

Article

Perceptions of community cats and preferences for their management in Guelph, Ontario. Part I: A quantitative analysis

Lauren Van Patter, Tyler Flockhart, Jason Coe, Olaf Berke, Rodrigo Goller, Alice Hovorka, Shane Bateman

Abstract – In 2014, 116 Guelph residents were surveyed to investigate attitudes about community cats and preferences for population management. There are an estimated 29 579 owned cats in Guelph, an estimated 40% of residents allow outdoor access to their cat(s), and 8054 households (15%) feed community cats. Participants reported more concern with community cat welfare than nuisance behavior. There were high levels of support for responsible pet ownership education (90%), accessible or low-cost spay/neuter (86%), and trap-neuter-return (78%), and low levels of support for inaction (4%) and euthanasia (20%). Respondents who did not own cats or who considered cats as “pests” or a “non-native, invasive species” were more supportive of euthanasia. Results suggest that Guelph residents want to see action taken to address community cat population concerns, and that proactive management tools such as education, accessible or low-cost spay/neuter, and trap-neuter-return would be well supported and less divisive than euthanasia.

Résumé – Perceptions à l'égard des chats communautaires et préférences pour leur gestion à Guelph, en Ontario. Partie I : analyse quantitative. En 2014, on a réalisé une enquête auprès de 116 résidents de Guelph afin d'étudier leurs attitudes à propos des chats communautaires et leurs préférences pour la gestion de la population. Il y a environ 29 579 chats appartenant à des propriétaires à Guelph et on estime qu'environ 40 % des résidents permettent à leurs chats d'aller à l'extérieur et que 8054 ménages (15 %) nourrissent les chats communautaires. Les participants ont signalé plus de préoccupations pour le bien-être des chats communautaires que pour le comportement nuisible. Il y avait des taux élevés d'appui pour l'éducation sur la possession responsable d'un animal de compagnie (90 %), la stérilisation accessible ou à faible coût (86 %) et la capture-stérilisation-mise en liberté (78 %) et de faibles taux de soutien pour l'inaction (4 %) et l'euthanasie (20 %). Les répondants qui ne possédaient pas de chats ou qui considéraient les chats comme des «animaux nuisibles» ou une «espèce non indigène et envahissante» manifestaient plus de soutien pour l'euthanasie. Les résultats suggèrent que les résidents de Guelph désirent que des mesures soient prises pour aborder les préoccupations liées à la population de chats communautaires et que des outils de gestion proactive, comme l'éducation, la stérilisation accessible ou à faible coût ainsi que la capture-stérilisation-mise en liberté seraient accueillis favorablement et seraient moins controversés que l'euthanasie.

(Traduit par Isabelle Vallières)

Can Vet J 2019;60:41–47

Introduction

The domestic cat (*Felis catus*) is the most popular pet in Canada, with approximately 36.9% of households owning 1 or more cats, and an estimated total of 9.3 million owned companion cats in the country (1). A 2017 Canadian Federation

of Humane Societies report states that 2/3 of stakeholders (animal rescues, municipalities, and veterinarians) believe their community is currently experiencing a cat overpopulation crisis, although there has been a downward trend among most stakeholder groups over the past 5 y (1). In addition to the homeless

Department of Clinical Sciences (Bateman), Department of Population Medicine (Coe, Berke), Ontario Veterinary College, Department of Geography (Van Patter), University of Guelph, Guelph, Ontario N1G 2W1; University of Maryland Center for Environmental Science Ringgold standard institution — Appalachian Laboratory, 301 Braddock Road, Cambridge, Maryland 21613, USA (Flockhart); City of Guelph — Intergovernmental Relations, Policy & Open Government, Guelph, Ontario (Goller); Queen's University — Geography & Planning, Kingston, Ontario (Hovorka).

Address all correspondence to Dr. Shane Bateman; e-mail: sbateman@uoguelph.ca

Use of this article is limited to a single copy for personal study. Anyone interested in obtaining reprints should contact the CVMA office (hbroughton@cvma-acmv.org) for additional copies or permission to use this material elsewhere.

cats living in shelters, there is a population of free-living stray or feral community cats. For the purposes of this study, “community cats” were defined as:

Cats that spend all of their time outdoors and do not currently have an owner who is actively caring for them. Some of these cats have never been socialized and are extremely frightened of human interaction (often termed feral). Some of these cats have had a home or have become accustomed to human interaction and have the potential to be adopted or to live successfully in a home with a new owner (sometimes termed stray). In some cases these cats exist as part of a colony in which humans provide food/water, shelter, and some basic preventive healthcare (spay/neuter, vaccinations).

