

**Title of Submission:** A Sky Without Birds: Perceptions of Cat Predation in British Columbia

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ENVR 400  
STEWARDSHIP CENTRE FOR BRITISH COLUMBIA

# **A Sky Without Birds: Perceptions of Cat Predation in British Columbia**

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# Executive Summary

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## **Introduction**

While cats can provide an important source of companionship for many Canadians, they are also the single largest source of human-related bird mortality when allowed to free-roam - responsible for killing an estimated 100 to 350 million birds annually in Canada (Blancher, 2013). To better understand the perceptions surrounding this ecological concern, we sought the input of British Columbians and organizations involved with cat-related bylaws in order to inform the design of an educational intervention program aimed at reducing cat predation of birds in British Columbia – an initiative that will be implemented by the Stewardship Centre for British Columbia (SCBC). The current study sought to address the following objectives:

1. Assess the existing knowledge and attitudes British Columbians have towards allowing cats to free-roam.
2. Rank potential solutions (stewardship practices) based on how favorably they are perceived by British Columbians.
3. Determine what action has been taken by organizations involved with cat-related bylaws towards limiting or addressing cat free-roaming.
4. Identify whether there is any interest among organizations involved with cat-related bylaws in taking additional action to limit cat predation of birds.

While the adverse impact of domestic and feral cats on the mortality of birds has been well documented, there are comparatively few studies examining public attitudes towards free-roaming cats. To our knowledge, this is the first study reporting the attitudes and perceptions British Columbians have towards free-roaming cats in their communities.

## **Methods**

Using the Google Survey tool, we recruited 300 adults living in British Columbia to participate in a multiple-choice online survey consisting of ten questions. These questions determined participants' knowledge and level of concern for this issue, attitudes on allowing cats to free-roam, and perceptions towards potential solutions.

Organizations involved in the encouragement, implementation, and enforcement of cat-related bylaws were invited to participate in an interview. A total of six participants (three representing animal welfare groups and three representing local governments) completed the interview. Interview questions were designed to understand existing bylaw(s) on the free roaming of cats, actions taken to address this issue (if any), and whether there is any interest or capacity for the organization to take additional steps.

### **Findings**

- 1. Less than half (46%) of cat owners surveyed keep their cats strictly indoors.**
  - ❖ Cat owners either are not aware of the implications of allowing their cats to free-roam, or do not find it concerning enough to keep their cats from free-roaming.
- 2. The overwhelming majority (92%) of cat owners observe at least one stewardship practice.**
  - ❖ Spaying/neutering was the most popular response (68% of cat owners), followed by supervising cats when they are outdoors (29% of cat owners).
- 3. Less than a quarter of British Columbians surveyed (24.8%) find it inappropriate to allow cats to free-roam.**
  - ❖ Cat owners are more likely than non-cat owners to find it “somewhat appropriate” or “appropriate” for cats to free-roam.
- 4. All six of the organizations interviewed would consider offering their support for a public education campaign.**
  - ❖ Economic infeasibility and lack of awareness on the issue emerged as the greatest barrier for other stewardship practices.
- 5. Five of the six organizations interviewed found it "somewhat inappropriate" or "inappropriate" for cats to free-roam.**
  - ❖ Most of the interviewed organizations were aware of the environmental harm of free-roaming, but were unsure how to limit or prevent it.

### **Recommendations**

- Municipal governments should consider an online public education campaign featuring information about bird predation, cat safety, and existing bylaws on free-roaming.
- Education campaigns should focus on cat-welfare as the primary motivation to restrict free-roaming.

- Education campaigns would likely find strong support in encouraging cat owners to spay/neuter their pets as opposed to a complete municipal ban on free-roaming.
- Bylaw enforcement for municipalities with existing free-roaming bylaws needs to be better funded, with the activity and success of their officers documented and made publicly-available.

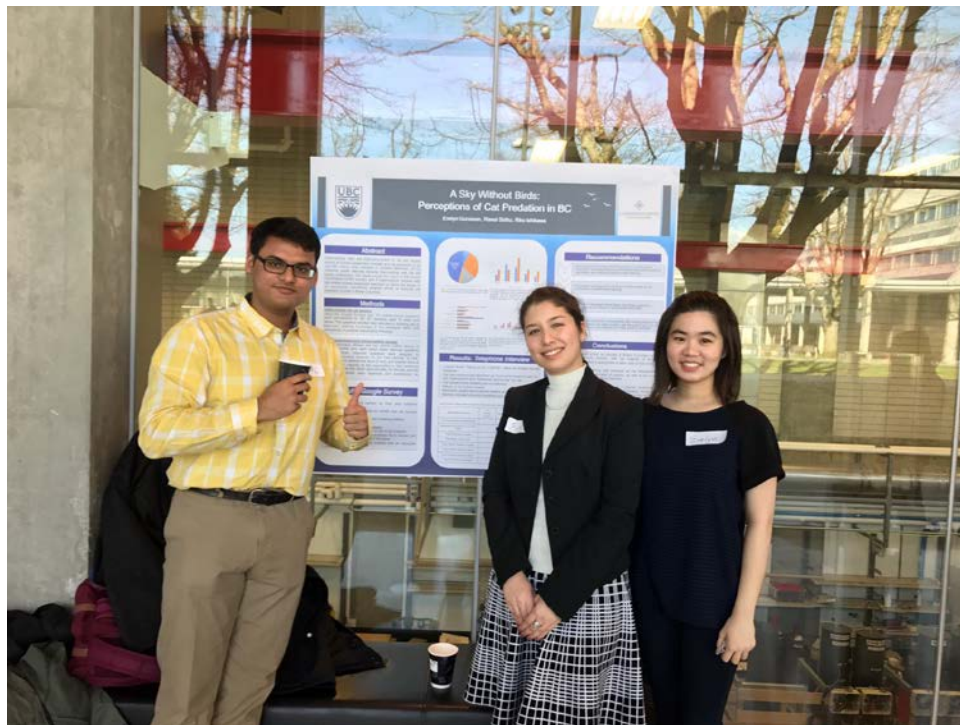
# Author Bios

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*Evelyn Gunawan: A 4th year Environmental Sciences student in Land, Air, and Water concentration. Passionate in the idea of sustainable development. Has previous field and wet lab research experience, and always looking forward to learn more.*

