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Kerrie Anne T. Loyd^a; Craig A. Miller^a

^a Warnell School of Forestry and Natural Resources, The University of Georgia, Athens, Georgia, USA

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Influence of Demographics, Experience and Value Orientations on Preferences for Lethal Management of Feral Cats

KERRIE ANNE T. LOYD AND CRAIG A. MILLER

Warnell School of Forestry and Natural Resources, The University of Georgia, Athens, Georgia, USA

Populations of feral domestic cats have increased throughout the United States, affecting wildlife and warranting attention from a variety of management agencies. This contentious issue requires a greater understanding of public attitudes and preferences for population control. We used data from a 2004 mail survey of Illinois homeowners' attitudes toward wildlife and conservation to investigate support for the lethal control of feral cats and to examine factors (demographic, experience, and wildlife value orientations) that may influence preference for euthanasia as a management option. Community size, gender, education level, wildlife value orientations, and negative experiences with feral cats were significant predictors of preference for lethal management.

Keywords euthanasia, feral cat management, Illinois, lethal control, stakeholder perceptions

Introduction

Feral cats (i.e., unowned, abandoned, wild-born) are increasing in number throughout the United States. Pet cats now number over 80 million (American Veterinary Medical Association, 2007) and the number of feral cats may be 60–100 million (Jessup, 2004). Domestic cats have been labeled one of the world's most invasive species (International Union for the Conservation of Nature, 2009), posing a threat to native birds and small mammals upon which they prey (Crooks & Soule, 1999; Dauphine & Cooper, 2009; Kays & DeWan, 2004; Lepczyk, Mertig, & Liu, 2003). Biologically effective yet socially acceptable management for feral cats is contentious within North America and in many developed countries abroad (Robertson, 2008).

The potential impact of feral cats on native wildlife is a common concern and focal point for management action by local agencies and organizations (Williams, 2009). Without attention, populations of unowned cats can quickly become a nuisance to residents (Lauber, Knuth, Tantillo, & Curtis, 2007) and may devastate some local wildlife populations, including small mammals and native birds (Baker, Bentley, Ansell, & Harris, 2005; Dickman, 1996). In addition to concerns for wildlife, there are a number of stakeholders concerned with the welfare of abandoned and feral cats (Jessup, 2004). Concerns also extend to human health; many infectious diseases and parasites carried by feral cats have

Address correspondence to Kerrie Anne T. Loyd, Warnell School of Forestry and Natural Resources, The University of Georgia, 180 E. Green St., Athens, GA 30602, USA. E-mail: loydk@warnell.uga.edu

potential human health implications (Barrows, 2004; Longcore, Rich, & Sullivan, 2009; Patronek, 1998).

Although diverse stakeholders (e.g., wildlife management agencies, cat welfare groups, human health agencies) generally agree that the number of feral cats must be reduced, the method of management is debatable. One common strategy involves permanent removal (trap and euthanize), while a second approach involves the capture, sterilization, and return of cats to the capture site (trap-neuter-release, TNR). Questions about the efficacy and compassion of the two central management strategies contribute to the dispute. The issue is currently influenced by opposing interests and beliefs of stakeholder groups yet local governments have little information regarding attitudes, value orientations and management preferences of the general public.

Although a few studies have investigated the human dimensions behind the issue of feral cat management, public support for lethal control of feral cats has not been examined. Texas A&M University employees were likely to support feral cat population control in areas where cats reside in close proximity to humans, suggesting their primary concerns involved impacts on people (Ash & Adams, 2003). Ohio residents who owned cats were more likely than non-cat owners to support using tax dollars to fund TNR programs as a method feral cat control; however, preferences for other management strategies (e.g., trap and euthanize, capture and adopt) were not investigated (Lord, 2008). Loyd and Miller (2010) recently examined predictors of preference for TNR and found that age, gender, and support for wildlife rights significantly influenced preference for this management option. Previous studies have reported that demographics (e.g., urban/rural residences, age, and gender) are also predictors of attitudes toward wildlife (Kellert & Berry, 1980; Mankin, Warner, & Anderson, 1999). Across diverse situations, gender has been documented as one of the most important demographic variables influencing attitudes toward wildlife and wildlife management (Dougherty, Fulton, & Anderson, 2003; Kellert & Berry, 1987). Place of residence influenced Illinois residents' attitudes toward and knowledge of wildlife (Mankin et al., 1999).