Media attention surrounding the overpopulation of cats in Canada has led to vigorous debate about how communities can best formulate solutions. High-quality scientific evaluation of community cat populations relevant to the geographic and climatic features of Canada is scarce. Thus, without community-specific information such as cat population sizes and citizen opinions, strongly opposing viewpoints persist and action on the issue remains a challenge.

Some citizen advocates are concerned about community cat welfare, and there is considerable debate about the quality of life and longevity of community cats, with some sources estimating an average lifespan of only 2 y (2,3). Trap-neuter-return (TNR) is frequently advocated as a humane alternative to trap and removal, which generally results in euthanasia (4). One of the greatest challenges in implementing community cat management strategies is managing public opposition, as there can be strong diverse opinions on the acceptability of competing approaches such as TNR and euthanasia (5–7). Humane alternatives require community-specific engagement and consensus to draft policy and implement actions.

Most research investigating public preferences for the management of community cats has occurred in the United States. Such studies have reported a wide range in levels of support for TNR (7), from 38% in Texas (in suburban neighborhoods) (8) to 76.6% in Ohio (9). Greater support for non-lethal control measures such as TNR has been found among: cat owners (9,10), women (6,8), and urban dwellers (6). Reasons for not supporting TNR have been identified as: previous negative experiences with cats (6), viewing cats as a nuisance (8), and doubting its effectiveness (8).

Little research has been conducted on community cats in the Canadian context. On a national scale, a study by Environment Canada (11) employed extrapolation and data from other countries to estimate the national feral cat population at 1.4 to 4.2 million, and concluded that feral cats were responsible for the majority of the estimated 100 to 350 million birds killed annually by cats in Canada. National surveys have investigated the demographics of companion animals in Canada, and highlighted the unique challenges facing owned and sheltered cats (1,12). These studies speculate that there is a decreased value placed on companion cats compared with dogs and advocate improved understanding and initiatives to change the culture of cat ownership. On a regional scale, a study from southern

Ontario used semi-structured interviews to investigate perceptions of feral cats and debate surrounding urban colonies, concluding that tolerance is spatially dependent, with feral cats viewed as belonging more on farms and less in wilderness areas (13). Locally, the total population size of free-roaming (community and owned-outdoor) cats in Guelph was estimated at 7662 (95% bootstrap CI: 6145 to 9966) using transect sampling (14). No previous studies have surveyed public perceptions of community cats or preferences for their management in the context of a specific community in Canada. Possible regional differences in values and preferences highlight the importance of conducting such research in novel contexts (6,15,16).

To fill this knowledge gap on community cat abundance and citizen opinions, various stakeholders formed the Guelph Cat Population Taskforce (GCPT) in 2013. As a collaborative, community-based initiative, the GCPT aims to: support research on community cats; promote outreach, education, and community involvement; and eliminate the euthanasia of healthy cats. Using data collected by the GCPT from surveyed Guelph residents, the objectives of this research were to: i) determine attitudes and opinions about owned and community cats; ii) determine acceptable actions to address cat population management; and iii) inform the development of community outreach and education efforts.

Materials and methods

Survey design and data collection

This research was undertaken from 2014 to 2015 in the city of Guelph, a medium-sized city in southwestern Ontario located 100 km west of Toronto. It is home to the Ontario Veterinary College at the University of Guelph. A pre-test of the survey was conducted with 10 individuals in August 2014 using the City of Guelph online poll administration software service (17). Results and feedback from this pre-test were used to modify the questionnaire and arrive at the final survey design. The survey (available on request from the corresponding author) comprised 4 sections and focused on: perceptions of community cats; views and values concerning community cats; preferences for community cat management; and personal and demographic information, some of which was optional. The survey was composed of a combination of multi-select, open-ended, and Likert Scale questions.

The survey was administered in person in November 2014 using convenience sampling. Participants were recruited to complete paper surveys at 6 primary public locations throughout the city. Using this method 2 GCPT members and 5 Guelph Humane Society volunteers recruited 116 participants. Additionally, 333 participants in the city completed an identical web-based survey between December 2014 and March 2015 (18). Due to significant differences in demographics and suspected selection bias in the web-based survey, the datasets were not combined, and only the in-person survey results are reported herein. For a qualitative analysis of responses to open-ended questions in both the in-person and web-based survey see Part II of this manuscript series (18). Ethics approval for this research was obtained from the University of Guelph Research Ethics Board (REB# 14JN012).

Table 1. Estimates and 95% confidence intervals of proportions and totals of certain cat populations and related households in Guelph, Ontario, 2014.

