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Anita T. Morzillo ^a, Angela G. Mertig ^b, Nathan Garner ^c & Jianguo Liu ^a

^a Center for Systems Integration and Sustainability, Department of Fisheries and Wildlife, Michigan State University, East Lansing, Michigan, USA

^b Department of Sociology and Anthropology, Middle Tennessee State University, Murfreesboro, Tennessee, USA

^c Texas Parks and Wildlife Department, Tyler, Texas, USA

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Evaluating Hunter Support for Black Bear Restoration in East Texas

ANITA T. MORZILLO,¹ ANGELA G. MERTIG,²
NATHAN GARNER,³ AND JIANGUO LIU¹

¹Center for Systems Integration and Sustainability, Department of Fisheries and Wildlife, Michigan State University, East Lansing, Michigan, USA

²Department of Sociology and Anthropology, Middle Tennessee State University, Murfreesboro, Tennessee, USA

³Texas Parks and Wildlife Department, Tyler, Texas, USA

Hunters are an influential interest group in wildlife management. Little is known, however, about variation in attitudes toward species restoration among hunters in regard to either specific hunting interests or restoration of black bear. We surveyed 1,006 East Texas residents to assess hunter support for restoration of black bear populations in East Texas and hunter interest in hunting black bears. Because we defined hunters broadly, our study included hunters who were demographically dissimilar to those in other studies. Sixty-one percent of hunters supported black bear restoration. Among hunters, restoration support was twice as great among those interested versus not interested in hunting black bears. Our results highlight the importance of measurement differences in determining the boundaries of particular stakeholder groups and reinforce the importance of hunting specialization in influencing management attitudes.

Keywords attitudes, black bear, hunting, restoration, Texas

Introduction

Inclusion of hunters in decision-making can have a substantial influence on overall wildlife and environmental management (e.g., Lybecker, Lamb, & Ponds, 2002). Understanding group and intra-group attitudes of hunters is important to wildlife management agencies because hunters are among the most vocal and influential stakeholder groups (Ericsson & Heberlein, 2003). Variability exists among hunters' attitudes toward individual species,

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Address correspondence to Anita T. Morzillo, Department of Forest Ecosystems and Society, 321 Richardson Hall, Oregon State University, Corvallis, OR 97331. E-mail: anita.morzillo@oregonstate.edu

which results in difficulty when attempting to project hunter response to wildlife issues. For example, both positive and negative attitudes toward wolves (*Canis lupus*) and wolf reintroductions have been reported for hunters. However, hunters have tended to be more positive toward wolves than the general population (Bjerke, Reitan, & Kellert, 1998; Williams, Ericsson, & Heberlein, 2002). Even if general attitudes toward a species are similar among hunters, variation may exist regarding preferred management strategies (e.g., Kaczynsky, Blazic, & Gossow, 2004; Lohr, Ballard, & Bath, 1996). For management involving species restorations, few studies exist regarding hunter attitudes prior to a restoration, particularly for black bears and in locations where black bears have not existed for several decades.

Most studies that assess hunters' attitudes toward black bears have taken place in areas where black bears already exist in some capacity. In such locations, attitudes vary depending on damage caused by black bears (White, Shropshire, & Staten, 1997) and human interaction with black bears (Peyton, Bull, Reis, & Visser, 2001). Bowman, Leopold, Vilella, Gill, and Jacobson (2001) reported that approximately half of respondents were willing to incur some property damage as a trade-off for the opportunity to hunt black bears. In Louisiana, where restoration of black bears is already underway, hunters surveyed at public hunting areas strongly supported black bear restoration (Van Why & Chamberlain, 2003). However, hunters observed on public lands constitute a small percentage of all self-described hunters. No research explicitly has evaluated whether personal interest in hunting black bear (among hunters) may affect individual support for restoration, particularly in an area where bears have not existed for many decades.

Our objectives were to: (a) evaluate hunter interest in future hunting of black bears in an area where a local black bear population has not existed for almost a century and (b) compare attitudes toward black bear population restoration between specialized subgroups of hunters (i.e., those interested vs. not interested in hunting black bears). Similar to past research (Bowman et al., 2001; Peyton et al., 2001; Van Why & Chamberlain, 2003), we hypothesized positive relationships between: (a) knowledge about black bears and interest in hunting black bears and (b) positive attitudes about black bears and interest in hunting black bears. We suspected that similar to other studies (e.g., Donnelly & Vaske, 1995; Miller & Vaske, 2003; Vaske, 2008), social-psychological variables would have greater predictive power than demographic variables in identifying interest in hunting black bears. We also expected that hunters interested in hunting black bear would be more supportive of black bear restoration. This study adds to past research because the desired long-term management outcome for black bear restoration is a managed harvest, which suggests the importance of hunter support for recovery and that hunters' roles in black bear management will increase during the recovery process. Evaluating hunters' views prior to restoration will enable managers to evaluate support for restoration and interest in harvest over time among a key stakeholder group.

