 2008). We coded urban background as an ordinal variable from responses to the following question: ‘where did you spend the majority of your childhood.’ Respondents could choose from rural, suburban, or urban categories.

All descriptive and inferential statistics were calculated using SPSS (Release 15.0.0, SPSS, Chicago, Illinois). We compared hunters and non-hunters using chi-square tests of independence. We

Table 1. List of North Carolina State University colleges and corresponding classes surveyed, 2006 (colleges $n = 8$, classes $n = 17$).

College name	Class name
College of Agriculture and Life Sciences	Local flora
	Introduction to human nutrition
College of Design	Special topics in architecture
College of Education	The teaching of composition
College of Engineering	Electromagnetism
College of Humanities and Social Science	American history
	Elementary Spanish
	Global environmental politics
	Public speaking
	Religious traditions of the world
College of Management	Developmental psychology
	Introduction to income taxes
College of Natural Resources	Fisheries and wildlife administration
	Forest wildlife management
	Natural resources advocacy
College of Physical and Mathematical Science	Introduction to statistics
	Quantitative chemistry laboratory

Table 2. Logistic regression models of wildlife orientations held by North Carolina State University students, 2006 ($n = 316$).

Dependent variables ^a	Independent variables								R ²	Model fit ^b (P)
	Gender (1 = male, 2 = fem)		Religion (1 = no, 2 = yes)		Urban (1 = rural, 2 = sub, 3 = urban)		Hunter (1 = no, 2 = yes)			
	B	Odds ratio (95% CI)	B	Odds ratio (95% CI)	B	Odds ratio (95% CI)	B	Odds ratio (95% CI)		
Utilitarian	-0.67*	0.51 (0.30-0.87)	0.96**	2.61 (1.41-4.82)	-0.12	0.88 (0.63-1.25)	1.01***	2.74 (1.58-4.77)	0.18	0.76
Aesthetic	0.17	1.19 (0.72-1.96)	0.36	1.43 (0.85-2.41)	0.31	1.37 (1.00-1.89)	0.44	0.642 (0.378-1.09)	0.05	0.26
Moralistic	0.99**	2.70 (1.42-5.15)	-0.29	0.75 (0.40-1.40)	-0.08	0.92 (0.62-1.37)	-1.02*	0.36 (0.16-0.81)	0.13	0.70
Scientific	-0.81**	0.45 (0.27-0.75)	-0.53*	0.59 (0.35-1.00)	0.01	1.01 (0.73-1.41)	0.02	1.02 (0.59-1.76)	0.07	0.95
Dominionistic	-0.91	0.40 (0.10-1.64)	0.78	2.19 (.471-10.15)	-0.45	0.64 (0.27-1.48)	1.32*	3.72 (1.03-13.42)	0.14	0.45
Humanistic	0.70*	2.00 (1.17-3.42)	-0.75**	0.47 (0.27-0.81)	-0.13	0.88 (0.62-1.24)	-0.83**	0.44 (0.23-0.81)	0.13	0.18
Naturalistic	0.18	1.20 (0.73-1.97)	-0.15	0.86 (0.51-1.46)	-0.06	0.94 (0.69-1.29)	0.88**	2.40 (1.38-4.17)	0.05	0.75
Symbolic	0.71	2.03 (0.85-4.86)	-0.13	0.88 (0.38-2.03)	-0.02	0.98 (0.58-1.66)	-1.85*	0.16 (0.04-0.71)	0.11	0.60

a. Coded such that 2 = yes, and 1 = no

b. Hosmer and Lemeshow test ($P > 0.10$ indicates failure to reject hypothesis that the model fits the data)

* $P < 0.05$

** $P < 0.01$

*** $P < 0.001$

used binary logistic regression to account for multiple variables simultaneously (Cohen and Cohen 1983). We evaluated model fit using the Hosmer-Lemeshow goodness-of-fit test (Hosmer and Lemeshow 2000). We assessed predictive performance of independent variables using odds ratios. Alpha was set at $P \leq 0.05$.

