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Public Attitudes Toward Lethal Coyote Control

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Predator control policies for coyotes are expensive and often controversial. A key aspect of this controversy is the public acceptability of different methods of coyote control, because some of the most controversial control methods are also the most cost-effective. This article casts further light on public preferences regarding lethal coyote control by analyzing data from Prince Edward Island, Canada. A distinction is made between the effects of sociodemographic characteristics on acceptability of control versus the acceptability of different lethal measures, based on damage caused by coyotes and rationale for control policies. The analysis confirms that lethal coyote control is more acceptable when coyotes are causing damage and that wildlife managers can minimize public opposition to control policies by carefully choosing among alternative methods of lethal control.

Keywords coyotes, lethal control, Logit, nuisance wildlife, random effects

Introduction

Efficiently and effectively resolving predation problems that affect economic activities has been the goal of public and private agencies in North America since 1630 (Yoder, 2000). In particular, clashes between sheep breeders and coyotes have led to a constant, widespread, expensive, and often controversial management of coyote populations. In response, coyotes have extended their range and can now be found in rural, urban, and suburban habitats of most of the North American continent.

In Eastern Canada coyotes have been especially successful in newly colonized environments, in part because there is little or no competition by other large predators. Lack of large predators in an area can also mean that some livestock owners no longer protect their animals from predators, and therefore often demand governmental intervention to control coyotes. Coyote control can be viewed as a public good. Once coyote control is implemented in an area it can be enjoyed by an additional local farmer at no additional cost for society (Samuelson, 1954), which can lead to an inefficiently low level of aggregate private provision. Individual farmers would privately exert less than the efficient level of effort on coyote control, because they would ignore the benefits they would provide to neighbor farmers. Other groups warn against the futility of lethal measures of coyote control or defend the inherent right of the coyote to use the natural environment alongside with humans. This has led to a great deal of ongoing controversy (Andelt, Phillips, Schmidt, & Gill, 1999). A key aspect of the controversy over coyote control is the public acceptability of different methods of control. Some methods are considered more cost-effective than others.

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In particular, selective methods of coyote removal generally require a higher degree of skill and are relatively more costly than non-selective methods (Knowlton, Gese, & Jaeger, 1999; Mason, 2001). Selective and non-selective methods, however, also vary greatly in terms of how humane, agreeable, reasonable, or acceptable they are perceived to be by different segments of the population. Because the public purse ultimately funds public predator control, the acceptability of control methods is key to their successful use. Relying solely on wildlife managers to determine control policy in the public interest is likely to result in controversy if the managers fail to gauge public preferences (Koval & Mertig, 2004).

During the last decades, there has been a growing trend against lethal predator control methods. Previous empirical analyses of attitudes toward predator control have revealed differences in results based on: (1) the species considered (Reiter, Brunson, & Schmidt, 1999), (2) the socioeconomic (Koval & Mertig, 2004) and urban status (Loker, Decker, & Schwager, 1999) of respondents, and (3) the particular context in which lethal control is proposed (Zinn, Manfredo, Vaske, & Wittmann, 1998; Zinn & Pierce, 2002; Koval & Mertig, 2004).[1] There is, to the author's knowledge, no study of public perceptions about coyote control in Canada.

This article investigates the attitudes of Prince Edward Island (PEI) residents toward coyote control there. PEI, an island off Nova Scotia and New Brunswick, is the smallest of Canada's provinces, with about 54% of the population (of about 135,000) living in rural settings and dependent on agriculture and fishing.

Previous Studies of Public Perceptions of Predator Control

The total economic value of wildlife includes the values associated with consumptive and non-consumptive uses and values unrelated to use. A full derivation of the economic impact of wildlife must consider use and non-use costs, including the disutility imposed by wildlife control on the general public (Pearce & Moran, 1994, p. 3). Non-use costs are not revealed through market economic transactions. Estimates of costs determined by stated-preference methods are needed for this task, because there is no market where the general public can reveal their preferences about predator control methods.