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*ENVR 400 Poster Presentation: (left to right) Rawel Sidhu, Riko Ishikawa, Evelyn Gunawan*

# Introduction

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## **Purpose of the Study**

This study is part of a larger three-year project led by the Stewardship Centre for British Columbia (SCBC) designed to encourage British Columbians to adopt Stewardship Practices (SPs): actions taken to reduce the impact free-roaming cats have on bird mortality. By soliciting the input of British Columbians as well as organizations involved with cat-related bylaws (e.g. local governments, animal welfare groups), this study seeks to understand the following questions:

***What are the current attitudes towards allowing cats to free-roam in British Columbia, and how do differing SPs vary in how favorably they are perceived?***

The responses generated through this study will help the SCBC understand the existing knowledge British Columbians have on this issue, their level of concern, and how they perceive possible solutions. This input will help inform the design of an educational intervention program the SCBC will be implementing to help reduce cat predation of birds in British Columbia.

## **The Impact of Free-roaming Cats on Wild Birds**

Despite having only been introduced to North America a few hundred years ago, there are now over 10.2 million cats in Canada, responsible for killing an estimated 100 to 350 million birds annually in Canada (Blancher, 2013). Approximately 12% of Canada's total wild bird population has declined over the past 40 years (Calvert et al., 2013). The impact of allowing cats to free-roam on bird mortality is enormous. An estimated 75% of all human-related bird deaths are caused by these felines – far overshadowing other sources of human-related bird mortality (Stewardship Center for British Columbia [SCBC], 2016). A four-year long study conducted by Environment Canada (2012) found that while marine oil activities kill approximately 1000 birds per year and collisions with buildings and other structures killed tens of millions of birds per year, cats kill more birds per year than all other sources of human-related activities combined (Calvert, 2013). Even using conservative estimates, 2-7% of all birds in southern Canada are killed by cats per year (Blancher, 2013). Given their ability to overwhelm and prey on existing native species, Dauphiné and Cooper (2009) classify cats as an invasive species – capable of causing significant destruction to the local ecology. Interestingly, it was emphasized that the invasive



species label only be applied to outdoor cats, given that cats kept strictly indoors pose no threat to birds and other wildlife.

While they are far less numerous than domestic cats, feral cats (cats without any owner) are responsible for nearly 60% of all bird kills (Blancher, 2013). A major source for this discrepancy can be found in their increased access to the outdoors. Table 1 describes how cats with access to the outdoors are responsible for more bird deaths per year than cats with restricted or no access to free-roam. Given the opportunity to free-roam outside of the house, domestic house cats are also well-equipped to hunt and kill birds (Calvert et al., 2013). Even healthy, well-fed, and domesticated cats have their predatory instincts well-intact, and will not hesitate to indiscriminately prey on birds and small mammals when given the chance (Blancher, 2013). Hunting wildlife appears to be intrinsic and genetically imprinted in cats, as efforts to feed – and even overfeed – outdoor cats have had no success in stopping their inherent instinct to hunt (Adamec, 1976). It should follow then that by both reducing the number of feral cats and keeping domestic cats indoors should help curb the number of bird deaths due to cat predation.

**Table 1 |** Parameters and ranges of values used in calculations to estimate bird kills in Canada. Modified from Blancher (2013).

| Parameter                                   | Range of Values Assumed    |
|---|----------------------------|
| number of Pet Cats in Canada                | 8.5 Million +/- 0.25M (SE) |
| percent Rural Pets                          | 27% to 33%                 |
| percent of pets with access to Outdoors     | 40% to 70%                 |
| Birds returned per Urban outdoor pet / year | 0.6 to 6.7 (midpoint 2.8)  |
| Birds returned per Rural outdoor pet / year | 2.8 to 14                  |
| Adjustment for undetected prey              | 2.0 to 5.8                 |
| number of Feral Cats in Canada              | 1.4 to 4.2 Million         |
| birds Killed per Feral cat / year           | 24 to 64                   |

British Columbia is especially vulnerable to this ecological issue. Over 300 bird species – the most in any province – breed in British Columbia (SCBC, 2016). While no data is available on how many of these species are threatened by cat predation, a few studies detailing the vulnerability of bird populations in British Columbia have been published. Feral and domestic cats were responsible for 22% of all predation events of Song Sparrow nesting in Rithet's Bog Conservation Area, British Columbia (Rithet's Bog Conservation Society, 2011). Pearson and Blair (2013) found that birds residing in highly urbanized regions where cat ownership is high (like the Fraser Valley and Southern Vancouver Island) face a

heightened risk of cat predation, especially during the spring and summer months when fledgling birds are the most numerous. According to Blancher (2013), cats were found to be a threat to 75% of grass and scrub-nesting bird species in British Columbia, which face a heightened risk for cat predation due to the increased time spent on the ground where cats have more access to them. Cases of widespread declines in island-nesting bird population due to feral cats have been documented in British Columbia. Rare and threatened bird species native to British Columbia, such as the Band-tailed Pigeon and Yellow-breasted Chat, are especially vulnerable to cat predation (SCBC, 2016). While these cases demonstrate that cat predation has an adverse effect on the bird populations of British Columbia, further – more comprehensive - investigation should be conducted to understand the scope and magnitude of this problem within the province.

### **Cat Owners' Perceptions on Free-Roaming**

While no research on this subject has targeted British Columbians specifically, multiple studies across North America have found that cat owners would be against a complete ban on the free-roaming of cats (Gramza et al., 2016; Lord, 2008; McDonald et al., 2015; and Slater et al., 2008). Lord (2008) found that cat owners were much less likely to view free-roaming cats negatively than those who did not own cats – 18.5% who saw it negatively compared to 34.2% respectively. In addition, the percentage of cat owners who perceived the free-roaming of cats to be positive (62.1%) was much higher than that of non-cat owners (42.5%). These findings appear to suggest that cat owners would be much more resistant to measures seeking to reduce the free-roaming of cats than the general population. No discernable difference in response was detected among urban, suburban, and rural respondents (Lord, 2008). A recent study by McDonald et al. (2015) lends support to these findings, and further suggests that cat owners are generally willing to allow their cats to free-roam because they do not view their pets as being harmful to wildlife. Moreover, 68% of cat owners felt that cats had either no or little influence on bird populations. By understanding and addressing the perceptions held by the public on allowing cats to free-roam, stakeholders in cat and bird welfare can provide a more effective and relevant educational intervention program.