Results

Seventeen classes were surveyed representing the eight colleges on NCSU's main campus, with 100% compliance rate and 5.45% margin of error. We did not attempt to follow up with students who were not attending class when the survey was administered. Of the 320 students surveyed, 104 (33%) were hunters and 216 (67%) were non-hunters. Most hunters (63%) were raised in a rural area, while most non-hunters (63%) were raised in non-rural areas. Also, 77% of hunters reported having another hunter in their household, while only 21% of non-hunters had a hunter in their household. Most hunters (78%) were male, while a majority of non-hunters (64%) were female. Non-hunter respondents were more racially diverse (20% non-Caucasian) than hunters (1% non-Caucasian).

Twenty-five percent of non-hunters supported hunting, whereas 52% were neutral, and 22% opposed hunting. Additionally, 72% of non-hunters believed game species should be managed, while 90% of hunters held the same opinion. Similarly, 77% of non-hunters and 89% of hunters believed non-game and endangered species should be managed. Eighty-eight percent of non-hunters and 73% of hunters believed animals should be treated humanely. A comparable percent of hunters (36%) and non-hunters (30%) believed that animals have "some rights." Few non-hunters (13%) indicated they had participated in wildlife issues (e.g., attended public forums, wrote legislatures or newspaper editorials), while 39% of hunters said they had participated. Further, when asked how wildlife populations should be managed, 76% of non-hunters indicated land should be preserved, while 56% recommended hunting and 21% supported non-lethal sterilization. When asked if they supported non-lethal sterilization as a wildlife management tool, 40% of hunters answered in the affirmative.

Hunters were more likely than non-hunters to have utilitarian (hunter = 57.1%, non-hunter = 26.7%), dominionistic (hunter = 10.5%, non-hunter = 1.9%), and naturalistic (hunter = 69.5%, non-hunter = 50.5%) orientations toward wildlife (Table 2). Non-hunters were more likely than hunters to claim moralistic (non-hunter = 27.6%, hunter = 8.6%), humanistic (non-hunter = 41.0%, hunter = 19.0%), and symbolic (non-hunter = 14.3%, hunter = 1.9%) orientations toward wildlife (Table 2). Women were more likely to view wildlife in moralistic (31.1%) and humanistic (43.5%) ways than men (moralistic = 11.0% humanistic = 23.2%), while men were more likely to view wildlife in utilitarian (48.4%) and scientific

(45.2%) ways than women (utilitarian = 25.5%, scientific = 26.7%; Table 2). Religious respondents were more likely to view wildlife in utilitarian (41.7%) ways than non-religious respondents (22.2%), while non-religious respondents were more likely to view wildlife in scientific (44.4%) and humanistic (45.7%) ways than religious respondents (scientific = 32.8%, humanistic = 29.4%; Table 2).

Belief that sport motivated hunting varied by whether respondents were hunters ($\chi^2 = 35.51$, 1 df, $p < 0.001$). Only 49% of hunters indicated they hunted for sport, while 74% of non-hunters believed sport was the primary reason for hunter participation (Figure 1). Hunters were more likely than non-hunters to view wildlife management ($\chi^2 = 5.04$, 1 df, $p = 0.025$) and collecting food ($\chi^2 = 5.074$, 1 df, $p = 0.024$) as primary reasons for hunting (Figure 1). Hunters and non-hunters did not differ on their views of family tradition as a predictor of hunting ($\chi^2 = 0.695$, 1 df, $p = 0.404$). Non-hunters were more likely (72%) than hunters (53%) to view lack of interest as the primary reason non-hunters do not hunt (Figure 2; $\chi^2 = 22.96$, 1 df, $p < 0.001$). Hunters were more likely (27.5%) than non-hunters (12.9%) to view concern for animal rights as the primary reason

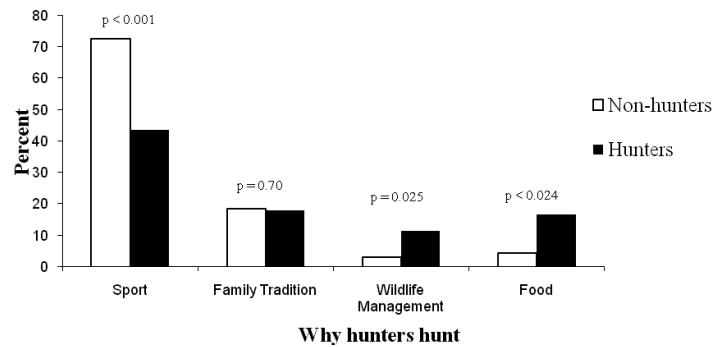


Figure 1. Reasons why hunters hunt according to hunters and perceived reasons according to non-hunters ($n = 278$), North Carolina State University students, 2006.