While research examining public attitudes towards control of invasive predators is limited (Bremner & Park, 2007), public attitudes toward control of native predators have received some attention (Reiter, Brunson, & Schmidt, 1999; Martinez-Espineira, 2006). Although lethal predator control used to be generally accepted, acceptability is now more limited to a few situations: controlling disease, ensuring species survival, managing population levels, and public safety (Koval & Mertig, 2004). A vocal public currently opposes lethal predator control (Schwartz, Swenson, & Miller, 2003), generally agreeing that lethal methods of control are inhumane (Reiter et al., 1999). Similarly, cat advocacy groups (e.g., Alley Cat Allies, Stray Pet Advocacy Group, No Kill Advocacy Group) now passionately promote TNR over any cat management actions that include lethal control. Public contributors donate millions of dollars annually to these efforts, which now influence policy on cat management nationwide (Alley Cat Allies, 2009).

Moral or ethical judgments guiding attitudes toward feral cat management have also been documented, approaching the issue from a perspective of feral cats as "nuisance wildlife" (Lauber et al., 2007). Ethical concerns expressed by individuals opposing TNR in support of lethal control for cats included: (a) concern for the quality of life of the animal and (b) preserving native species (Lauber et al., 2007). Although feral cats are not always viewed as "wildlife" or "nuisance wildlife," such cats are successfully reproducing and hunting in our natural systems, and have become relevant to the field of wildlife management. Some members of the public do view feral cats as part of the natural environment. Lauber et al. (2007), for example, found respondents' ethical judgments supporting

lethal control of deer and feral cats to be similar. Additionally, some cat advocacy organizations promote feral cats as “protected, healthy wildlife” (No Kill Advocacy Center, 2006).

With limited existing research on attitudes toward feral cat management, information on public attitudes toward wildlife management and value orientations *may* be helpful for understanding current attitudes toward lethal management of feral cats. Wildlife value orientations are “patterns of direction and intensity among a set of beliefs about wildlife across several dimensions” (Fulton, Manfred, & Lipscomb, 1996, p. 3). Wildlife value orientations are hypothesized to be changing (Inglehart, 1997) and many Americans now focus on caring for and emotional bonding with wildlife (Manfred, Vaske, Brown, Decker, & Duke, 2009; Teel, Manfred, & Stinchfield, 2007). Trends supporting a predicted progression toward a more humane society (Manfred, Teel, & Bright, 2003) include growth of organizations addressing animal welfare issues, and emerging social conflict over issues involving wildlife (Teel et al., 2007). Shifting wildlife values orientations could translate to public support for feral cat existence in the natural environment (pro-TNR) because concern for individual animals may lead members of the public to regard TNR as a more humane option than euthanasia. Shifting wildlife values orientations could also lead to support for environmental protection and wildlife conservation (anti-TNR/pro-euthanasia of domestic cats) if members of the public are more concerned about the welfare of populations of wildlife than individual feral cats. Support for feral cat management options may also be influenced by knowledge of cat impact on wildlife or hobbies (such as bird watching).

Objectives

The issue of feral cat population control, including the acceptability of euthanasia as a management strategy, is a high priority for the Illinois Department of Natural Resources (IDNR). The agency received growing numbers of complaints from residents across the state about feral cats during the three years prior to this study (2001–2004) (J. Buhnerkempe, personal communication, August 18, 2003). Understanding how preferences for feral cat management relate to wildlife value orientations and demographics could help managers predict responses to actions and ordinances affecting cats. To this end, the following research objectives were examined: (a) to determine levels of support for trap-euthanasia management of feral cats in Illinois and (b) to identify demographic, experience variables, and wildlife value orientations that influence preference for lethal control of feral cats.