### **Stewardship Practices for Local Government**

The SCBC recommends a multi-pronged approach which includes public education about responsible pet ownership, the enactment of local government bylaws to protect birds and other wildlife (and reinforce responsible pet practices), and increased municipal support to humane shelters and societies to help

address the cat overpopulation crisis and its impact on birds and wildlife. According to Pearson and Blair (2013), an effective stewardship program will require cat owners to recognize the consequences of allowing their feline pets to free-roam outdoors, and the consequences it can have on both wildlife and the well-being of their cats (Pearson & Blair, 2013).

The first and foremost practice should be to educate pet owners on practices that will limit the impact their cats have on birds and other wildlife. Practices such as keeping cats indoors or on leashes, spaying/neutering cats, and keeping cats away from nests and birdfeeders will all help mitigate the problem. The implementation of an animal control bylaw (that includes cats) should also be considered in order to encourage responsible pet ownership. The single most important bylaw that can be adopted to mitigate wildlife mortality and reduce the number of lost, unwanted and feral cats is to restrict cats from free-roaming (SCBC, 2016).

Requiring cats to be licensed, neutered, and fitted with microchips would further reduce the number of lost cats that either end up in shelters, or are left to reproduce and hunt in the outdoors. Another option that municipalities can consider is a mandatory licensing program that could be used to limit the number of cats per household, and aid in returning lost cats to their owners. A survey of 703 households in Ohio found that approximately 75% of participants would not have any issue with a licensing program if it were implemented (Lord, 2008). In the same survey, it was found that a mere 12.7% of participants were aware of any bylaws regulating the free roaming of cats. Regardless of the action taken by local governments, it is essential the public be made aware of policies and regulations.

### **Stewardship Practices for Cat Owners**

In addition to the municipal-scale stewardship practices mentioned above, the SCBC encourages cat owners to take an active role in protecting British Columbia's bird populations. At the individual level, cat owners should consider limiting the amount of time their cat is allowed to be outdoors, keeping their cats on a leash when they are outside, neutering their cats, fencing off areas where birds congregate (such as nesting sites and bird feeders), and avoid spreading bird seed on the ground. All of these methods have been shown to be successful in curbing rates of bird predation by cats (SCBC, 2016; McDonald et al., 2015).

# Methods

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## **Online Survey for Cat Owners**

Using the Google surveys tool, we designed and piloted an online survey (Appendix A) consisting of ten multiple-choice questions to 300 residents of British Columbia. Inclusion criteria for online survey respondents included (1) being 19 years of age or older; (2) living in British Columbia as determined by their IP address; (3) and having access to a computer or mobile device capable of hosting the online survey. The questions collected cat owner and non-cat owner attitudes on allowing cats to free-roam, existing knowledge of this ecological issue, and perceptions of possible SPs. All data, including answers from incomplete surveys, were assembled by Google in an excel file.

## **Telephone Interviews for Organization Representatives**

Organizations involved with cat-related bylaws were contacted by email (using contact information provided by the SCBC) with an interview request. The phone-based interview (Appendix B) consisted of seven questions designed to better understand what bylaws and actions have been done by their organization to address this ecological issue, what kind of support and challenges they have had in creating and enforcing these bylaws, and what additional actions (if any) their organization would be willing to take in order to reduce cat predation of birds. Each interview lasted approximately 30 minutes and the data collected was organized and summarized as qualitative data.

This research was reviewed and approved by the Behavioural Research Ethics Board at the University of Columbia.

# Results

## Online Survey for Cat Owners

### The Situation in British Columbia

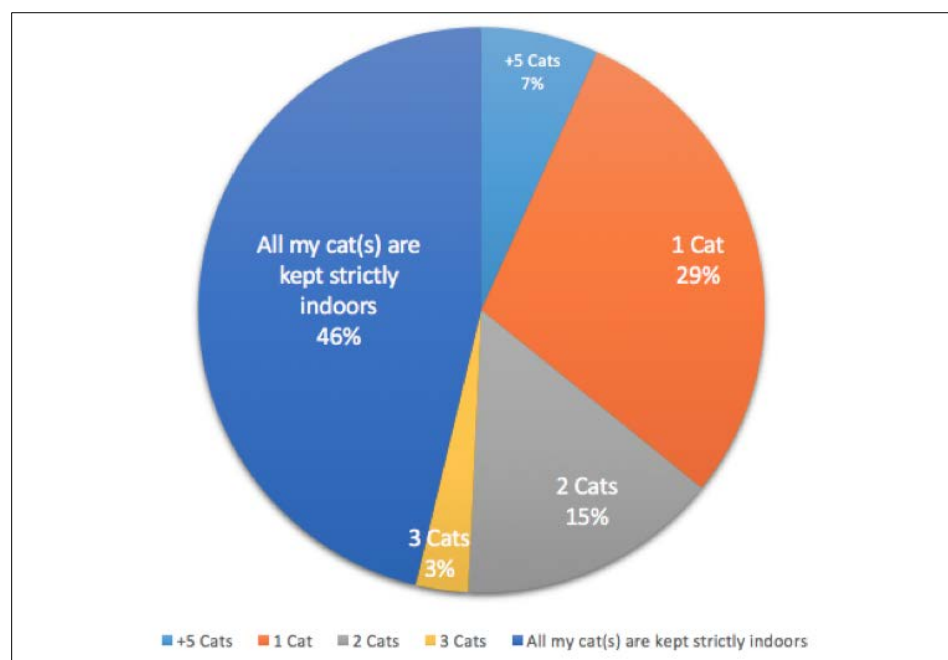


Fig. 1 Cat owner responses for question 3: "How many of those cats spend time outside unsupervised?"  
N=134.