Conceptual Background

Results from social-psychological studies suggest that individual membership within key stakeholder or interest groups contributes to individual attitudes toward a particular species (Bath & Buchanan, 1989; Lybecker et al., 2002). Although they may share interest in the same general activity, hunters as a group are diverse in skill and behavior (Miller & Graefe, 2000), and are driven by different personal motivations (Decker & Connelly, 1989). Researchers have suggested a need to evaluate user groups at the sub-group level based on similar characteristics (Vaske, Beaman, Stanley, & Grenier, 1996), which is referred to as specialization within the broader context of recreation (Bryan, 1977). For

example, Miller and Graefe (2000) evaluated hunter participation based on target species (e.g., deer vs. pheasant) and method of hunting used (e.g., archery vs. rifle). Researchers have evaluated specialization related to hunting (e.g., Needham, Vaske, Donnelly, & Manfredi, 2007), but results have been inconsistent (e.g., Kuentzel & Heberlein, 1992; Needham et al., 2007). This article explores whether attitudes toward black bear restoration among hunters differs among subgroups of hunters depending on individual interest in hunting black bears.

Methods

Study Area and Context

The federally threatened Louisiana black bear (*Ursus americanus luteolus*), 1 of 16 subspecies of the American black bear (Hall, 1981), was nearly extirpated from its historic range of Louisiana, southern Mississippi, and East Texas by the early 1900s as a result of over-harvest and habitat loss. A public outreach campaign during the early 1990s led to restoration efforts in Louisiana that are now underway (BBCC, 1997; Bowker & Jacobson, 1995). The number of black bear sightings has been increasing in East Texas, which prompted the recent creation of a black bear conservation and management plan for East Texas. This plan seeks to restore habitat for reestablishment of black bears (Texas Parks and Wildlife Department [TPWD], 2005). Although excessive hunting contributed to the demise of black bears in East Texas, population recovery may present an opportunity for a managed harvest in the future. Support for restoration and interest in future harvest among hunters is important within the context of overall restoration efforts in Texas.

The study area (total area = 25,372 km²) consisted of 12 counties in southeastern Texas (Angelina, Hardin, Jasper, Liberty, Newton, Orange, Polk, Sabine, San Augustine, San Jacinto, Trinity, Tyler) where black bear sightings have taken place during the past decade. In 2000, the human population of the study area was approximately 500,000 (USDC, 2001). A majority of the area was rural, but interspersed with small towns and one larger community (Lufkin). Forty-six percent of the land was managed privately for timber, and 15% of the land was owned by the Federal government (Big Thicket National Preserve and the Davy Crockett, Sabine, Angelina, and Sam Houston National Forests). Mixed forest was the dominant land cover (Morzillo, 2005).

Data Collection

We used population density information from the U.S. Census Bureau and ArcView GIS 3.2 (Environmental Systems Research Institute, Inc., Redlands, California) to partition our study area into three mutually exclusive strata: (a) rural: <500 people per square mile and villages with <2,500 residents; (b) urban: ≥500 people per square mile and towns with more than 2,500 residents; and (c) suburban: suburban development confined to the southern edge of the study area (Kalton, 1983; Morzillo, Mertig, Garner, & Liu, 2007). We assumed that rural residents would have the greatest probability of contact with black bears (Pelton, 2003), and chose sample sizes for each stratum to ensure adequate representation of the less-populated rural stratum. Name and address information was purchased from Survey Sampling, Inc., who provided a random sample from within each of the three strata we identified. In January 2004, we mailed a questionnaire to 3,000 residents (2,000 rural; 600 urban; 400 suburban), approximately 1% of the adult population. We used multiple mailings and a token financial incentive to increase response rate (Dillman, 2000).

Interest in Hunting Black Bear

To identify interested versus non-interested (i.e., in hunting black bear) specialized segments of the overall hunter population, we first asked participants to respond (yes or no) to the question, "Do you hunt?" Respondents who answered no to the preceding question were excluded from further analysis. Those who answered yes to the preceding question were asked: "Would you be interested in hunting for black bear in East Texas?" (yes, no, or unsure). This resulted in dividing those who identified themselves as hunters into specialized groups based on personal interest in hunting black bears. Unsure responses were not included for comparisons of interested (coded as 1) versus not interested (coded as 0) hunters.