Statistic	Result
Proportion households owning cat	0.37 (0.28 to 0.47)
Mean number of cats per owning household	1.48 (1.25 to 1.74)
Proportion of cat-owning households allowing outdoor access	0.40 (0.25 to 0.56)
Total owned cats	29 579 (22 089 to 39 610)
Total indoor-outdoor cats	11 694 (5517 to 22 019)
Total indoor-only cats	17 885 (9810 to 29 717)
Proportion of households that feed or have fed community cats around their homes	0.15 (0.09 to 0.23)
Number of households feeding community cats	8054 (4734 to 12 477)
Number of respondents	116

Data analysis

Demographic data and the number of dwellings (including houses, apartments, and townhomes; hereafter referred to as households) in the city of Guelph were obtained from the Canada Census Program (19). Survey respondent data on cat-ownership (the sample proportion) were used to estimate the proportion of households owning a cat in Guelph (the target population). The 95% confidence interval (CI) was estimated using the exact or Pearson-Clopper method. A Poisson model was then fitted using the quasi-likelihood estimation method due to over-dispersion (owing to the mean being larger than the variance of the raw data using only households with 1 cat or more) using the survey data to estimate the mean and 95% CI of the number of cats in cat-owning households. To estimate the number of owned cats in Guelph the number of households was multiplied by the proportion of households owning cats and the number of cats in each cat-owning household (20). To estimate the number of indoor-outdoor owned cats in Guelph, the number of owned cats was multiplied by the estimated mean of a binomial distribution and exact 95% CI of the proportion of households that provide outdoor access to their cats (14). The number of indoor-only cats was 1 minus the estimated proportion of households that provided outdoor access to their cats multiplied by the number of owned cats.

Relationships between the perceived effectiveness of and support for euthanasia as a management tool and 2 other variables were tested to see if respondents owned 1 or more cats, and whether they considered community cats to be “pests” or “non-native, invasive species.” People who classified euthanasia to be “effective” were considered as those who responded that euthanasia was extremely effective or somewhat effective. People who classified euthanasia as “ineffective” were considered as those who indicated that euthanasia was extremely ineffective or somewhat ineffective. People who strongly supported or somewhat supported euthanasia were considered as “supportive” and those who strongly did not support or somewhat did not support euthanasia were classified as “not supportive.” Using these classifications, 2-tailed Fisher exact tests were used to determine if the observed number of respondents was signifi-

Table 2. Responses to the question “Are community cats a problem in Guelph or your neighborhood?” Not all respondents answered the questions, so the sample size is less than the total number of respondents.

	Guelph	Neighborhood
Strongly agree	8%	8%
Somewhat agree	33%	21%
Neutral	33%	24%
Somewhat disagree	14%	23%
Strongly disagree	12%	24%
Number of respondents	112	113

cantly different from expected. The open software program R (21) was used for all statistical analyses. The significance level $\alpha = 0.05$ was applied in all tests.

Results

In 2016, Guelph had a population of 131 794 people and 55 927 households. Of the 116 respondents, most were female (55%) and had post-secondary education (76%). Approximately 1/3 of all respondents said they owned 1 or more cats, which resulted in an estimate of ~30 000 owned cats in Guelph (Table 1). The majority (60%) of cats were indoor only (~17 885 indoor-only cats in Guelph), while 40% of households allowed outdoor access to their cats (~11 694 indoor-outdoor cats in Guelph; Table 1).

Most respondents (62%) were aware of 1 or more community cats around their home. Approximately 15% (95% CI: 9% to 23%) of respondents currently feed or have fed community cats around their homes, resulting in a city-level estimate of 8054 households engaging in community cat feeding (Table 1). Of the respondents who fed cats, 43% had not fed any cats in the past year, 38% had fed 1 cat in the past year, and 19% had fed 2 or more cats in the past year. Forty-one percent of respondents strongly or somewhat agreed that community cats were a problem in Guelph, and 29% strongly or somewhat agreed that community cats were a problem in their neighborhood (Table 2).

Most respondents (78%) viewed community cats as “abandoned, homeless pets.” Thirty-two percent of respondents considered community cats to be “beneficial for rodent control.” Twenty-five percent of respondents considered community cats to be a “non-native, invasive species,” while 16% considering community cats to be “a natural part of the ecosystem.” Seventeen percent of respondents viewed community cats as “pests” (Figure 1).