Methods

Data were obtained from an eight page self-administered mail survey of 2,600 randomly selected Illinois single-family homeowners, representative of urban and rural counties in Illinois (Miller, Campbell, Leiter, & Colligan, 2007). Participants were mailed a cover letter, questionnaire, and postage-paid return envelope during February 2004. At two-week intervals, nonrespondents were mailed a reminder postcard, second questionnaire packet, second reminder postcard, and finally a third questionnaire packet. Of the 2,600 survey questionnaires mailed to Illinois homeowners we received 1,680 completed questionnaires for a total response rate of 65%.

The questionnaire included five items related to “feral free-ranging cats.” Four items were dichotomous response variables and measured: (a) survey participants’ perceptions of feral cats as a problem on their property, (b) as a problem in their neighborhood,

(c) if feral cats were killing small birds and mammals, and (d) if the IDNR should control the feral cat population. The fifth item was a categorical variable that measured preference for IDNR actions regarding management of feral free-ranging cats. Respondents chose between “capture, neuter, and return,” “capture and euthanize,” “capture and keep in shelter,” or “other.” The term “capture” was chosen over “trap” due to possible negative perceptions associated with “trap,” as respondents could have interpreted that term to mean leg-hold traps. Euthanasia is highly criticized as a method of cat control both in Illinois and nation-wide and we focused our analysis on factors that contributed to preferences for this lethal method. The goal of this research was to examine euthanasia versus all other (non-lethal) methods. Preference for capture and euthanize was coded “1”; all other responses recoded into “other” (coded “2”). The resulting dichotomous variable (euthanize vs. other) was used as the dependent variable in subsequent logistic regression models.

Homeowners identified their community as 1 of 6 types ranging from rural (farm or non-farm) to large city of >1 million people. We collapsed responses into four community types: “rural,” “small towns of <10,000 people,” “small cities of 10,000 to <100,000,” and “cities of >100,000 people” (U.S. Census Bureau, 2000).

Wildlife value orientations were measured using a series of 12 statements about wildlife with a 7-point scale (1 = strongly disagree, 4 = unsure, 7 = strongly agree) (Bright, Manfredo & Fulton, 2000; Manfredo et al., 2003; Vaske, Donnelly, Williams, & Jonker, 2001). Principal Components Analysis (PCA) with varimax rotation was used to determine factor groups corresponding to value-orientations. Grouped variables in each factor identified through PCA were tested for reliability using Cronbach’s alpha with .60 as the minimum accepted value (Nunnally, 1978; Kim & Mueller, 1978). Grouped variables were then summed and divided by the number of variables in the factor to form a single latent variable representing each wildlife value orientation.

We tested differences in responses by preference for management method using Pearson’s Chi-square for categorical variables and one-way Analysis of Variance (ANOVA) for continuous variables. Group size effect for each variable was tested using Eta (for dichotomous independent variables in ANOVA tests) and Cramer’s V (for independent categorical variables with >2 categories). Values for both Eta and Cramer’s $V = .1$ suggest a minimal effect size, $.3$ can be interpreted as typical, and $\geq .5$ as substantial (Vaske, 2008). We used logistic regression to examine significance of experiences with feral cats, demographics (age, community size, education level, and gender), and value orientations toward wildlife on preference for lethal control of feral cats. We developed a series of partial models using forward step-wise logistic regression that tested like variables (e.g., experience, demographics and value orientations).

Results

Descriptive Findings

Respondents represented Illinois homeowners in several demographic categories: (a) gender of respondents was 76% male, and approximated male homeowners in the state (71%), (b) mean income of respondents (\$40,000–\$59,999) approximated that of residents statewide (\$54,141) (U.S. Census Bureau, 2008). Respondents were less represented by residents of large urban centers (e.g., Chicago), reported higher education levels achieved (58% had some college) than the population at large (42%), and were older (22% >65 years of age) in comparison to the general population (12% >65 years).

Fifty-two percent of respondents preferred capture and euthanasia for feral cat management, 27% capture-neuter-return, 18% capture and keep in shelter, and 3% chose "other." A majority of respondents (67%) had not experienced problems with feral cats on their property, killing birds or small mammals (78%) or scaring birds from birdfeeders (84%) (Table 1).