Out of all the respondents, 166 people do not own cats. Out of the 134 cat owners (Fig.1), 46% keep all their cats strictly indoors.

Table 2. Contingency table of the number of cats owned and the number of owners who let these cats roam outdoor or kept indoor.

| # of Cat | Let outdoor | Kept indoor |
|----------|-------------|-------------|
| 1 cat    | 37          | 39          |
| 2 cat    | 19          | 17          |

|        |   |   |
|--------|---|---|
| 3 cat  | 2 | 2 |
| 4 cat  | 2 | 2 |
| 5+ cat | 4 | 0 |

A chi-square test of independence based on Table 2 was performed to see how likely the number of cats owned and cat owners habit (keep cats indoor or outdoor) are independent. The relation between these variables was found not to be significant,  $\chi^2(4, N=124)=4.15$ ,  $p>0.05$ . Therefore the number of cats owned does not affect the likelihood of cat owners keeping their cats from free-roaming.

### Existing Practices and Concerns

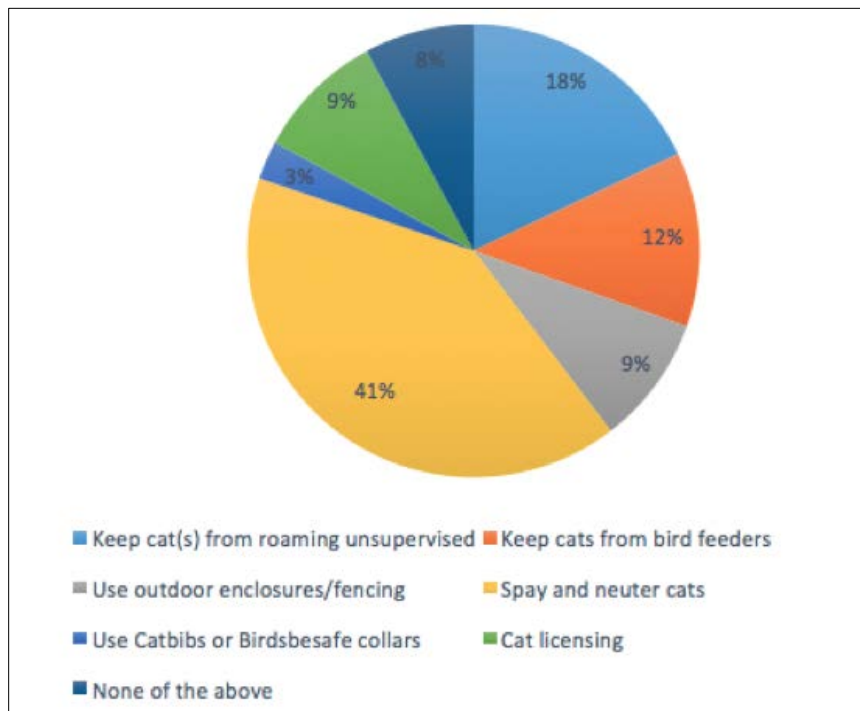


Fig. 2 Responses of cat owners to question 4: “Which of the following do you currently do? Check all that apply.” N= 217.

Out of all respondents, 92% cat owners responded that they do at least one or more of the listed SPs. The stewardship practices the most put into use “spay and neuter cats” (41%) (Fig. 2). The next SPs most

put into use are “keeping cat(s) from roaming unsupervised” and “keep cats from bird feeders”. Although there is a wide gap between the most popular SP and the others, there appears to be no obvious motivators behind popular SPs.

Table 3. Contingency table of survey question number 4 and 6. N=300.

|  | 4. Which of the following do you currently do? Check all that apply |                             |                                |                      |                                    |               |                   |
|--|---|-----------------------------|--------------------------------|----------------------|------------------------------------|---------------|-------------------|
| 6. What do you think is the biggest threat to unsupervised cats in your community? | Keep cat(s) from roaming unsupervised                               | Keep cats from bird feeders | Use outdoor enclosures/fencing | Spay and neuter cats | Use Catbibs or Birdsbesafe collars | Cat licensing | None of the above |
| Being hit by a vehicle   | 15  | 11                          | 12                             | 39                   | 5                                  | 9             | 54                |
| Getting a disease  | 2   | 1                           | 0                              | 3                    | 1                                  | 1             | 10                |
| Fighting with other cats   | 8   | 4                           | 3                              | 10                   | 1                                  | 2             | 12                |
| Interacting with wildlife  | 14  | 13                          | 4                              | 35                   | 0                                  | 8             | 51                |
| Other  | 1   | 0                           | 2                              | 4                    | 1                                  | 2             | 55                |

Out of all the people who currently practice “spay and neuter cats” (Table 3), most of them think that “being hit by a vehicle” and “interacting with wildlife” are the biggest threats to unsupervised cats in their communities. In fact, for people who practice an SP, they think that “being hit by a vehicle” are the biggest concern to free-roaming cats. The lowest concern for all cat owners, regardless of whether they practiced SPs or not, was “getting a disease”.