Support for Black Bear Restoration

To quantify support for black bear restoration ("restock"), respondents indicated their response (yes, unsure, or no) to the statement: "Would you support the restocking of black bears into suitable habitats in East Texas by natural resource agencies?" In the context of the TPWD conservation and management plan, restocking would involve the physical release of black bears from other locations into rural forested areas of southeastern Texas as a means to restore the local black bear population.

Background Variables

To compare hunters interested and those not interested in hunting bears, we used five demographic variables and four social-psychological variables. The demographic variables were: (a) community type (e.g., urban, rural), (b) sex, (c) age, (d) formal education completed, and (e) household income. The four social-psychological variables were: (a) knowledge about black bears, (b) perceived danger to humans, (c) enjoyment from having black bears around, (d) concern about problems that bears may cause.

Knowledge was constructed from six separate survey items. Respondents indicated (yes or no) whether they had been aware prior to the survey of the following information about black bears in the local area: (a) until the early 1900s, eastern Texas contained a large population of black bears, (b) the number of black bear sightings in eastern Texas has increased during the past decade, (c) black bear populations are increasing in size in Arkansas, Louisiana, and Oklahoma, (d) black bears in Texas are protected by both federal and state legislation, (e) black bears exist throughout most of the United States and North America, and (f) black bears are mainly vegetarians. We assigned a score of 1 for each correct response (i.e., "yes" for each statement), and a 0 for each incorrect response ("no"). Summing the scores resulted in an overall knowledge score for each individual; possible scores ranged from 0–6.

For perceived danger to humans ("danger"), respondents indicated yes, unsure, or no to the statement: "In general, do you believe black bears are a potential danger to humans?" Enjoyment from having black bears around ("enjoy") and concern about problems that bears may cause ("concern") were based on responses to an item that asked respondents to select one statement, from among the following, that best described how they felt about black bears in East Texas: (a) "I *would* enjoy having black bears around AND I would *not* worry about problems they may cause," (b) "I *would* enjoy having black bears around BUT I *would* worry about the problems they may cause," (c) "I would *not* enjoy having black bears around BUT I would *not* worry about problems that they may cause,"

(d) "I would not enjoy having black bears around AND I *would* worry about problems they may cause," and (e) "I have no particular feelings about black bears regardless of problems caused or not caused by them." For the variable "enjoy," if a respondent selected (a) or (b), we classified them as would enjoy (having black bears around); if a respondent selected (c) or (d), we classified them as would not enjoy. For "concern," if a respondent selected (b) or (d), we classified them as concerned (about problems); if a respondent selected (a) or (c), we classified them as not concerned. Respondents who selected (e) were not given scores for "enjoy" or "concern."

Non-Response Follow-Up

We mailed a non-response follow-up questionnaire to individuals ($n = 1,600$) within the survey sample who did not return a survey. This questionnaire included 10 questions from the actual survey. Demographic characteristics and responses did not differ significantly between respondents of the original survey and the non-response questionnaire ($n = 163$).

Statistical Analysis

Weights were applied to univariate analyses to account for the stratified sampling procedure (Kalton, 1983). For bivariate analyses, we used one-way ANOVA to compare group means, Chi-square to test relationships between categorical variables, and Pearson's correlation to test relationships between continuous or approximately continuous variables (as well as dummy variables; Kim, 1975; Sokal & Rohlf, 1995). We calculated effect size (Gliner, Vaske, & Morgan, 2001) using Cramer's V and Φ , where appropriate, to assess the strength of relationship between variables in bivariate analysis. We used multinomial (binary) logistic regression (Sokal & Rohlf, 1995) to test the simultaneous effect of the background variables on hunter interest in hunting black bears. Odds ratios ($\text{Exp}(\beta)$) were used to assess the strength of variable relationships in logistic analysis (Sokal & Rohlf, 1995).

Results

The overall survey response rate was 40% ($n = 1,006$). Fifty-two percent of all respondents identified themselves as hunters ($n = 524$). Forty-five percent of hunters were interested in hunting black bear in East Texas ($n = 236$); 40% were not interested ($n = 211$), and 15% were unsure ($n = 77$). Average age of all hunters was 54 ± 14.59 . Hunters interested in hunting black bears ($M = 50 \pm 14.80$) were younger than hunters not interested in hunting black bears ($M = 56 \pm 14.32$; $r = -.190$, $p \leq .001$). Hunters interested in hunting black bears did not differ from hunters not interested in hunting black bears for other demographic characteristics, except for sex (Table 1).