Bivariate Analysis of Demographic Variables

There was a significant difference in management preference by community size ($F = 48.95$, $p < .001$, Cramer's $V = .228$) and gender ($F = 105.50$, $p < .001$, $\eta^2 = .331$, Table 2). Support for trap and euthanasia increased as the size of the community of residence decreased. Rural residents were most likely to support this management option (71%) while urban residents were least likely to support the lethal method (39%) (Table 2). Men (61%) were more likely than women (22%) to prefer trap and euthanasia. While there was not a significant difference between respondents grouped by education level, those with higher education levels (53% of respondents with some college or an associate's degree and 59% of those with a bachelor's degree) were more likely to support lethal control than those with other education levels (Table 2).

Wildlife Value Orientations

Table 3 lists the survey statements used to identify respondent wildlife value orientations. PCA identified three wildlife value orientations: (a) wildlife existence values, (b) wildlife rights, and (c) economic value of wildlife. Wildlife existence value orientations included statements such as "Healthy populations of fish and wildlife are important to me" and "Whether or not I see fish and wildlife it is important to know they exist." Wildlife rights orientations included statements such as "Wildlife should have the same rights as people" and "Rights of wildlife to exist are more important than human use of wildlife." Lastly, economic value of wildlife included statements such as "Too much attention is given to wildlife in our society" and "Some species are not worth spending money to save" (Table 3).

Logistic Regression Models for Experience, Demographics, and Value Orientations

The first regression model examined the influence of negative experiences with feral cats on preference for lethal control. Negative experiences with feral cats were significantly related to preference for euthanasia (Table 4); if feral cats were causing problems on residents' properties or were seen killing small birds and mammals, respondents were more likely to support lethal control of feral cats ($\beta = .88$, $p < .001$, and $\beta = .89$, $p < .001$,

Table 1
Illinois homeowners' ($n = 1,680$) experiences with feral cats

	Yes(%)	No(%)
Have you ever had a problem with feral housecats on your property?	33	67
Have you ever had a problem with feral housecats killing birds or small mammals on your property?	22	78
Have you experienced feral cats scaring birds from your birdfeeder?	16	84

Table 2

Bivariate analysis of demographic variables of preference for trap and euthanasia of feral cats among Illinois homeowners ($n = 1,680$) in 2004

Demographic variables	Prefer euthanasia		χ^2 or <i>F</i> -value	<i>p</i>	Cramer's <i>V</i> or <i>Eta</i>
	Yes (%)	No (%)			
Community size			48.945	<.001	.228
Rural	71	29.			
Small town (<10,000)	53	47			
Small city (10,000–100,000)	44	66			
Urban (>100,000)	39	61			
Gender			105.500	<.001	.331
Female	22	78			
Male	61	39			
Education			10.546	0.160	.105
<High School	37	63			
High School/Tech School	57	43			
Some college/associate degree	53	47			
Bachelor degree	59	41			
Graduate or Professional	49	51			
Age (Mean years)	52	52	1.260	0.760	.306

respectively, Table 4). A small percentage of respondents (16%) had experienced feral cats scaring birds from birdfeeders but this was not a significant predictor of support for lethal control as a management preference (Table 4).

The influence of demographic variables on preference for feral cat euthanasia was examined in the second logistic regression model. All variables with the exception of mean age were statistically significant predictors. Increasing community size ($\beta = -.20, p < .001$) and female gender ($\beta = -1.39, p < .001$) were negatively related to preference for euthanasia while increasing education level was positively associated with this lethal management option ($\beta = .09, p = .003$). Men were three times more likely to prefer euthanasia than women.

The third regression model explored relationships between the three categories of wildlife value orientations (wildlife existence, wildlife rights, and economic value of wildlife) and preference for lethal management of feral cats. Wildlife existence and wildlife rights values orientations were significant predictors ($p < .001$) of preference for euthanasia in the wildlife values partial model. Greater support for wildlife existence was related to preference for euthanasia ($\beta = .362$). On the contrary, support for wildlife rights was linked to preference for alternative management options ($\beta = -.45$, Table 4).