Studies have attempted to evaluate the non-use costs of different control techniques. Bowker, Newman, Warren, and Henderson (2003) used contingent valuation to compare alternative deer control measures. Residents were unwilling to spend more for the non-lethal alternative. Over 60% of respondents stated a zero willingness to pay regardless of control measure, but only half of these zero bidders expressed no problem with deer, whereas the other half bid zero because of distaste for the control technique, safety concerns, or doubts about its effectiveness.

It is important to distinguish between those who are opposed to any type of technique and those who would agree with a control policy if an acceptable technique were employed. Reiter et al. (1999) found widespread agreement in the United States with non-lethal methods of wildlife damage control, but not with lethal methods. The main factor affecting the acceptability of a control method was human safety, with animal suffering coming next, followed by effectiveness, environmental impacts, severity of the problem, and ability of the method to only affect a specific problematic animal.

Acceptability of wildlife control has been shown to depend on the control technique considered. Kellert (1979) found that most people in the United States disagreed with the use of non-selective control methods (indiscriminate shooting or trapping) and overwhelmingly opposed the use of poisons. In general, trapping and slow poisons are seen as inhumane (Reiter et al., 1999; Zinn & Andelt, 1999), whereas shooting is perceived as

resulting in least suffering for the animals. Poisoning is negatively regarded by most, including pet owners, hunters, and farmers. This once-popular control method has been phased out in many communities across North America (Andelt et al., 1999).

In general, the literature suggests that young, urban, female, wealthy, and more-educated individuals exhibit more favorable attitudes toward predators (Hewitt, 2001; Zinn et al., 1998, Zinn & Pierce, 2002) and would be expected to disfavor coyote control measures, particularly lethal techniques. Bowker et al. (2003), when studying attitudes toward deer control, found females more likely to protest lethal options and less willing to pay for them than males. A similar result was reported by Bright, Manfredo, and Fulton (2000) and Koval and Mertig (2004).

Especially in the case of nuisance wildlife, it is reasonable to expect that previous experience will affect individuals' acceptance of lethal control (Bowker et al., 2003). Public attitudes toward predator control also appear to be to be situation dependent and strongly affected by the goal of the control policies (Andelt et al., 1999; Loker et al. 1999; Hewitt, 2001; Koval & Mertig, 2004), with acceptance increasing when the rationale for predator control is explained to the public. Wittmann, Vaske, Manfredo, and Zinn (1998) and Zinn et al. (1998) found that the acceptability of wildlife lethal control policies was dependent on the specific type of context in which it was proposed. Reiter et al. (1999) found that wildlife control was most acceptable when associated with the removal of predators that preyed on livestock or the control of species that damaged crops. In general, studies show that removal of coyotes is more acceptable when these animals carry diseases or attack livestock.

Hypotheses

Based on the literature, a series of hypotheses about the effect of variables on the likelihood to agree with lethal coyote control were advanced. It was hypothesized that those who approve of hunting (including those who actually hunt themselves) would be more likely to accept lethal methods of coyote control. This may reflect attitudes toward nature but also the idea that coyotes compete with hunters for some types of game (Walsh, Loomis, & Gillman, 1984). Having recently seen a coyote was expected to decrease the likelihood of agreeing with lethal control. It was also expected that those who experienced problems with coyotes would be more likely and that richer individuals would be less likely to find lethal coyote control acceptable.

It was hypothesized that the number of coyotes that respondents would be willing to sponsor through a private compensation scheme would be negatively correlated with the respondents' likelihood to agree with lethal coyote control. It was further hypothesized that poisoning of coyotes would be the least acceptable of the three control techniques and that selective shooting would be the most acceptable control technique. Finally, it was hypothesized that coyote control would be more acceptable when proposed in the context of coyote damage to livestock.