## Attitudes and Rationale

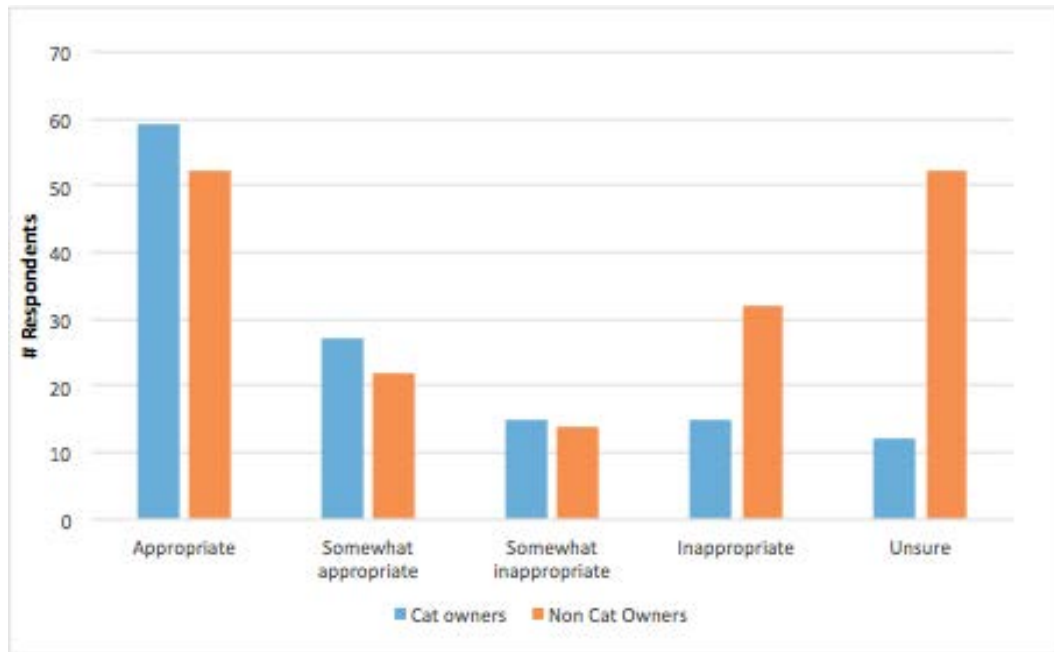


Fig. 3 Cat owner and non-cat owner responses to question 5: "How appropriate is it for cat owners to allow their cats to be outside unsupervised?" N=300.

A higher number of survey respondents think it is appropriate to let their cats outside unsupervised. A chi-square test of independence for respondents who think it is "appropriate" and "somewhat appropriate" to allow their cats outside unsupervised, was also performed to examine if the differences between cat owners and non cat owners are significant. The differences between these variables was found to be significant,  $\chi^2 (1, N=160) = 0.0519, p < 0.05$ . Therefore the opinion on free-roaming of cats depends on whether the respondent owns cats or not.



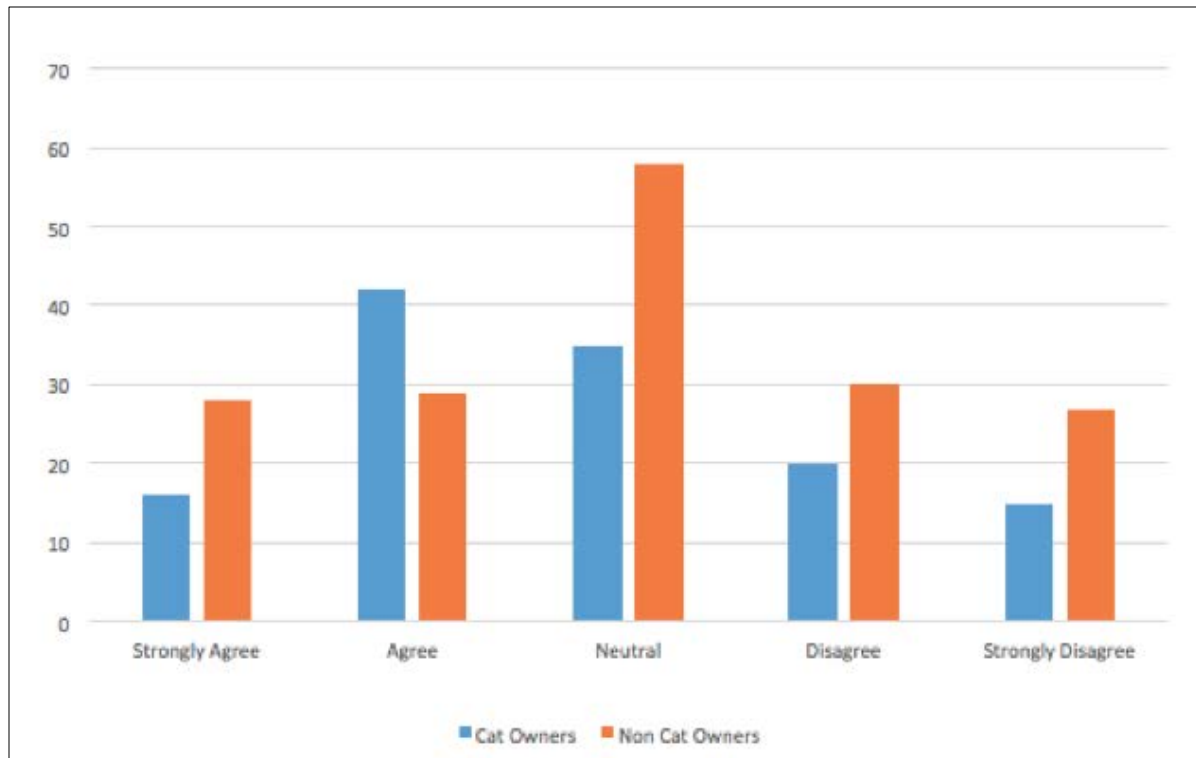


Fig. 4 Cat owner and non cat owner responses to question 7: "Please indicate your level of agreement with the following statement: Cats are estimated to be one of the most significant causes of wildlife and bird deaths in Canada." N=300.

61.7% of survey respondents are neutral, disagree, and strongly disagree to the statement: "Cats are estimated to be one of the most significant causes of wildlife and bird deaths in Canada". This indicates that the majority of BC residents are not aware of or even misinformed about the link between wildlife and bird mortality and their pet cats' predatory behavior.

Additionally, according to Fig. 4, fewer numbers of cat owners state that they are neutral, disagree, and strongly disagree to the statement. Hence, it seems that cat owners are more aware that non-cat owners of the impact of cats on wildlife.