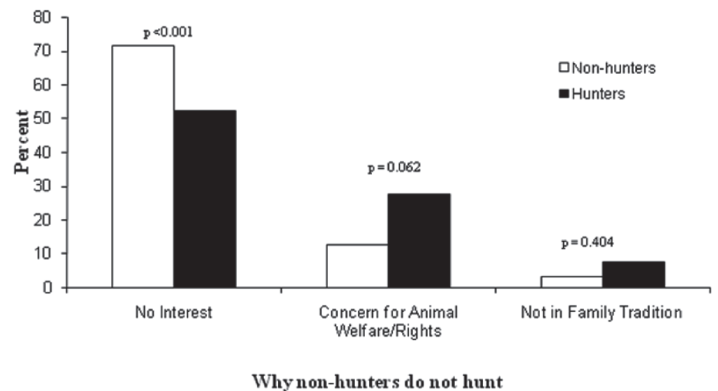


Figure 2. Reasons why non-hunters do not hunt according to non-hunters and perceived reasons according to hunters ($n = 274$), 2006.

non-hunters do not hunt (Figure 2; $\chi^2 = 3.49$, 1 df, $p = 0.062$). Half (53%) of hunters correctly identified that hunter numbers are declining, while only 24% of non-hunters thought the hunting population was decreasing.

Discussion

There were notable differences between hunters and non-hunters in our sample of NCSU college students. Consistent with national trends, the majority of hunters among NCSU students were raised in rural communities, which typically have long-standing hunting traditions, whereas non-hunters were more frequently from suburban and urban areas. We found a greater percentage of female hunters among NCSU students than observed in national trends (22% at NCSU compared to the 9% national average; U.S. Department of the Interior 2002). Exposure to hunting was important: 77% of NCSU student hunters reported having one or more hunters in their household, while only 21% of non-hunters made the same claim. These results support the importance of familial influences on hunting participation (Zinn et al. 2002, Peterson et al. 2008b).

Our research indicated hunters and non-hunters in the NCSU student body shared many orientations regarding wildlife. With strong naturalistic and scientific orientations, hunters and non-hunters have the potential to agree on many aspects of wildlife management. It appears that hunters and non-hunters shared an underlying appreciation for wildlife and believed that wildlife should be treated humanely. However, hunters appeared to have a more cogent understanding of hunting trends, both in North Carolina and nationally, and were more active in other wildlife policy related activities (e.g., attending North Carolina Wildlife Resources Commission meetings or contacting the legislature about wildlife concerns) than non-hunters.

Hunters within the NCSU student body oriented themselves toward wildlife in utilitarian, dominionsitic, and naturalistic ways that give satisfaction through direct experience (Table 2). These results are intuitive because hunting extracts practical and material values from wildlife (e.g., meat, hides, and trophies), killing or attempting to kill something is one way of exerting mastery or control over it (Kellert 1989), and the recreational value of hunting is tied in part to physical experiences in nature (Dizard 2003). Conversely, moralistic, humanistic, and symbolic orientations toward wildlife were positively associated with being a non-hunter at NCSU. The orientations toward wildlife negotiated by non-hunters are conspicuous for their lack of emphasis on physical experience or contact with wildlife in contrast to utilitarian or naturalistic identities expressed by hunters. This may be explained by pragmatic constraints associated with urbanization and declines in travel

to natural areas. This lack of physical connection to wildlife has been blamed on technological alternatives to outdoor recreation (e.g., video games; Pergams and Zaradic 2008). Because current U.S. college students are the first generation truly "native" to the digital age (Millenbah and Wolter 2009), any technology-induced isolation from wildlife will likely grow in the future.

The gender effects highlighted in this study indicate male college students may be more likely to view wildlife as objects (i.e., things that are acted upon [for use in case of utilitarian views and knowledge in the case of scientific views]) and female college students may be more likely to view wildlife as subjects (e.g., subjects of emotional attachment in the case of humanistic views and ethical concern in the case of moralistic views). Similarly, previous research suggested males had cognitive perceptions of animals while females have more emotional perceptions of animals (Gilligan 1982, Kellert and Berry 1987), and males view wildlife as objects (i.e., things that are acted upon) whereas females view wildlife as subjects (i.e., actors; Bell 2001, Huxham et al. 2006).