Concerns about community cats were highest for issues surrounding cat welfare, followed by wildlife damage, public health, and nuisance (Figure 2). In terms of cat welfare, the greatest number of participants were concerned about community cats starving (73%), followed by vehicular injury (59%), and infectious disease (57%), and finally predation by coyotes, etc. (46%) (Figure 2). Respondents were more concerned with community cats killing birds (53%) than they were with cats killing other animals (35%) or spreading diseases to wildlife (31%) (Figure 2). More than twice the number of participants were concerned with community cats transmitting diseases or parasites to the public (41%) than with cat bites or scratches (18%) (Figure 2). Smaller percentages of respondents were

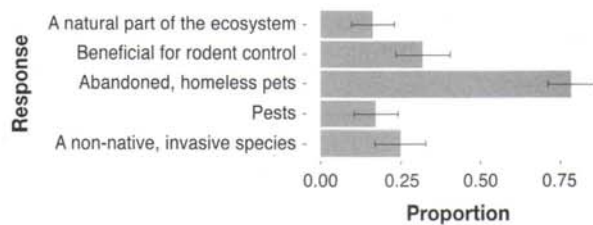


Figure 1. Bar plot of estimates and 95% CI of the perceptions of community cats in Guelph, Ontario.

concerned with nuisance issues such as cat feces (32%), getting into garbage (28%), spraying (24%), and noise (16%).

Participants believed that accessible or low-cost spay/neuter was the most effective management option, followed by responsible pet ownership education (e.g., information about spay/neuter, identification, vaccination, or nutrition), education (e.g., information about cat behavior and the issues around overpopulation), and TNR (Figure 3). Participants believed that doing nothing would be least effective, followed by euthanasia (Figure 3). Most respondents supported a range of potential management options. There was general agreement between participants' beliefs about the effectiveness of management options and their level of support for these strategies. Respondents most strongly supported responsible pet ownership education, education, accessible or low-cost spay/neuter, and TNR (Figure 4). Participants were least supportive of inaction and euthanasia (Figure 4).

There was no significant difference between respondents who considered community cats as "pests" or a "non-native, invasive species" ($n = 41$) and those who did not ($n = 75$), in terms of their perceived effectiveness of euthanasia to reduce cat populations [odds ratio (OR) = 2.28, $P = 0.13$]. Despite this, respondents who considered community cats as "pests" or a "non-native, invasive species" were in significantly greater support of implementing euthanasia to reduce cat populations in Guelph than those who did not (OR = 5.07, $P = 0.002$; Figure 5, right panel). There was no significant difference between respondents who owned a cat ($n = 43$) and those who did not own a cat ($n = 73$), in terms of their perceived effectiveness of euthanasia to reduce cat populations (OR = 0.42, $P = 0.14$). Despite this, cat owners were significantly less supportive of implementing euthanasia to reduce cat populations in Guelph than those who did not own cats (OR = 0.20, $P = 0.01$; Figure 5, left panel).

Most respondents (49%) believed the role of the GCPT should be to decrease the population of community cats, 31% believed it should be to stabilize the population, 10% believed it should be to eliminate the population, and only 3% believed it should be to do nothing (7% did not respond).

Discussion

This paper provides community cat population estimates and perceptions and preferences for community cat management in Guelph, Ontario. We estimate that there are just under 30 000 owned cats in Guelph, or approximately 1 cat for every 4 citizens. Our estimate of the number of indoor-outdoor cats

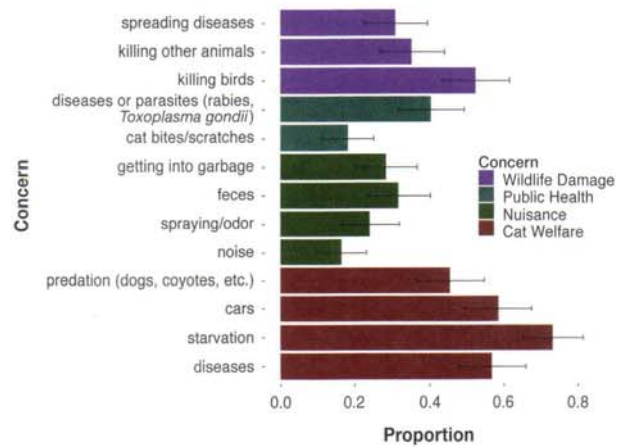


Figure 2. Bar plots of estimates and 95% CI of the concerns surrounding community cats in Guelph, Ontario based on cat welfare, nuisance, public health, and wildlife damage.

(11 494; 95% CI: 5517 to 22 019) overlaps with an independent estimate of free-roaming cats (7662; 95% CI: 6145 to 9966) (14) using walking transect sampling. Deriving similar results in the same study area using different techniques reinforces our confidence in population estimates and provides stronger evidence to help guide conversations about community cats and their management. Communities wishing to develop strategies to address cat population concerns should similarly consider developing multiple models of cat population abundance and distribution given that population abundance is a metric frequently used to define the success or failure of cat management strategies (1).