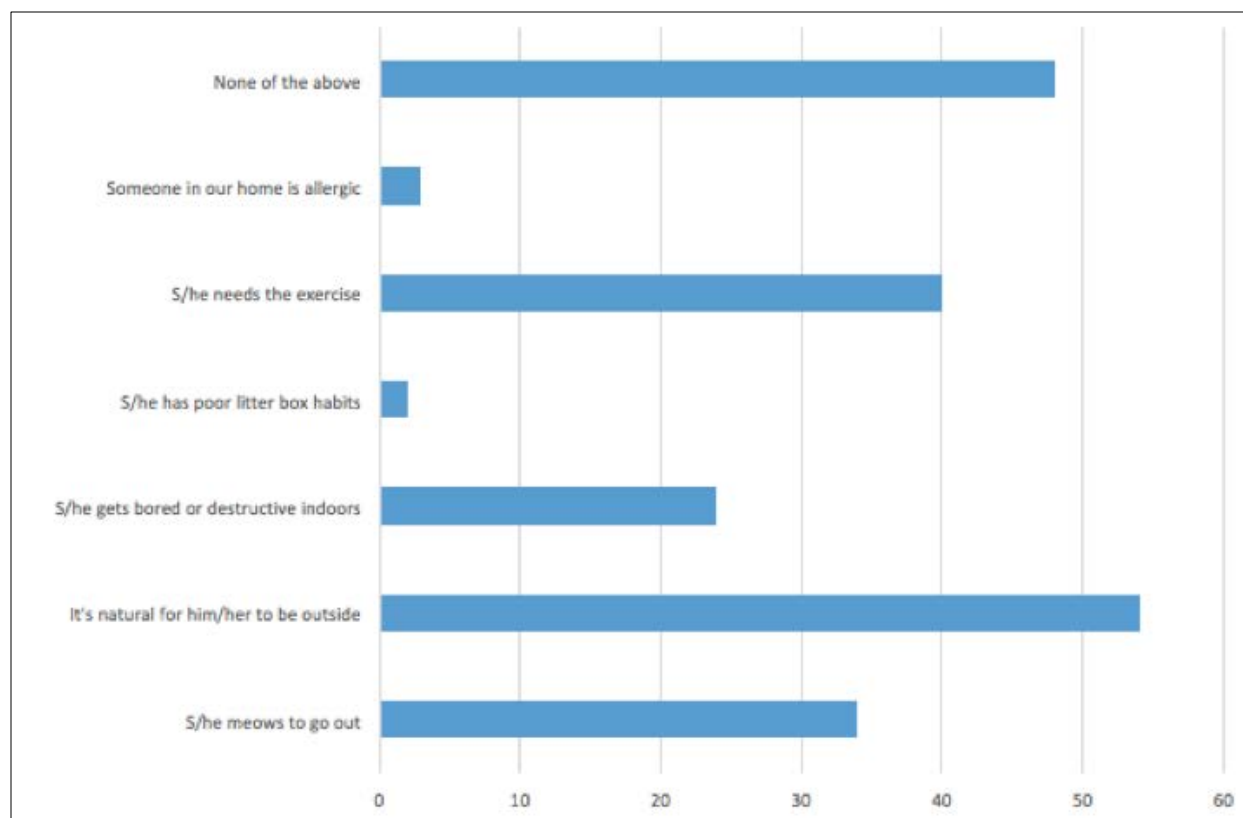


Fig.5 Cat owner responses to question 9: "If you let cat(s) outdoors, what are your reasons?" N= 205.

According to fig.5, the most common reasoning behind letting cats outdoors centered around beliefs such as "it is natural for [cats] to be outdoors" or "[cats] need the exercise" rather than practical reasons such as "poor litter box habits", which was the least popular answer. Free-roaming of cats can be thus assumed to be motivated by what owners believe they ought to be doing, rather than based on actual cat behavior. Education for cat owners that change their current beliefs may greatly change whether they let their cats free-roam or not.

### Creating an Effective Solution

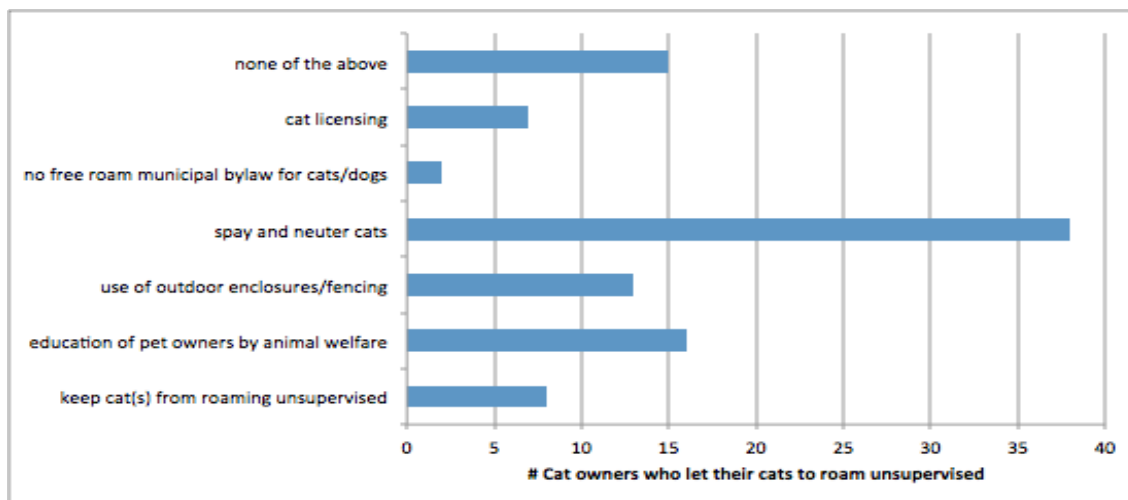


Fig. 6 Cat owners who let their cats roam unsupervised responses to question 10: “Thinking about ways to reduce cat impacts on birds and wildlife and to improve cat health and safety, which of the following practices would you support or adopt” N=64.

Based on Fig. 6, for the cat owners who let their cats roam unsupervised, 59.4% of them would support or adopt “spaying and neutering” their cats as a potential stewardship practice. In comparison to Fig. 2, it is visible that cat owners are more likely to support or adopt stewardship practices that they are already doing.