The tendency for our religious respondents to view wildlife in utilitarian ways more than non-religious respondents may reflect White's (1967) assertion that Judeo-Christian faith promotes a dominion over nature perspective. The views of religious versus non-religious respondents may reflect a debate in the United States over creationism and evolution that has pitted science against religion in regards to creating identities for animals since the 1920s (Larson 1997).

Hunters and non-hunters within the NCSU student body showed clear differences in how they characterized each other. Non-hunters overestimated the importance of hunting for sport as a key motivation for hunters, which may indicate (1) animal welfare and rights groups influence non-hunter perception of hunting, (2) non-hunters rarely ask hunters about their true motivations for hunting, (3) hunters fail to articulate their particular motivations for hunting, or (4) advertising aimed at sport hunters influences public perceptions more than actual interactions with hunters (Peterson et al. 2008b). The latter scenario is problematic for hunters, because sport hunting can provide a lucrative market and may drive advertising even if sport, as a motivation for hunting, declines in the future. Most non-hunters indicated the reason they did not hunt was because of a lack of interest, indicating that non-hunters may not be as concerned about animal rights and welfare as hunters believe.

The NCSU students who hunted were more likely than non-hunters to view wildlife management and collecting food as primary reasons for hunting. The 100-year history of hunters promoting, conducting, and paying for wildlife management in North America may explain the first finding (Geist et al. 2001). The di-

vergent views between these two groups regarding meat hunting may reflect that most commercially-produced meat varieties in the United States cost less than the average amount spent to obtain an equivalent amount of venison through hunting (Peterson 2004). However, the value of venison to hunters may derive more from cultural norms (e.g., the value of knowing where your food comes from or physically providing for your family) and its role in social exchanges as from its contribution to a household's food supply. The potential for hunting to reduce the carbon footprint associated with food procurement is growing as an additional value of venison (Kerasote 1993).

Management Implications

Our research suggests that although hunting and non-hunting students at NCSU may have differing identities in relation to wildlife, they do have similar views on the importance of wildlife conservation, management, and humane treatment of wildlife. Therefore, we encourage educational forums where non-hunters and hunters can exchange thoughts/experiences and learn how each others identities were developed and what motivates each group to participate or not participate in hunting. This study provides preliminary guidance for tailoring wildlife education and outreach materials for stakeholder groups based on hunting participation, religion, and gender, and for improving communication between hunting and non-hunting groups. Materials developed for each group should reflect, at least initially, orientations the group holds in relation to wildlife. For example, collegiate wildlife educators may be able to improve education programs for females by characterizing wildlife as subjects in addition to objects (Bell 2001, Huxham et al. 2006, Peterson et al. 2008a). Efforts to improve dialogue between hunters and non-hunters should counter the effects of sport hunting-related advertising and media by emphasizing the importance of food and wildlife management as motivations for hunters, and the fact that lack of interest, not animal rights views, is the primary reason most non-hunters do not hunt.

Most non-hunters at NCSU incorrectly identified the main motivation for hunters as "sport" and oriented themselves to wildlife in ways that indicated a lack of physical interaction with wildlife. This suggests that an increasingly urban population of college students has grown detached from traditional wildlife-related activities and is misinformed on why hunters choose to hunt. Although we agree with Millenbah and Wolter's (2009) suggestion that adopting new technology (e.g., pod-casts, virtual classrooms and textbooks) in university curriculum will facilitate teaching students native to the digital age, our results suggest wildlife management curricula may need to include courses that jettison technology and force students to interact with wildlife without digital intermediaries (e.g., GPS,

GIS, radios). Unfortunately university-level summer camp programs, the historical stronghold for coursework requiring physical interaction by college students with wildlife, are becoming progressively rare among wildlife management programs in the United States. Future research should address how our results apply to broader populations of hunters and non-hunters, the extent animal rights and welfare agendas and advertising for sport hunting contribute to public misperceptions regarding motivations for hunting, and why hunting predicted engagement in wildlife management decision making.

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