Most respondents (62%) were aware of community cats around their home. A low percentage (29%) answered that community cats were a problem in their neighborhood, but more (41%) believed community cats were a problem in Guelph as a whole. Similar findings were reported in Ohio, where 30% of participants agreed that free-roaming cats were a problem in their neighborhood, whereas 45% agreed they were a problem in the State (9). The sources of perceptions that there are community cat problems elsewhere are unclear, but could include firsthand knowledge, stories or impressions gleaned from others, or possibly assumptions from learning that a survey on community cats is being conducted in that locale. Approximately 8000 households (15%) in the city of Guelph feed or have fed community cats, less than that reported in Ohio (26%) where rural residents were more likely to feed free-roaming cats than were urban or suburban residents (9). Our estimate of the number of households feeding community cats should be taken with some caution given it assumes respondents can reliably identify cats without owners from indoor-outdoor cats. If this assumption is not met then our estimate may be better stated to reflect the number of households feeding free-roaming (owned or unowned) cats in Guelph. Observed discrepancies between our results and other studies could be a result of differences in survey design, surveys with small sample sizes, or regional/cultural differences. It highlights the importance of accurate, place-specific data on attitudes and behaviors towards community cats that may influence the success of outreach efforts (22).

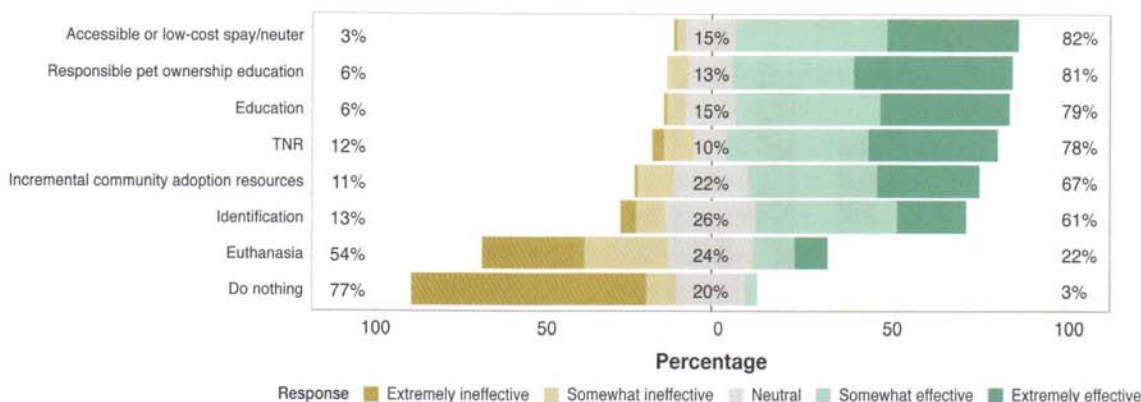


Figure 3. Horizontal stacked bar plot of Likert scale responses of the perceived effectiveness of each potential management option for community cats in Guelph for the 116 city of Guelph residents who responded to the in-person survey. Some management options do not total 100% due to rounding. TNR – trap/neuter/return.

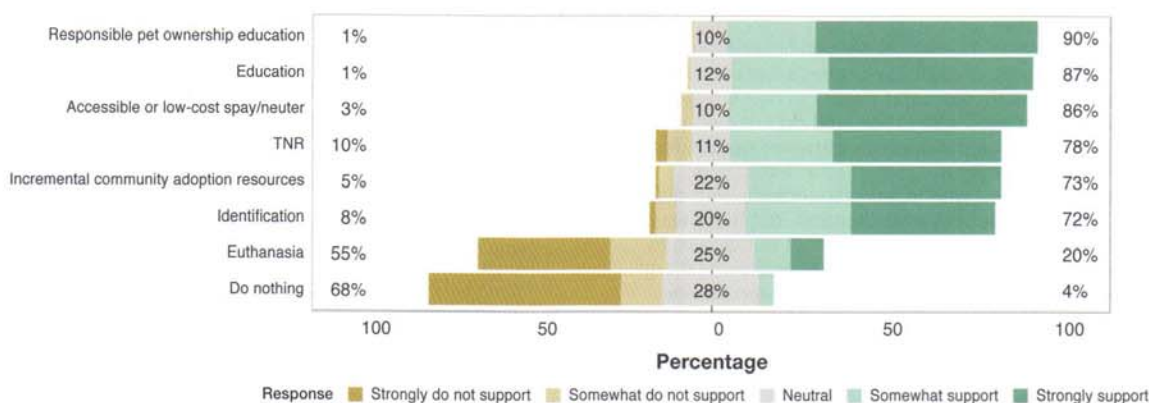


Figure 4. Horizontal stacked bar plot of Likert scale responses of the level of support for implementing each potential management option for community cats in Guelph for the 116 city of Guelph residents who responded to the in-person survey. Some management options do not total 100% due to rounding. TNR – trap/neuter/return.