The full logistic regression model investigated the combined influence of those variables that were significant predictors in each of the initial models (experience, demographics and value orientations) on preference for feral cat euthanasia. Each variable remained a significant predictor in the full model (Table 4). Negative experience variables remained significant predictors in the full logistic regression model ($p < .001$). Community size ($\beta = -.09, p = .046$), male gender ($\beta = -1.21, p < .001$), and education level ($\beta = .11, p < .001$) in addition to both wildlife existence ($\beta = .250, p < .001$) and wildlife rights ($\beta = -.352, p < .001$) value orientations, were also significantly related to preference for trap and euthanasia in the full logistic regression model.

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Table 3

Principal components analysis of attitudes toward wildlife populations, rights, and funding among Illinois homeowners, 2004. ($n = 1,680$). Factor loadings reported

Statement	Existence value orientations	Wildlife rights value orientations	Wildlife economic value orientations
Healthy populations of fish and wildlife are important to me.	.914		
We should be sure future generations have an abundance of fish and wildlife.	.927		
Whether or not I see fish and wildlife it is important to know they exist.	.808		
Loss of habitat has more impact on wildlife populations than hunting.	.794		
Hunting is cruel and inhumane to animals.		.787	
Hunting for trophy animals should not be tolerated.		.727	
Wildlife should have the same rights as pets but not humans.		.696	
Wildlife should have the same rights as people.		.653	
Rights of wildlife to exist are more important than human use of wildlife.		.645	
Too much attention is given to wildlife in our society.			.792
Endangered species should be protected even at the cost of the economy and jobs (reverse coded).			.720
Some species are not worth spending money to save.			.719
Cronbach's α	.819	.775	.627

Kaiser-Meyer-Olkin = .810.

Discussion

Results of our study suggest residents of rural communities are more likely than urban residents to support lethal control of feral cats. These preferences may be explained through similar findings regarding public attitudes toward wildlife. Rural residents have previously been found to have utilitarian (focus on usefulness of animals), dominionistic (satisfaction derived from control over animals), or negativistic (dislike or fear of animals) attitudes toward wildlife (Kellert & Berry, 1980). Rural residents of Illinois are also more likely than metropolitan residents to support hunting (Mankin et al., 1999). Lethal control of other predators, including naturalized coyotes, has been found to be more acceptable to residents from rural locations in comparison to those from urban areas (Reiter et al., 1999) as well as to hunters (Martinez-Espineira, 2006). Our findings suggest rural residents may view management of predators such as cats and coyotes in a similar manner.

Table 4
 Logistic regression model predicting support for trap and euthanasia among Illinois homeowners

	Partial models				Full model			
	β	Wald	Odds ratio	<i>p</i> -value	β	Wald	Odds ratio	<i>p</i> -value
Experience model								
Problem on property	.88	25.080	2.404	<.001	.76	17.60	2.147	<.001
Feral cats killing birds/mammals	.89	21.940	2.425	<.001	.79	15.14	2.21	<.001
Feral cats scaring birds	-.22	1.510	.803	.202				
Demographics model								
Community	-.20	22.510	.851	<.001	-.09	3.970	.910	.046
Gender	-1.39	65.680	.250	<.001	-1.21	43.270	.298	<.001
Education	.085	9.120	1.089	.003	.105	11.880	1.110	.001
Age	.00	.048	.999	.827				
Value-orientations model								
Existence	.36	21.300	1.436	<.001	.25	8.750	1.284	.003
Rights	-.45	90.560	.640	<.001	-.35	49.450	.703	<.001
Funding	-.02	.220	.978	.637				

Community size, gender, and education were significant predictors of preference for feral cat euthanasia. Men were more likely to support euthanasia while women preferred non-lethal options. Previous studies about gender and attitudes toward animals have found that men are generally more utilitarian and dominionistic, whereas women are more concerned with humane treatment of animals and hold greater affection for individual animals, particularly pets (Kellert & Berry, 1987). A survey of public attitudes toward management of invasive species in Scotland also found men to be greater supporters of wildlife control and eradication of invasive species especially when proposed to protect native species (Bremner & Park, 2007). Martinez-Espinera (2006) found men to be more likely than women to agree with lethal control of coyotes and Zinn and Pierce (2002) found women to be less willing than men to accept lethal control of mountain lions. Women may have more favorable attitudes toward most predators, including cats, and combined with concerns for humane treatment of animals and greater affection for pets, women should be expected to be more likely to oppose euthanasia as a method of feral cat control.