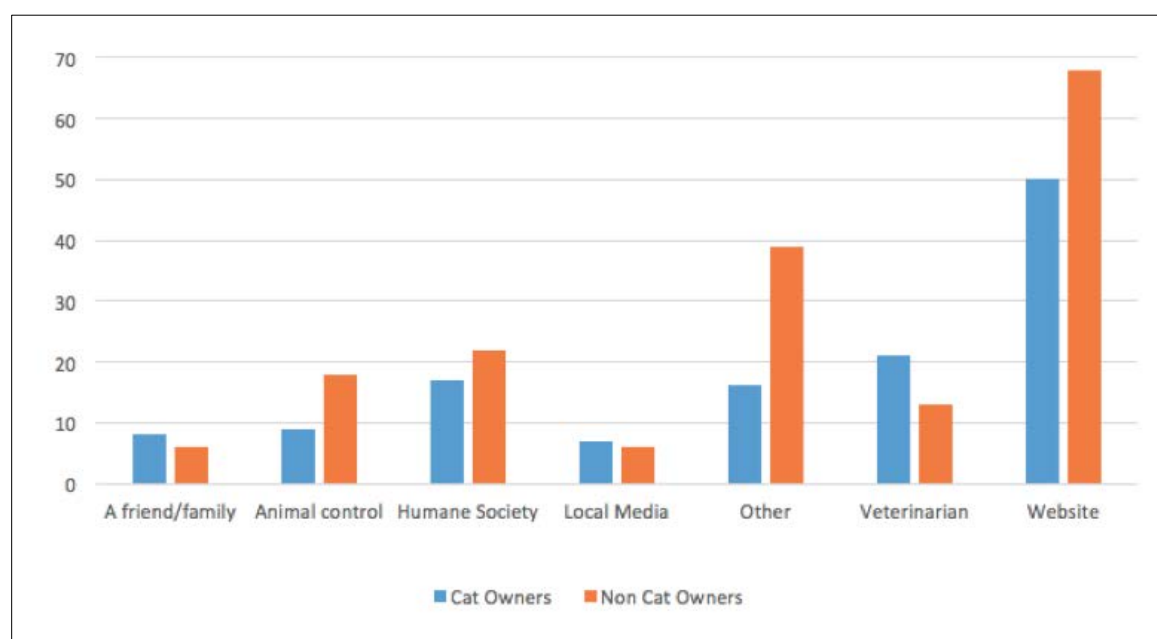


Fig. 7 Cat owner and non-cat owner responses to question 8: “Where would you first turn to for information about keeping cats and wild birds safe?” N= 134 for cat owners and N= 166 for non-cat owners.

As the majority of cat owners answered that they get their information on cats and birds from websites (Fig. 7), the best education method for the general public would be online. Preferably, the website would be easily accessible and approved by an expert such as a veterinarian or a humane society.

### Telephone Interviews for Organization Representatives

Table 4. Respondent answers to phone interview question: “Which of the following stewardship-practices would the city consider adopting?”

| <b>Stewardship-practices</b>                   | <b>1. Government official</b> | <b>2. Government official</b> | <b>3. Government official</b>          | <b>4. Animal welfare</b> | <b>5. Animal welfare</b> | <b>6. Animal welfare</b> |
|--|-------------------------------|-------------------------------|--|--------------------------|--------------------------|--------------------------|
| <b>No free-roaming municipal bylaw</b>         |                               | yes                           | yes                                    |                          | yes                      | yes                      |
| <b>Mandatory cat licensing municipal bylaw</b> |                               | yes                           |  | yes                      | “Very unlikely to pass”  | yes                      |
| <b>Trap-Euthanasia program</b>                 |                               |                               | “Last resort, depending on cat health” |                          |                          |                          |
| <b>Mandatory Spay-neuter</b>                   |                               | yes                           | yes                                    |                          | yes                      | “Only encouraged”        |
| <b>Trap, Neuter, Release Program</b>           |                               |                               | yes                                    | yes                      |                          | yes                      |
| <b>Trap, Neuter, Adopt program</b>             |                               | yes                           | yes                                    | yes                      | yes                      | yes                      |
| <b>Low-cost spay-neuter program</b>            |                               | yes                           | yes                                    |                          | yes                      | yes                      |
| <b>Public Education Campaign</b>               | yes                           | yes                           | yes                                    | yes                      | yes                      | yes                      |

A total of six respondents participated in our phone interview. It is worth noting that one animal welfare groups and a government official were from the same city. Only 1 city out of the 5 interviewed did not have any sort of bylaw pertaining to cats. Of the others, 2 had a no free-roam policy and 2 others had a conditional no free-roam policy. These conditions were either dependent on the cat’s health condition, or had requirements such as whether cats are spayed/neutered and licensed with a microchip or tattoo.

These bylaws were mainly put into place due to recommendations from animal welfare groups and experts. Some respondents indicated that complaints about free-roaming cats damaging property was the major motivator. Concerns about birds and other wildlife were a secondary motivation if considered.

Where there were no bylaws, respondents answered that potential bylaws were met with mixed responses, but where there existed bylaws, there was little resistance. One respondent attributed the lack of public response to the lack of awareness of the existence of the bylaw. Some respondents reported overall positive responses such as residents voluntarily bringing in their cats to be spayed/neutered, the increase in return rates of rescued cats, and even a “[positive] shift in value on cats”, where the respondent no longer feels that cats are being held less valuable than dogs in the community.

Most organizations being interviewed answered that it is either “somewhat inappropriate” or “Inappropriate” for cats to be free-roaming. Two of the respondents who replied that it is “somewhat appropriate” were from cities with conditional or no free-roaming bylaws. The biggest threats to cats was considered to be being hit by a vehicle or interacting with wildlife in alignment with the majority of responses from British Columbian survey respondents. One respondent from an animal welfare group answered that all threats were possible and equally likely.

Barriers to creating bylaws given by respondents centered around costs, the difficulty of enforcement, and the lack of awareness. Funding of stewardship bylaws were considered to be a major factor, not only to maintaining enforcement, but also for shelters to keep cats when they are captured. An animal shelter proposed it was necessary for the government to acknowledge the issue for a bylaw to pass, and others mentioned that resident compliance and understanding were also important for both passing and maintaining a bylaw. All respondents answered positively to public education campaigns, which could address the problem of public awareness.