Knowledge scores were greater among hunters interested in hunting black bears ($M = 3.39 \pm 1.69$) than among hunters not interested in hunting black bears ($M = 2.79 \pm 1.83$; $F = 3.657$, $df = 6, 439$, $p = .001$, $V = .218$). Hunters interested in hunting black bears were more likely to have positive beliefs and attitudes toward black bears than hunters not interested in hunting black bears (Table 2). Support for restoration ("restock") was reasonably high among all hunters (61%), but was nearly twice as high among hunters interested (80%) versus not interested (43%) in hunting for black bears. Those not interested in hunting black bears were more likely to be unsure about restoration than those interested in hunting black bears.

Table 1
Sample characteristics of all hunters, as well as hunters interested and not interested in hunting black bears

Variable (<i>n</i> = all, interested, not interested)	Percent of hunters ^a			Test statistic (interested vs. not interested)
	All	Interested	Not interested	
Community type ^b (518, 232, 211)				$r = .065, p = .173$
Rural, Farm	25	26	23	
Rural, non-farm	35	37	35	
Small town (<5,000 people)	23	23	24	
Large town (5,000–10,000 people)	5	5	4	
Suburb	4	3	7	
Small city (10,001–50,000 people)	7	6	8	
Large city (>50,000 people)	0	0	0	
Sex (517, 233, 208)				$\chi^2_1 = 17.084,$ $p \leq .001; \Phi = .20$
Male	87	93	80	
Female	13	7	20	
Education (516, 232, 208)				$r = -.034, p = .483$
Primary school (grade 8)	4	3	4	
High school graduate or equivalent	34	33	35	
Vocational or trade school	10	10	8	
Some college	25	27	23	
Associate's degree (2 year degree)	7	10	6	
College graduate (4 year degree)	12	13	14	
Graduate or professional degree	7	4	10	
Income (481, 223, 188)				$r = 0.69, p = .163$
Less than \$20,000	14	12	18	
\$20,000 to \$39,999	24	22	27	
\$40,000 to \$59,999	27	29	21	
\$60,000 to \$74,999	15	16	14	
\$75,000 or more	21	21	20	

^aHunters includes all hunters ("All"), hunters interested in hunting black bears ("Interested"), and hunters not interested in hunting black bears ("Not interested").

^bCoding for community type was such that more rural areas received a higher value.

Results from multinomial logistic regression analysis suggested that hunters who were females, were older, had more formal education, and would not enjoy having black bears in East Texas were more likely to respond that they were not interested in hunting black bear (Table 3). When the demographic variables and the socio-psychological variables were entered as blocks, both variable groups added significantly to the model. The difference between the full model (Table 1) and a reduced model with only demographic variables was significant ($\chi^2 = 47.571, df = 5, p \leq .001$). The difference between the full model and a reduced model with only the social-psychological variables was also significant ($\chi^2 = 33.544, df = 5, p \leq .001$).

Table 2

Comparison of beliefs about and attitudes toward black bears among all hunters and those interested and not interested in hunting black bears

Variable (<i>n = all, interested, not interested</i>)	Percent of hunters ^{a,b}			Test statistic (interested vs. not interested)
	All	Interested	Not interested	
Danger (521, 235, 210)				
Yes	18	12	29	$\chi^2_2 = 33.158;^{*c} V = .28$
Unsure	19	12	20	
No	63	77	51	
Enjoy (465, 216, 185)				
Yes	85	95	71	$\chi^2_1 = 43.413;^{*} \Phi = .33$
No	16	5	29	
Concern (465, 216, 185)				
Yes	53	38	66	$\chi^2_1 = 32.259;^{*} \Phi = .28$
No	48	63	34	
Restock (523, 236, 211)				
Yes	61	80	43	$\chi^2_2 = 73.740;^{*} V = .41$
Unsure	19	13	20	
No	20	8	37	

^aHunters includes all hunters ("All"), hunters interested in hunting black bears ("Interested"), and hunters not interested in hunting black bears ("Not interested").

^bSummation not equal to 100% is a result of rounding.

^cAn asterisk (*) indicates $p \leq .001$.