Methods

Data Collection

A phone survey was conducted on a random sample of listed and unlisted residential phone numbers. Calls were made between the hours of 12:00 and 21:00, during both weekdays and Saturdays. The guidelines in Dillman (1978) were followed during the different stages of the surveying process. A total of 438 contacts with eligible respondents[2]

were made, resulting in 255 completed questionnaires. The response rate was about 58%.[3] One male and one female student research assistant obtained 63% of the 255 responses, whereas a professional research center obtained the rest. No significant differences were found between the subsamples obtained by the students and the research center. Discarding incomplete responses left 218 usable responses.

Because some individuals refused to participate in the survey, non-response bias is possible if respondents significantly differed from non-respondents in characteristics that influence attitudes toward coyote control. The comparison of the sample's summary statistics (Table 1) with those applicable to the whole of PEI reveals significant differences, so some systematic non-response bias should be expected. For example, females were over-sampled (60% of the respondents were female and 40% were male; the average for PEI is 51% versus 49%). The respondents were more educated and slightly poorer than their average counterparts in the population. The average family *income* level[4] in the sample was $38, 800, whereas it is $46, 543 in PEI (Stats Canada). Therefore, the results should be regarded with caution when generalizing from the sample to the population. However, because the aim of the analysis was not to estimate

Table 1
Variable Descriptives

Variable ($n = 218 \times 6 = 1308$)	Mean	Std.Dev	Min	Max
age	45.02	17.50	12	82
agree (with proposed lethal control)	0.51	0.5	0	1
approve (1 if respondent hunts or approves of hunting)	0.66	0.48	0	1
cats (number of cats owned)	0.40	0.61	0	3
density (population density)	163.1	233.8	6	923
dogs (number of dogs owned)	0.38	0.50	0	2
Income	3.88	1.21	2.5	5.5
lastseen (how recently respondent saw a coyote)	2.77	1.74	1	6
livestock (1 if respondent owns livestock)	0.08	0.27	0	1
male	0.40	0.49	0	1
petkilled (1 if respondent had a pet killed by coyotes)	0.03	0.16	0	1
poison (1 if poisoning coyotes is proposed)	0.33	0.47	0	1
predation (1 if suggested context involves coyote predation)	0.5	0.50	0	1
problems (1 if respondent had problems caused by coyotes)	0.07	0.25	0	1
sheep (1 if respondent owns sheep)	0.01	0.10	0	1
shoot (1 if selective shooting of coyotes is proposed)	0.33	0.47	0	1
sponsored (coyotes respondent would agree to sponsor)	1.97	7.20	0	100
traps (1 if trapping coyotes is proposed)	0.33	0.47	0	1

Note that some of these where considered but removed from the finally reported models.

population parameters, the imbalance in the sample was not judged to be a serious problem.

The questionnaire included questions on (1) sociodemographic characteristics of the respondent, (2) livestock and pet ownership, (3) attitudes toward hunting, (4) direct or indirect experiences with coyotes,[5] (5) respondents' willingness to pay to protect coyotes, and (6) willingness to contribute to coyote elimination (through the contribution to a bounty to be paid to professional hunters).

Finally, there were *agree/disagree* questions about the acceptability of three types of lethal methods to control coyotes: trapping, poisoning, and selective shooting. In this article, the focus is on the answers to these questions. Each respondent was asked six questions in total about attitudes toward coyote control. The first three questions asked about the acceptability of three different coyote control techniques and the other three asked about the acceptability of each technique "if farmers are losing livestock due to predation." The observations were stacked so that the six responses from each individual generated six observations for a new single binary variable (*agree*). Thus, the original 218 usable observations yielded a full sample of $n = 218 \times 6 = 1308$ observations.