## Summary of Results and Key Findings

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The results of our Google Survey indicate that there is little discrepancy in answers between cat owners and non-cat owners, as well as by gender or age range. Less than half of cat owners let their pets outdoors unsupervised, and the general consensus for both cat owners and non-cat owners was that this is appropriate behavior. Popular reasons to this came from the idea that it is in the nature of cats to be outdoors. As respondents indicated getting hit by cars to be the greatest dangers to free-roaming cats, it is visible that most cat owners do not understand or are not informed of dangers of letting their pet cats free-roam, and similarly, of the impacts caused by their cats to wildlife.

Stewardship practices to which all respondents answered positively aligned with stewardship practices already put into place by cat owners. Therefore, both cat and non-cat owners are more comfortable with practices that they are familiar with. According to the survey results, cat owners are most comfortable with spaying and neutering method and the least with no free-roam municipal bylaw. Therefore, simply introducing a bylaw that prohibits free-roaming may not be effective.

All animal welfare groups and government officials interviewed gravitated towards cruelty-free options such as trap neuter adopt over trap neuter release. As some residents consider no-free bylaws to be “cruel”, governments may take such opinions into consideration and hesitate to create strict bylaws. If education of citizens change the opinions of these residents, it can be assumed that the likelihood of bylaws passing will increase. Education is also important for the government itself. An animal welfare group mentioned that a presentation they had done to the municipal government motivated a no free-roam and recommend spay/neuter bylaw to be considered.

Our recommendation is to introduce a mix of stewardship practices to ensure efficient reduction in cat predation on birds. Spaying and neutering cats should be reinforced and promoted since it is the method that cat owners are already comfortable with. Usage of catbibs or collars can reduce predation directly. However, since this method is currently unpopular, we suggest that education materials aim towards addressing common misunderstanding about this method. In order to have these stewardship practices efficiently implemented, the recommended approach would be to educate people through eye-catching and user-friendly websites.

## Conclusion

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Despite overwhelming evidence showing free-roaming cats to be a significant source of bird mortality, less than half of the cat owners in British Columbia keep their cats strictly indoors. Furthermore, only a small fraction of British Columbians find it inappropriate to allow cats to free-roam – with the majority underestimating the risk free-roaming cats pose on birds and other wildlife. Of the potential solutions posed, spaying and neutering cats emerged as the SP with the most favorability, as well as the most popular SP already being practiced. Organizations involved with cat-related bylaws overwhelmingly favored the use of a public education campaign as a possible solution. A public education campaign may help address the lack of awareness British Columbians have on the impact of cat predation on bird mortality, as well as convince cat owners to limit or prevent their pets from free-roaming.

## Acknowledgements

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We would like to thank the Stewardship Centre for British Columbia for their support in guiding and funding this study, as well as the ENVR 400 teaching team for their ongoing encouragement and feedback.

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# Appendices

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## **Appendix A: Google Survey Questions**

1. I am 19 years of age or older and consent to participating in this research project. \*

Yes

No

I prefer not to say

2. How many cats, if any, does your household have as pets?

1 Cat

2 Cats

3 Cats

4 Cats

5+ Cats

My household does not have cats

3. How many of those cats spend time outside unsupervised?

All my cat(s) are kept strictly indoors

1 Cat

2 Cats

3 Cats

4 Cats+

5 Cats

My household doesn't have any cats

4. Which of the following do you currently do? Check all that apply.

Keep cat(s) from roaming unsupervised

Keep cats from birdfeeders

Use outdoor enclosures/fencing

Spay and neuter cats

Use Catbibs or Birdsbesafe collars

Cat licensing

None of the above

5. How appropriate is it for cat owners to allow their cats to be outside unsupervised?

Appropriate

Somewhat appropriate

Somewhat inappropriate

Inappropriate

Unsure

6. What do you think is the biggest threat to unsupervised cats in your community?

Being hit by a vehicle

Getting a disease

Fighting with other cats

Interacting with wildlife

Other

7. Please indicate your level of agreement with the following statement: Cats are estimated to be one of the most significant causes of wildlife and bird deaths in Canada.

Strongly Agree

Agree

Neutral

Disagree

Strongly Disagree

8. Where would you first turn to for information about keeping cats and wild birds safe?

Veterinarian

Humane Society

Local Media

Website

A friend/family

Animal control

Other

9. If you let your cat(s) outdoors, what are your reasons? (check all that apply)

- S/he meows to go out
- It's natural for him/her to be outside
- S/he gets bored or destructive indoors
- S/he has poor litter box habits
- S/he needs the exercise
- Someone in our home is allergic
- None of the above

10. Thinking about ways to reduce cat impacts on birds and wildlife and to improve cat health and safety, which of the following practices would you support or adopt?

- Keep cat(s) from roaming unsupervised
- Education of pet owners by animal welfare
- Use outdoor enclosures/fencing
- Spay and neuter cats
- No free roam municipal bylaw for cats/dogs
- Cat licensing
- None of the above

\* For ethical reasons, respondents who responded “No” or “I prefer not to say” were cut off from answering the rest of the questions using Google Survey’s screening option.

### **Appendix B: Interview Questions**

1. Currently, are there any bylaws on cats (if any), and are they being enforced? How? What are the consequences for violating the bylaw(s)?
2. How is the success of the bylaw(s) being measured – if at all? What are the parameters used to assess this success (e.g. drop in cat complaints, increase in returned lost cats, reduced number

of cats in shelters, decrease in feral cat population)?

3. What is the general level of compliance for these bylaw(s)?
4. What was the motivation/ driving-force behind creating the bylaw(s) (e.g. public complaints, expert recommendation, educational campaign)? Who pushed for the bylaw(s) to be adopted (e.g. individual, animal-welfare group, veterinarians)?
5. Did you face any barriers or resistance when adopting the bylaw(s)? If so, from whom?
6. What kind of an effect have the cat bylaw(s) had – if any? Has it resulted in a noticeable drop in cat-related complaints? What has been the public response been like to these bylaw(s)?
7. Which of the following stewardship-practices would the city consider adopting? [If no to any, ask for their reasons why].
  - No free-roaming municipal bylaw
  - Mandatory cat licensing municipal bylaw
  - Trap-Euthanasia program
  - Mandatory Spay-neuter municipal bylaw
  - Trap, Neuter, Release Program
  - Trap, Neuter, Adopt program
  - Low-cost spay-neuter program
  - Public Education Campaign