In agreement with previous research from southern Ontario, respondents most frequently perceived community cats as “abandoned, homeless pets” and therefore were most concerned with cat welfare (13). Few respondents considered community cats to be “pests,” and accordingly there was relatively little concern with nuisance issues such as feces, spraying, and getting into garbage among respondents in the current study. Our findings on perceptions of community cats differed markedly from those reported in Georgia, where 50% of participants classified feral cats as a “nuisance” and only 38% believed that feral cat welfare was important (15). This discrepancy could be due to the higher population densities of community cats expected in more temperate climatic conditions (23), and the identified negative correlation between tolerance for outdoor cats and perceived abundance (24). Alternatively, this finding may be a result of differences in culture and prevailing attitudes about animal welfare among geographic regions (16). Given the lack of data, it is difficult to know if these attitudes are widespread across Canadian cities or how attitudes may have shifted over time as community cat management has garnered increasing media attention across North America.

In terms of community cat management, Guelph residents want action taken to reduce or stabilize the population of commu-

nity cats. Only 3% responded that the GCPT was not needed and 4% supported no action being taken. Only 10% of respondents to the current survey answered that the community cat population should be eliminated, possibly either because some level of community cat population was viewed as acceptable, or for fear that “eliminate” implied lethal removal. Only 20% of respondents in this survey supported euthanasia, which is much less than reported in Georgia (44%) (15). The greatest support in our study was for proactive approaches such as responsible pet ownership education (90%) and accessible or low-cost spay/neuter (86%). There was also strong support for TNR (78%), similar to findings from Ohio (76.6%) (9), and California (76%) (10). Conversely there was much less support for TNR than was found in Georgia (49%) (15), Texas (8), and Hawaii (25). These discrepancies suggest that there are potential regional and temporal differences in prevailing attitudes towards cat management practices and their effectiveness. Communities implementing new strategies may benefit from an assessment of local perceptions and attitudes. Our findings suggest that in our community there is broad support for multi-faceted, proactive approaches that maximize cat welfare and improve cat ownership practices.

In terms of perceived effectiveness of the various management tools, our study found that many more respondents

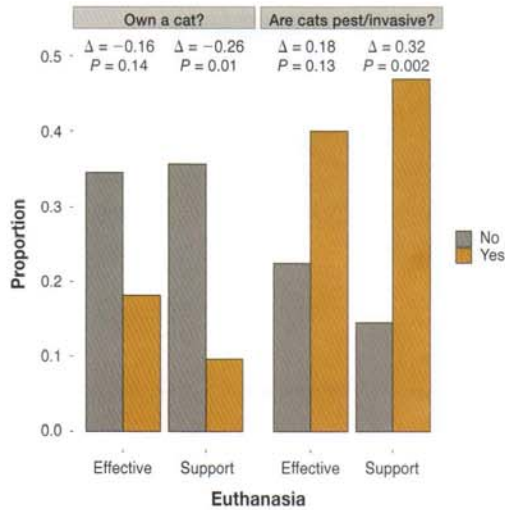


Figure 5. Bar plots of proportion of respondents who agree that euthanasia is effective for managing community cats and support its implementation. There was no significant difference between respondents who did or did not own a cat in their belief of the effectiveness of euthanasia but fewer cat owners support its implementation compared with those who do not own a cat (left). There was no significant difference between respondents who consider community cats as “pests” or a “non-native, invasive species” compared with those respondents who did not with respect to the effectiveness of euthanasia, but there was a difference with respect to support to implement euthanasia to manage community cats (right). Results are based on 116 city of Guelph residents who responded to the in-person survey.

(81%) believed TNR to be a somewhat or extremely effective management strategy compared with euthanasia (23%). These findings are in contrast to modeling exercises that indicate euthanasia is more effective than TNR to reduce populations of outdoor cats (26–28). Our findings also differ from results in Georgia, where 47% of individuals believed trap-euthanize was most effective at reducing cat populations, and fewer believed TNR was most effective (15). Cat owners in the current study believed that euthanasia was less effective, and responsible pet ownership education and TNR were more effective, compared to participants who did not own cats. The data also supported our hypothesis that respondents who considered community cats to be “pests” or “non-native, invasive species” were in greater support of euthanasia as a cat population management option in Guelph than those who did not. This aligns with findings from Illinois, where previous negative experience with feral cats was a significant predictor for preferring euthanasia as a management tool (6). Interestingly, despite this difference in levels of support, there was no significant difference between respondents who considered community cats as “pests” or a “non-native, invasive species” and those who did not in the perceived effectiveness of euthanasia to reduce cat populations. This suggests that Guelph citizens holding a negative perception of community cats would approve the use of euthanasia as a management tool, despite their disbelief in its effectiveness.