Analysis

To test the hypotheses, a binary choice model was estimated. The dependent variable, *agree*, took the value 1 to represent acceptability of the control method and 0 to represent non-acceptability. The independent variables were (1) coyote control methods (*traps, shoot, poison*) coded as binary variables, (2) previous experiences with coyotes (*lastseen, problems*), (3) willingness to contribute to the conservation of coyotes (*sponsored*), and (4) socioeconomic characteristics of the household (*age, male, income, approve*). Other sociodemographic variables like *age, education level*, and *income* were also tested, but were kept out of the final model. The same applies to variables such as *petkilled, livestock, sheep*, and *density*. These variables did not present enough variability in the sample to contribute significantly (at the usual $p < 0.05$) to explain the variability of *agree* and revealed problems of multicollinearity with other explanatory variables.

Random Effects Logit Model

A simple logit model was not appropriate because the responses were interdependent answers given by the same individual to questions about different types of coyote control. Such a model that pooled all observations ignoring the correlation would lead to biased results (Baltagi, 2001, p. 206; Agresti, Cafo, & Ohman-Strickland, 2004).

A random-effects logit model (Greene, 2004, pp. 689–700) was used to take into account the expected correlation pattern for each individual related to how a "yes" answer to one question about one type of control technique impacted the answer given about a different control method. We fitted via maximum-likelihood the random-effects model:

$$\Pr(y_{it} \neq 0 \mid X_{it}) = \frac{1}{1 + \exp^{-(\beta_0 + \beta_0 X_{it})}}$$

for $i = 1, \ldots n$ individuals and $t = 1, \ldots 6$ responses per individual. Underlying this model is the variances components model

$$y_{it} \neq 0 \Leftrightarrow \beta_0 + \beta_i X_i + v_i + \varepsilon_{it}$$

where ε_{it} are iid logistic distributed with mean zero and variance

$$\sigma_\varepsilon^2 = \frac{\pi^2}{3}$$

independently of v_i. The calculation of the Pearson's correlation coefficient

$$\rho = \frac{\sigma_v^2}{\sigma_v^2 + \sigma_\varepsilon^2}$$

gives a measure of the proportion of the total variance that is due to the individual-level variance component. When $\rho = 0$ the inter question variance component is unimportant, and the estimation would not differ from the simple pooled regression of all observations. This was formally tested using a likelihood-ratio test. To assess the goodness-of-fit of the estimated model, a full maximum-likelihood model with only one constant was fitted and compared with the proposed model using a likelihood-ratio test. An asymptotically equivalent Wald-test of all the parameters (except the constant) in the proposed model is also reported. The random effects logit model was run with Stata 8.1 (StataCorp, 2003) on the stacked data set (n = 1308).

Results

The marginal effects on the expected value of *agree* of changes in one variable at the means of all the independent variables are reported in Table 2. In the case of binary independent variables, their marginal effect was calculated as the discrete change in the expected value of *agree* resulting from their changing from 0 to 1. The model did a good job at predicting the value of *agree*.

The model suggested that older respondents were more likely to agree with lethal methods of coyote control. When everything else is the same, being one year older increased the likelihood of accepting any of the proposed methods by 0.006. In the logit model, the parameter estimate is the natural log of the odds ratio, so the odds ratio is the natural log to the β^{th} power, where β is the unstandardized parameter estimate (Table 2). Since *age* had a parameter estimate of 0.0251 and exp(0.0251) = 1.0255, one additional year of age increased by 2.6% the odds that someone would agree to the proposed control technique.

When the odds ratio is less than 1, an increase in the value of the independent variable (or a change from zero to one in a binary variable) decreases the odds that the dependent variable equals a given value. For example, the odds ratio of *cats*, 0.52, means that for an average respondent the odds of accepting coyote control were about halved with each additional cat owned. If the confidence interval includes the value of 1.0 for the odds ratio, the variable is not considered a useful predictor of the binary result (see, for example, *income*). The quantitative effects of changes on other independent variables can be

Table 2
Random Effects Logit (Dependent = *agree*) Results for Marginal Effects at the Means and Odd Ratios