Educational level was also a predictor of preference for feral cat euthanasia. Education level is related to moralistic attitudes toward wildlife (Kellert & Berry, 1987) and moralistic respondents may feel that euthanasia is more humane than re-releasing feral cats into the environment where they may suffer from disease, weather, predation, and

vehicle accidents. We did not measure these attitudes in this study though and can only speculate on such connections between education and moralistic values. Educated respondents may be more aware of the feral cat issue or may have been previously exposed to feral cat management programs or educational materials on college campuses where the issue is often prevalent (Hughes & Slater, 2002). Bremner and Park (2007) found that attitudes toward control and eradication of invasive species were related to awareness of existing or prior projects to control invasive species.

Experiences with feral cats were also significant predictors of preference for euthanasia of cats. Bowker, Newman, Warren, and Henderson (2003) found previous experiences with nuisance deer to affect acceptance for lethal control of these animals. Martinez-Espineira (2006) found that respondents possessing past negative experiences with coyotes were more likely to accept lethal control methods of coyote management. Illinois respondents with negative experiences may be more aware of the presence of cats, the problems associated with overpopulation and thus prefer permanent removal as a solution.

Increased support for wildlife rights was related to decreased preference for euthanasia. Respondents with these value orientations believed hunting is inhumane and supported protection of wildlife rights. We hypothesize that such respondents would also support protection of feral cats, agreeing that euthanasia of feral cats is an inhumane solution; however, we did not examine this in the study and further research is needed to explore this question. Lauber et al. (2007) found supporters of fertility control (TNR) believed killing animals was not justified due to the "right to life" of the animals; they were additionally concerned with caring for individual animals.

In contrast to wildlife rights, wildlife existence value orientations predicted preference for feral cat euthanasia. Supporters agreed that healthy populations of wildlife were important and should be protected for future generations. Supporting removal of cats from our natural systems protects native species and this may explain the wildlife existence values orientations as a predictor for trap and euthanasia. Seventy-eight percent of respondents in a recent survey on public support for management of non-native invasive species supported eradication of invasive species to protect native wildlife (Bremner & Park, 2007). These results imply that wildlife values orientations, in addition to demographics (community, gender, and education) and negative experiences, are important predictors of preference for lethal control of feral cats.

Because we choose to examine preference for lethal management and collapsed all other management options, we were unable to compare predictors of preference for this option with influences predicting preference for alternative options. Additionally, collapsing other management options to create a dichotomous variable assumes these options are somewhat similar, a limitation of our analysis.

Conclusion

One of the most critical needs to guide management of feral cats is information on public attitudes toward feral cats and their control. Although our results suggest a few influences on preferences for management, lethal control warrants further research attention. Public policy decisions are continuing to be made based on inadequate information (Longcore et al., 2009). Trap-neuter-release of feral cats is a method of management promoted by cat advocacy and animal welfare groups, despite growing evidence that it is ineffective at reducing feral cat populations (Castillo & Clarke, 2003; Levy, Gale, & Gale, 2003; Nutter, 2005). Although lethal control of feral cats may be more effective (Andersen, Martin, & Roemer, 2004; Loyd & DeVore, 2010; Schmidt, Swanneck, Lopez, & Roemer, 2009), our

results suggest it may not be acceptable to some demographic groups, including urban residents and women. Attitudes toward cats in general, experiences with feral cats, and preference for lethal control should be examined across a broader scale. Additionally, researchers should address whether or not the general public views feral cats as wildlife and should examine additional predictors of preferences for feral cat management (e.g., cat ownership, feral cat feeding, exposure to cat advocacy materials, bird watching, and conservation activities).

The social aspect of feral cat management remains the greatest challenge to decision-makers, hindering progress on the issue of population control. There is a gap in knowledge related to public awareness of feral cats and their impact on native wildlife. Investigating knowledge with regards to attitudes and management preferences could help with the development of education programs and material designed to better inform stakeholders. Future human dimensions studies on this issue could examine a greater geographic extent as regional difference in attitudes may exist. Additional study of public perceptions of feral cats can help local managers make more informed decisions and aid in understanding of the growing public debate regarding feral cat management.

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