One limitation of this study is the lack of a description in the survey of how euthanasia would be used as a tool. Although we believe it unlikely that respondents would be confused about euthanasia, it may have influenced our results. A second limi-

tation of this study is the small sample size. The overall study also comprised 333 web-based responses; however, these data were not combined because of significant differences, which we believe to be indicative of greater self-selection bias in the web-based survey. Self-selection bias occurs when only individuals who feel strongly about the issue in question are likely to complete the survey. There is some evidence to suggest that self-selection bias and nonresponse rates may be greater in web-based versus paper surveys (29,30). Therefore, the small sample resulting from the labor- and time-intensive in-person method was a trade-off for a more representative sample. A limitation of quantitative analyses of surveys in studying human-animal relationships is that they can oversimplify complex perceptions and values (31). Consequently, to complement and extend the findings in this manuscript we have reported separately on the qualitative analysis of the in-person and web-based surveys’ open-ended questions to explore the underlying views and values that contribute to the findings reported herein (18).

Our study provides a list of supported actions that could be applied in a management plan for community cats in Guelph. Management actions, combined with their associated level of support, can be applied to population models (32) to understand how different strategies are likely to influence the cat population composition and structure. When integrated with estimated costs of each management action, these population modeling exercises can illuminate the optimal approach to meet management objectives, such as reducing the number of community cats by a given percentage, while accommodating community-specific preferences for certain management tools (e.g., TNR, education) over others (e.g., euthanasia). Overall, the results of the current study suggest that Guelph residents want to see action taken to address community cat population concerns. Proactive management tools such as education, accessible or low-cost spay/neuter, and TNR would be well-supported by the community. The GCPT will use these results to advocate for continued research and action concerning community cat management in Guelph.

CVJ

References

1. Canadian Federation of Humane Societies. Cats in Canada 2017: A Five-Year Review of Cat Overpopulation. 2017. Available from: https://www.cfhs.ca/cats_in_canada_2017 Last accessed October 2, 2018.
2. Jessup DA. The welfare of feral cats and wildlife. *J Am Vet Med Assoc* 2004;225:1377–1383.
3. Nutter FB, Levine JF, Stoskopf MK. Reproductive capacity of free-roaming domestic cats and kitten survival rate. *J Am Vet Med Assoc* 2004;225:1399–1402.
4. Gibson KL, Keizer K, Golding C. A trap, neuter, and return program for feral cats on Prince Edward Island. *Can Vet J* 2002;43:695–698.
5. Loyd KAT, DeVore JL. An evaluation of feral cat management options using a decision analysis network. *Ecol Soc* 2010;15:10–27.
6. Loyd KAT, Miller CA. Influence of demographics, experience and value orientations on preferences for lethal management of feral cats. *Hum Dimens Wildl* 2010;15:262–273.
7. Wald DM, Jacobson SK, Levy JK. Outdoor cats: Identifying differences between stakeholder beliefs, perceived impacts, risk and management. *Biol Conserv* 2013;167:414–424.
8. Ash SJ, Adams CE. Public preferences for free-ranging domestic cat (*Felis catus*) management options. *Wildlife Soc B* 2003;31:334–339.
9. Lord LK. Attitudes toward and perceptions of free-roaming cats among individuals living in Ohio. *J Am Vet Med Assoc* 2008;232:1159–1167.