Variable	Logit	Logit Odds Ratio
age	0.01***	1.03***
male[a]	0.25***	2.79***
cats	–0.16***	0.53***
dogs	0.14*	1.72*
approve[a]	0.22***	2.50***
lastseen	–0.05**	0.82**
problems[a]	0.26**	3.00**
income	0.04	1.18
sponsored	–0.01**	0.96**
poison[a]	–0.71***	0.02***
shoot[a]	0.15***	1.83***
predation[a]	0.34***	4.09***
constant	–1.82***	
σ_u	1.56***	
ρ	0.42***	
N	1308	
ll	–576.93	
Wald $\chi^2(12)$	252.19	
LR $\chi^2(12)$	617.64	
LR ($\rho = 0$) $\chi^2(01)$	96.26	
% correctly classified (0)	72	
% correctly classified (1)	84	

Note: ***$p < 0.01$ **$p<0.05$ *$p < 0.1$.
[a]dy/dx is for discrete change of dummy variable from 0 to 1.

interpreted analogously. As hypothesized, males were more likely to agree with the use of lethal control techniques.

Owning *cats* significantly reduced the likelihood of approving of lethal coyote control methods. Owning *dogs*, on the other hand, increased the likelihood that the respondent agreed with the control method. As expected, hunters and others who approve of hunting were more likely to accept lethal methods of coyote control. Having seen a coyote recently (captured by the variable *lastseen*) decreased the likelihood that the respondent agreed with the lethal control method. Those who had actually seen a live coyote might hold less utilitarian views toward them. As expected, however, those who had experienced problems with coyotes were more likely to accept lethal control methods. It was a priori expected that the variable *income* would yield a negative coefficient. Although non-significant, the income coefficient had a positive sign. The variable *sponsored* referred to the number of coyotes respondents would be willing to sponsor through a private compensation scheme (i.e., affected farmers would be compensated and the coyote could be spared). As expected, those who were willing to sponsor more coyotes were less likely to agree with lethal methods of control.

The three control methods were treated as binary variables in the stacked regression. The variable *traps* was used as the baseline level and omitted to avoid perfect collinearity with the other two dummies. The variable *poison* had the expected negative sign, whereas *shoot* (corresponding to *selective shooting* of coyotes known to be causing problems) had a positive sign. Both effects were significant, confirming a priori expectations. As hypothesized, the public was more comfortable with lethal control when coyotes were causing damage (predation had a significant positive sign). This notion also contributed to the positive sign of *shoot*, because the term "selective shooting" implied that the coyotes to be killed were causing damage. This effect is consistent with previous findings.

Latent Propensity and Manifest Association to Accept Control Methods

The econometric models allowed for within-individual correlation of responses. This referred to the extent to which an individual who agreed with one method (e.g., trapping of coyotes) was more likely to accept the selective shooting or the poisoning of coyotes. However, it should be noted that the random-effects approach does not consider potential unidirectional patterns or ordering in the within-individual correlation of responses. If having answered "yes" about one control technique increased the likelihood of answering "yes" later about a different technique, but not the other way around, this model would not be efficient. The model did not allow for "consistency" between responses in the sense that respondents might reason that having answered "yes" to a question about poisoning coyotes made it logical for them to then answer "yes" to a question about selective shooting of coyotes, although the opposite does not hold. The responses given by an individual were analyzed assuming that the ordering of the questions did not matter. Although the model took into account that each respondent might be more likely to agree to a question about shooting than to a question about poisoning coyotes and also modeled the likely influence of "the situation" (through *predation*), every other type of within-respondent correlation was assumed to be independent of the ordering of the responses.

To confirm the validity of this approach, alternative correlation patterns were explored under a generalized estimating equations (GEE) framework (Hoffman, 2004, pp. 154–160).[6] An *exchangeable* or unordered correlation pattern was not significantly outperformed by any unidirectional pattern. This suggests that changing the ordering of the responses would not make a difference. After controlling for the effect of the technique dummies and *predation*, the remaining within-respondent correlation between responses resulted from each respondent's latent and unobserved propensity to accept lethal control or not, rather than with some tendency to be consistent along some unidirectional spectrum. This also provided reassurance that the results were not substantially sensitive to question ordering (Alberini, Boyle, & Welsh, 2003).