Discussion

Hunting is an important ecological and economic component of wildlife management. As hunting participation declines in North America (Duda, Bissell, & Young, 1998; Floyd & Lee, 2002), resource managers have ecological and economic incentives to maintain hunter satisfaction. Knowledge about hunter motivations (e.g., Decker & Connelly, 1989), skills and behaviors (e.g., Miller & Graefe, 2000), satisfaction (e.g., Manfredi, Fix, Teel, Smeltzer, & Kahn, 2004), ethics (Gilbert, 2000; Peterson, 2004), and attitudes toward particular species (e.g., Bjerke et al., 1998) are all important components of effective wildlife management. In a broader social context, because wildlife is a public natural resource, both the general public and interest groups have a stake in game management decisions (Kleiman, 1989; Riley et al., 2002).

For this analysis, we did not explicitly compare hunters to non-hunters or the general population in our study area. However, it is important to note that some of the demographic characteristics of hunters in our sample were consistent with other studies (e.g., for community type and sex; Duda et al., 1998; Floyd & Lee, 2002), whereas others contrasted with prior studies (e.g., age, education, income; Duda et al., 1998; Floyd & Lee 2002; Koval & Mertig, 2004; Mehmood, Zhang, & Armstrong, 2003; see Morzillo et al., 2007 for demographics of the full sample from which this analysis was drawn). The atypical higher education and income of hunters in our study may have been partially because

Table 3

Multinomial logistic regression analysis^{a-b} for characteristics of hunters interested and not interested in hunting black bears; coefficients represent the effect of a variable on being in the group of hunters not interested in hunting black bears versus those interested in hunting black bears (i.e., interest in hunting black bears is the reference category)

	β	Wald	Exp(β)
Intercept	.556	.422	
Community type	-.144	3.098	.866
Sex (= female)	1.499	15.390*	4.484
Age	.032	12.631*	1.032
Education	.153	4.225*	1.166
Income	-.026	.064	.974
Knowledge	-.091	1.599	.913
Danger (= no)	-.600	2.750	.549
Danger (= unsure)	-.487	1.156	.614
Enjoy (= yes)	-1.556	12.155*	.211
Concern (= yes)	.503	3.652	1.653

^aAll variable relationships $df = 1$; an (*) denotes significance at the 95% confidence level.

^bLog-likelihood test (comparing the model to a null model with only an intercept): $\chi^2 = 86.623$, $df = 10$, $p \leq .001$.

respondents to mail surveys are typically slightly more educated and wealthier than the general public (Dillman, 1978; Groves, 1989). It also is possible that hunters in our particular region were wealthier and more highly educated than the average American hunter. It is perhaps more likely that these differences were related to how we measured hunting participation. We measured a person's self-perception as a hunting participant rather than their amount of participation in or commitment to hunting. Therefore, we may have included more variability among hunters as respondents (e.g., infrequent hunters and those with higher educations and incomes) than has occurred in other surveys. Future research should explore possible differences in results that derive from variations in how hunters are defined by researchers.

In general, hunter knowledge, attitudes, and support for restoration were consistent with past research (e.g., Bath, 1989; Kellert, Black, Rush, & Bath, 1996; Ericsson & Heberlein, 2003; Bowman, Leopold, Vilella, & Gill, 2004; Morzillo et al., 2007). However, considering limited demographic differences between hunters interested versus not interested in hunting black bears (the only significant bivariate differences were for age and sex), it was unexpected that belief and attitude scores between these two groups would contrast so greatly. Both demographic variables (as a group) as well as social-psychological variables (as a group) were important in predicting hunter interest/specialization. Furthermore, while all of the social-psychological variables were individually significant in predicting interest at the bivariate level, only enjoy remained significant while controlling for all variables (both demographic and social-psychological). Among the demographic variables, age and sex remained significant at both levels of analysis, and education became significant only while controlling for other variables (indicating suppression by other variables or variable relationships; Cramer, 2003). The relative importance of both social-psychological as well as demographic variables in our results differs from past research (Donnelly &

Vaske, 1995; Vaske, Donnelly, Williams, & Jonker, 2001; Miller & Vaske, 2003; Vaske, 2008) and does not support our initial hypothesis. We suspect that this may be largely because of our use of a broader definition of hunters, as noted earlier. We likely experienced greater variation in our hunter sample, allowing us to tease out relationships that otherwise might have been hidden. The relative importance of demographic variables, is however, not entirely unprecedented. In a study regarding recreation management preferences, Brown, Rosenberger, Kline, Hall, and Needham (2008) found demographic variables to have a greater impact than other variables, including those considered more social-psychological in nature. Our results thus highlight the importance of continuing to consider these background variables, especially when evaluating sub-group differences.