10. Dabritz HA, Atwill ER, Gardner IA, Miller MA, Conrad PA. Outdoor fecal deposition by free-roaming cats and attitudes of cat owners and nonowners toward stray pets, wildlife, and water pollution. *J Am Vet Med Assoc* 2006;229:74–81.
11. Blancher P. Estimated number of birds killed by house cats (*Felis catus*) in Canada. *Avian Conserv Ecol* 2013;8:3.
12. Perrin T. The business of urban animals survey: The facts and statistics on companion animals in Canada. *Can Vet J* 2009;50:48–52.
13. Van Patter LE, Hovorka AJ. 'Of place' or 'of people?' Exploring the animal spaces and beastly places of feral cats in southern Ontario. *Soc Cult Geogr* 2017;19:275–295.
14. Flockhart DTT, Norris DR, Coe JB. Predicting free-roaming cat population densities in urban areas. *Anim Conserv* 2016;19:472–483.
15. Loyd KAT, Hernandez SM. Public perceptions of domestic cats and preferences for feral cat management in the southeastern United States. *Anthrozoös* 2012;25:337–351.
16. Hall CM, Adams NA, Bradley JS, et al. Community attitudes and practices of urban residents regarding predation by pet cats on wildlife: An international comparison. *PLoS ONE* 2016;11:e0151962.
17. Polladaddy Ltd., Sligo, Ireland.
18. Van Patter L, Flockhart T, Coe J, et al. Perceptions of community cats and preferences for their management in Guelph, Ontario. Part II: A qualitative analysis. *Can Vet J* 2019;60:48–54.
19. Statistics Canada. Census Profile, 2016 Census, Guelph, City [Census subdivision], Ontario and Wellington, County [Census division], Ontario, 2017. Available from: <http://www12.statcan.gc.ca/census-renewement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3523008&Geo2=CD&Code2=3523&Data=Count&SearchText=guelph&SearchType=Begins&SearchPR=01&B1=All&TABID=1> Last accessed October 2, 2018.
20. Murray JK, Browne WJ, Roberts MA, Whitmarsh A, Gruffydd-Jones TJ. Number and ownership profiles of cats and dogs in the UK. *Vet Rec* 2010;166:163–168.
21. R Core Team. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. 2014.
22. Levy JK, Crawford PC. Humane strategies for controlling feral cat populations. *J Am Vet Med Assoc* 2004;225:1354–1360.
23. Legge S, Murphy BP, McGregor H, et al. Enumerating a continental-scale threat: How many feral cats are in Australia? *Biol Conserv* 2017;206:293–303.
24. Wald DM, Lohr CA, Lepczyk CA, Jacobson SK, Cox LJ. A comparison of cat-related risk perceptions and tolerance for outdoor cats in Florida and Hawaii. *Conserv Biol* 2016;30:1233–1244.
25. Lohr CA, Lepczyk CA. Desires and management preferences of stakeholders regarding feral cats in the Hawaiian Islands. *Conserv Biol* 2014;28:392–403.
26. Andersen MC, Martin BJ, Roemer GW. Use of matrix population models to estimate the efficacy of euthanasia versus trap-neuter-return for management of free-roaming cats. *J Am Vet Med Assoc* 2004;225:1871–1876.
27. Schmidt PM, Swannack TM, Loez RR, Slater MR. Evaluation of euthanasia and trap-neuter-return (TNR) programs in managing free-roaming cat populations. *Wildlife Res* 2009;36:117–125.
28. Miller PS, Boone JD, Briggs JR, et al. Simulating free-roaming cat population management options in open demographic environments. *PLoS ONE* 2014;9:e113553.
29. Bethlehem J. Selection bias in web surveys. *Int Stat Rev* 2010;78:161–188.
30. Khazaal Y, Van Singer M, Chatton A, et al. Does self-selection affect samples' representativeness in online surveys? An investigation in online video game research. *J Med Internet Res* 2014;16:e164.
31. Seymour M, Wolch J. "A little bird told Me..." Approaching animals through qualitative methods. In: DeLyser D, Herbert S, Aitken S, Crang M, McDowell L, eds. *The SAGE Handbook of Qualitative Geography*. Thousand Oaks, California: Sage, 2010:305–320.
32. Flockhart DTT, Coe JB. Multistate matrix population model to assess the contributions and impacts on population abundance of domestic cats in urban areas including owned cats, unowned cats, and cats in shelters. *PLoS ONE* 2013;8:e0192139.

CVMA Emerging Leaders Program



CANADIAN VETERINARY
MEDICAL ASSOCIATION
L'ASSOCIATION CANADIENNE
DES MÉDECINS VÉTÉRAIRES

Makers of PREVAIL®
Veterinary Disinfectants



CVMA EMERGING LEADERS PROGRAM

Low staff morale, burnout, financial challenges, workplace drama?

A host of related challenges can easily make our veterinary careers less fulfilling.

The Canadian Veterinary Medical Association's (CVMA) Emerging Leaders Program can help bring joy back into the workplace by offering experienced professionals, and recent graduates, an opportunity to explore their approach to personal and professional accomplishments and their working relationship with colleagues.

All participants, regardless of their area of practice or years of experience, will come away enriched from this highly interactive workshop.

For more information, please contact Sarah Cunningham at scunningham@cvma-acmv.org



CanadianVeterinaryMedicalAssociation



@CanVetMedAssoc



CVMAACMV



CANADIAN VETERINARY
MEDICAL ASSOCIATION

339 Booth Street, Ottawa (Ontario) K1R 7K1
T • (800) 567-2862 • (613) 236-1162
F • (613) 236-9681
admin@cvma-acmv.org
canadianveterinarians.net