The models were based on the notion that the binary responses obtained were associated with a *latent* variable such that the binary variable took the value 1 if the value of the latent variable lied above a certain threshold. The intra-individual correlation between the responses given by the same individual can be considered a latent variable. This would lead to the consideration of the latent propensity of one response ("yes"/"no") to correlate with other responses by the same individual. The value of the statistic ρ provides this type of measure.

The random effects logit estimated ρ as 0.424, suggesting that unobserved individual characteristics of the respondent accounted for 42% of a respondent's latent propensity to

accept coyote control of different types (trapping, poisoning, or shooting). After controlling for all the variables included in the model, there was still some correlation between the responses given by the same individual.

Similarly, the value of $\sigma_u = 1.557$ in the logit model can be interpreted as revealing that the odds of agreeing to lethal coyote control of someone who had unobserved propensity to agree one standard deviation above the average were about $\exp(1.557) = 4.7$ times those of someone who had just average unobserved propensity to agree. This stresses the importance of using a random-effects model, instead of pooling all the observations together. Alternatively, one can consider the intra-individual correlation given by the actual dichotomous outcomes, rather than the latent unobserved propensity. Following the methodology developed by Rodríguez and Elo (2003), several measures of intra-individual manifest association were calculated (Table 3).

For a respondent whose observed propensity to agree was at the sample median (see central column, *p50*, in Table 3), the marginal probability of giving an affirmative answer to any given question about lethal control was 0.577. The corresponding joint probability of giving an affirmative response to two given questions equaled 0.407. From these basic measures, additional correlation measures can be derived. For example, the odds ratio (OR) of expressing agreement with a given control method for someone who agreed previously with another method was about 0.6 times higher than for someone with the same characteristics who expressed disagreement before. Note that the odds ratio of 4.7 refers to differences between the responses about a given method for two respondents with different unobserved propensities to agree, whereas the odds ratio of 3.6 has to do with the expected response about a given method for individuals who were *observed* to give different responses about another method.

Pearson's correlation coefficient (0.3) suggested much lower manifest than intra-individual association. Only about 9% of the variation in responses to a given control method was explained by responses about another method. In contrast, unobserved individual characteristics resulted in about 42% correlation of the latent propensity to express approval between methods. Yule's *Q* (Yule, 1912) equaled 0.561, so for any two respondents with median individual characteristics their probability of being concordant[7] in their responses about 2 control methods exceeded the probability of being discordant by about 56 percentage points.

These measures depend on the respondents' characteristics; they take different values if calculated for a respondent other than the one with the median observed propensity to agree. Tables 3 shows[8] additional values of these measures for some selected percentiles, apart from the median (*p50*). Among respondents whose average probability to agree was very low or very high (see values for *p1* and *p99*) the acceptance of one of the three

Table 3
Measures of Intra-Class Manifest Association in Random-Effects Logit: Evaluated with Linear Predictor Set at Selected Percentiles

Measure	p1	p25	p50	p75	p99
Marginal probability	0.02	0.20	0.58	0.79	0.96
Joint probability	0.00	0.08	0.41	0.67	0.92
Odds ratio (OR)	6.71	3.91	3.55	3.87	5.38
Pearson's r	0.07	0.26	0.30	0.26	0.14
Yule's Q	0.74	0.59	0.56	0.59	0.68

control techniques considered was associated with between a fivefold and a tenfold increase in the probability of accepting one of the other two techniques. On the other hand, for those individuals at the median (those who were not very likely nor very unlikely to accept lethal coyote control) the acceptance of one of the three control techniques was associated with only about a threefold increase in the probability of accepting one of the other two techniques.