We initially suspected that hunters may share a common general interest in wildlife (Lybecker et al., 2002), thereby generating support for restoration among hunters in general regardless of interest in hunting black bear more specifically. Our results, however, suggest that attitudes about wildlife may be even more limited to species of individual specialized hunting interest. Perceptions about how black bear may affect quality of life (i.e., enjoyment of having bears in the area, perceived danger of black bears and concern about problems that black bears may cause) may influence personal desire to have black bears locally, personal interest in hunting them, and support for restoration among hunters (Lybecker et al., 2002; Kaczensky et al., 2004). In a previous study, results for the general public also illustrated relationships between perceptions of the effect of black bears on quality of life and support for restoration (see Morzillo et al., 2007), yet it was surprising to see such a similar sharp contrast among the hunters in our sample, particularly when segregated only based on interest in one target species.

Overall hunter support for black bear restoration, while moderately high, was lower than reported elsewhere. Van Why and Chamberlain (2003) reported an 80% approval of black bear restoration by Louisiana hunters, who were given a questionnaire by volunteers on public lands during periods of high use (e.g., first day of deer season). Survey implementation mode was a probable factor in the differences between our results and those from Louisiana. Statistically random identification of hunters in our survey may have captured responses from many subsets of the hunter population, including those who may seek to avoid crowded hunting areas or hunt explicitly on their own property or other private lands. Automatically assuming that Texas hunters were similar in opinion to Louisiana hunters surveyed by Van Why and Chamberlain (2003) would have overestimated restoration support for our study area by approximately 20%. Bowman et al. (2001) reported interest in hunting black bears among hunters in Arkansas and Mississippi, but did not report magnitude of interest or support for restoration among hunters specifically.

Personal motivations for hunting are diverse (Decker & Connelly, 1989; Bissell, Duda, & Young, 1998; Peyton et al., 2001; Manfredo et al., 2004), and possibly affected interest in hunting black bears and support for black bear restoration in our study. Although we did not seek information about hunting motivation in general, we received a variety of volunteered reasons for interest or non-interest in hunting black bears, such as: "only years into the future if there is a sustainable population," "can be happy hunting or just watching, in general," and "only hunt deer and squirrel," and "only hunt what I like to eat." Thus, interest in hunting black bears purely for sport may be outweighed by other motivations, such as concern about species sustainability, enjoyment of the outdoors, and sustenance; this also may partly explain the demographic differences we found in interest in hunting black bears. The ability to see a black bear in the wild was the most important benefit among hunters surveyed by Van Why and Chamberlain (2003).

In our study, hunter age influenced desire to hunt black bears. Although hunters were younger than non-hunters in our study (Morzillo, unpublished data), hunters interested in hunting black bear were also younger than hunters not interested in hunting black bear. This relationship may be explained by the idea that as hunters age, their motivations typically shift from an achievement orientation (i.e., focus on take) to one that is more appreciative (i.e., focus on experience as a whole; Jackson & Norton, 1980, Decker & Connelly, 1989). Further research into hunting motivations related to black bear recovery (e.g., acquisition of trophy, method of take; Manfredo et al., 2004) would provide further insight into these relationships. Younger hunters may be a promising group for promoting support for black bear recovery, and the possibility of hunting black bear may attract young members of the population to the sport.

In general, our results suggest that attitude patterns among hunters interested versus not interested in hunting black bears are diverse. In fact, broader variation exists among hunters divided along this species-level specialization criterion than across the overall sample of our survey of the general population collectively (Morzillo et al., 2007). It is unlikely that hunters will respond to questions about black bear restoration cohesively as a single stakeholder group in the future. Rather than assume that all hunters are comparably knowledgeable about wildlife, informed about current wildlife management issues, and supportive of wildlife restoration, managers may learn useful information from further nuanced attention to this important stakeholder group.