In more intuitive terms, those most comfortable with lethal control were not very fussy about which particular technique was used. If they agreed with the use of one, it was very likely that they would accept an alternative. Those most uneasy with lethal control, and therefore very unlikely to agree with any given technique, exhibited a very high level of observed individual correlation between responses about different techniques. This may be because those who disliked lethal control were willing to accept it only when the circumstances made it imperative in their view, caring less, in that situation, about which particular technique is proposed.

Conclusions

Individual sociodemographic characteristics explained the likelihood that respondents agree with the use of different lethal coyote control measures. Older, male, dog-owning respondents who approve of hunting and have experienced coyote damage were more likely to agree with the lethal control of coyotes. Having seen a coyote recently decreased the likelihood of accepting lethal coyote control, as did the willingness to pay to preserve coyotes. Acceptability of lethal control rose considerably when the lethal control methods were proposed in the context of coyote predation on domestic livestock. As found in previous studies (Knowlton et al., 1999; Mason, 2001) lethal control techniques that allow for selective removal of coyotes were most acceptable, whereas poisoning was the most controversial.

The management implications of the results in terms of correlations between responses given by a given individual to questions about different control techniques are that both in those jurisdictions where most individuals are against any type of lethal control and those ones where most individuals are likely to find them acceptable, there is little point in spending resources trying to choose the most acceptable technique. Instead, managers should focus on persuading the public of the desirability of lethal control in the first case (Koval & Mertig, 2004) and/or developing more effective non-lethal alternatives, while simply making sure that the most cost-effective technique is applied in the second case.

This is because if most people in a jurisdiction, given their individual characteristics, are highly likely to accept any given type of lethal coyote control, they will have high correlation between methods. In such jurisdictions choosing between substitute methods (and their associated cost-effectiveness) is not an issue. It may be most efficient for wildlife managers to devote some resources to explaining the rationale for control policies rather than expending more on finding out about and implementing the most preferred (or least controversial) lethal control technique. Similarly, in jurisdictions where individuals are highly unlikely to accept any given type of coyote control, managers should focus on justifying the rationale for lethal control and/or investigating more effective non-lethal control methods, rather than working on choosing the right method of control. However, in those jurisdictions where the likelihood of public acceptance of any given lethal control technique is intermediate, managers should strive to find out about the most acceptable technique and to ensure its adoption, rather than the more controversial alternatives. That is, in areas where lethal coyote control is divisive, it is more efficient to devote resources

to both justifying the need for lethal control and to ensuring that the most acceptable control technique is adopted.

Further research should allow for the use of split samples to shed further light on the issue of control technique. Additionally, more alternatives could be considered in the survey, in particular non-lethal control techniques, such as surgical sterilization or relocation, could be proposed as alternatives to trapping, shooting, and poisoning.

Notes

1. See Zinn and Miller (2003) for an extensive review.
2. When a residential phone number applied to several respondents, the first available adult willing to participate was interviewed. This may have led to oversampling females relatives to males, because females were usually more cooperative during the phone interviews.
3. Following Dillman (1978, pp. 238–239) out-of-service numbers and commercial numbers were discarded. Calls meeting answering machines, busy signals, or no answer after five dial tones were retried once on a different day and discarded after two new failed attempts.
4. Respondents were offered a choice between the following categories: less than $20,000; between $20,000 and $30,000; between $30,000 and $40,000; between $40,000 and $50,000; and over $50,000.
5. The text of the full questionnaire is available on request.
6. The GEE regressions are available on request. I am grateful to an anonymous referee for suggesting further checks of the assumptions of the initial model.
7. A pair of respondents is considered *concordant* if one of the respondents disagrees with both methods whereas the other respondent agrees. A pair of respondents is considered *discordant* if one of the respondents agrees after having disagreed about another method whereas the other respondent does the opposite (i.e., disagrees after having agreed to another method question).
8. Equivalent values for a probit model, omitted but available on request, fall, of course, very close to those for the logit.

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