References

- Bath, A. J., & Buchanan, T. (1989). Attitudes of interest groups in Wyoming toward wolf restoration in Yellowstone National Park. *Wildlife Society Bulletin*, *17*, 519–525.
- Bissell, S. J., Duda, M. D., & Young, K. C. (1998). Recent studies on hunting and fishing participation in the United States. *Human Dimensions of Wildlife*, *3*, 75–80.
- Bjerke, T., Reitan, O., & Kellert, S. R. (1998). Attitudes toward wolves in southeastern Norway. *Society and Natural Resources* *11*, 169–178.
- Black Bear Conservation Committee (BBCC). (1997). *Black bear restoration plan*. Baton Rouge, Louisiana.
- Bowker, B., & Jacobson, T. (1995). *Louisiana black bear (Ursus americanus luteolus) recovery plan*. Atlanta, GA: U.S. Fish and Wildlife Service.
- Bowman, J. L., Leopold, B. D., Vilella, F. J., & Gill, D. A. (2004). A spatially explicit model, derived from demographic variables, to predict attitudes toward black bear restoration. *Journal of Wildlife Management*, *68*, 223–232.
- Bowman, J. L., Leopold, B. D., Vilella, F. J., Gill, D. A., & Jacobson, H. A. (2001). Attitudes of land-owners toward American black bear compared between areas of high and low bear populations. *Ursus*, *12*, 153–160.
- Brown, R. N. K., Rosenberger, R. S., Kline, J. D., Hall, T. E., & Needham, M. D. (2008). Visitor preferences for managing wilderness recreation after wildfire. *Journal of Forestry*, *106*, 9–16.
- Bryan, H. (1977). Leisure value systems and recreation specialization: The case of trout fishermen. *Journal of Leisure Research*, *9*, 174–187.
- Cramer, D. (2003). A cautionary tale of two statistics: Partial correlation and standardized partial regression. *Journal of Psychology*, *137*, 507–511.
- Decker, D. J., & Connelly, N. A. (1989). Motivations for deer hunting: Implications for antlerless deer harvest as a management tool. *Wildlife Society Bulletin* *17*, 455–463.
- Dillman, D. A. (1978). *Mail and telephone surveys: The total design method*. New York: Wiley-Interscience.
- Dillman, D. (2000). *Mail and internet surveys: The tailored design method* (2nd ed.). New York: John Wiley & Sons.

- Donnelly, M. P., & Vaske, J. J. (1995). Predicting attitudes toward a proposed moose hunt. *Society and Natural Resources*, 8, 307–319.
- Duda, M. D., Bissell, S. J., & Young, K. C. (1998). *Wildlife and the American mind: Public opinion on and attitudes toward fish and wildlife management*. Harrisonburg, VA: Responsive Management.
- Ericsson, G., & Heberlein, T. A. (2003). Attitudes of hunters, locals, and the general public in Sweden now that the wolves are back. *Biological Conservation*, 111, 149–159.
- Floyd, M. F., & Lee, I. (2002). Who buys fishing and hunting licenses in Texas? Results from a statewide household survey. *Human Dimensions of Wildlife*, 7, 91–106.
- Gilbert, F. F. (2000). Considerations in managing wildlife populations for sport. *Wildlife Society Bulletin*, 28, 457–463.
- Gliner, J. A., Vaske, J. J., & Morgan, G. A. (2001). Null hypothesis significance testing: Effect size matters. *Human Dimensions of Wildlife*, 6, 291–301.
- Groves, R. M. (1989). *Survey errors and survey costs*. New York: John Wiley & Sons.
- Hall, E. R. (1981). *The mammals of North America*. New York: John Wiley & Sons.
- Kaczensky, P., Blazic, M., & Gossow, H. (2004). Public attitudes toward brown bears (*Ursus arctos*) in Slovenia. *Biological Conservation*, 118, 661–674.
- Kalton, G. (1983). *Introduction to survey sampling*. Newbury Park, CA: Sage Publications, Inc.
- Kellert, S. R., & Berry, J. K. (1987). Attitudes, knowledge, and behaviors toward wildlife as affected by gender. *Wildlife Society Bulletin*, 15, 363–371.
- Kellert, S. R., Black, M., Rush, C. R., & Bath, A. J. (1996). Human culture and large carnivore conservation in North America. *Conservation Biology*, 10, 977–990.
- Kim, J. O. (1975). Multivariate analysis of ordinal variables. *American Journal of Sociology*, 81, 261–298.
- Kleiman, D. G. (1989). Reintroduction of captive mammals for conservation. *Bioscience*, 39, 152–161.
- Koval, M. H., & Mertig, A. G. (2004). Attitudes of the Michigan public and wildlife agency personnel toward lethal wildlife management. *Wildlife Society Bulletin*, 32, 232–243.
- Kuentzel, W. F., & Heberlein, T. A. (1992). Does specialization affect behavioral choices and quality judgements among hunters? *Leisure Sciences*, 14, 211–226.
- Jackson, R., & Norton, R. 1980. "Phases": The personal evolution of the sport hunter. *Wisconsin Sportsman (Nov.–Dec. 1980)*, 17–20.
- Lohr, C., Ballard, W. B., & Bath, A. (1996). Attitudes toward gray wolf reintroduction to New Brunswick. *Wildlife Society Bulletin*, 24, 414–420.
- Lybecker, D., Lamb, B. L., & Ponds, P. D. (2002). Public attitudes and knowledge of the black-tailed prairie dog: A common and controversial species. *Bioscience*, 52, 607–613.
- Manfredo, M. J., Fix, P. J., Teel, T. L., Smeltzer, J., & Kahn, R. (2004). Assessing demand for big-game hunting opportunities: applying the multiple satisfaction concept. *Human Dimensions of Wildlife*, 32, 1147–1155.
- Mehmood, S., Zhang, D., & Armstrong, J. (2003). Factors associated with declining hunter license sales in Alabama. *Human Dimensions of Wildlife*, 8, 243–262.
- Miller, C. A., & Graefe, A. R. (2000). Degree and range of specialization across related hunting activities. *Leisure Sciences*, 22, 195–204.
- Miller, C. A., & Vaske, J. J. (2003). Individual and situational influences on declining hunter effort in Illinois. *Human Dimensions of Wildlife*, 8, 263–273.
- Morzillo, A. T. (2005). *Integrating ecology and socioeconomics for species restoration: Feasibility of a Louisiana black bear reintroduction in and around Big Thicket National Preserve, Texas*. Unpublished doctoral dissertation, Michigan State University, East Lansing.
- Morzillo, A. T., Mertig, A. G., Garner, N., & Liu, J. (2007). Resident attitudes toward black bears and population recovery in East Texas. *Human Dimensions of Wildlife*, 12, 417–428.
- Needham, M. D., Vaske, J. J., Donnelly, M. P., & Manfredo, M. (2007). Hunter specialization and its relationship to participation in response to chronic wasting disease. *Journal of Leisure Research*, 39, 413–437.
- Pelton, M. R. (2003). Black bear. In J. A. Chapman & G. A. Feldhamer (Eds.), *Wild mammals of North America* (2nd ed., pp.547–555). Baltimore, MD: John Hopkins University Press.

- Peterson, M. N. (2004). An approach for demonstrating the social legitimacy of hunting. *Wildlife Society Bulletin*, 32, 310–321.
- Peyton, B., Bull, P., Reis, T., & Visser, L. (2001). *Public views on bear and bear management in the lower peninsula of Michigan*. Report to the Michigan Department of Natural Resources, Wildlife Division. Lansing, Michigan, USA.
- Riley, S. J., Decker, D. J., Carpenter, L. H., Organ, J. F., Siemer, W. F., Mattfeld, G. F., & Parsons, G. (2002). The essence of wildlife management. *Wildlife Society Bulletin*, 30, 585–593.
- Sokal, R. R., & Rohlf, F. J. (1995). *Biometry* (3rd edition). New York: W. H. Freeman and Company.
- Texas Parks and Wildlife Department (TPWD). (2005). *East Texas black bear conservation and management plan* (PWD PL W7000–1046 [6/05]). Austin, Texas.
- Van Why, K. R., & Chamberlain, M. J. (2003). Hunter knowledge and opinion of Louisiana black bear restoration. *Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies*, 57, 299–307.
- Vaske, J. J., Beaman, J., Stanley, R., & Grenier, M. (1996). Importance performance and segmentation: where do we go from here? *Journal of Travel and Tourism Marketing*, 5, 225–240.
- Vaske, J. J., Donnelly, M. P., Williams, D. R., & Jonker, S. (2001). Demographic influences on environmental value orientations and normative belief about National Forest management. *Society and Natural Resources*, 14, 761–776.
- Vaske, J. J. (2008). *Survey research and analysis: Applications in parks, recreation and human dimensions*. State College, PA: Venture Publishing, Inc.
- United States Department of Commerce Bureau of the Census (USDC). (2001). *Census Bureau American FactFinder tool* [Electronic version]. Retrieved October 10, 2001, from http://factfinder.census.gov/home/saff/main.html?_lang=en
- White, T. H., Jr., Shropshire, C. C., & Staten, M. (1997). Black bear damage in the Mississippi Alluvial Valley. *Proceedings of the Wildlife Damage Management Conference*, 7, 109–117.
- Williams, C. K., Ericsson, G., & Heberlein, T. A. (2002). A quantitative summary of attitudes toward wolves and their reintroduction (1972–2000). *Wildlife Society Bulletin*, 30, 575–584.