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Evaluating the Effects of Wellington's Animal Bylaw and Snip'n'Chip Campaign

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Evaluating the Effects of Wellington's Animal Bylaw and Snip'n'Chip Campaign

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Abstract

The Wellington City Council (WCC) and the Society for the Prevention of Cruelty to Animals (SPCA) have implemented several measures to promote responsible cat ownership and protect endangered wildlife from predation by cats. This project evaluated the public response to the Animal Bylaw and the Snip'n'Chip campaign in addition to their overall effects on microchipping trends and cat owner behavior. We found that most of the public felt positively towards the bylaw, that most cat owners were compliant with the bylaw regardless of their awareness of it, and that Snip'n'Chip brought accessibility to those who needed it but was not advertised as effectively as it could have been.

Executive Summary

Introduction

New Zealand was geographically isolated until roughly 1000 years ago, and in that time, hundreds of unique native species have evolved – especially birds. This changed when Maori and European settlers arrived, bringing foreign mammals like rats, mice, weasels, and cats. Since then, predation of native birds by these mammals has caused extinction of 31% of New Zealand's endemic bird species. In response, New Zealand government and conservation organizations have introduced the Predator Free New Zealand initiative, which aims to eradicate invasive rats, possums, and mustelids. Though not affected by the initiative, cats are also natural and proficient predators of birds, and will need to be managed in addition to the other predatory mammals.

The Wellington City Council (WCC) passed the Animal Bylaw in August 2016 and collaborated with the Society for the Prevention of Cruelty to Animals (SPCA) to run the Snip'n'Chip campaign from October to December of 2016. Effective February 2018, the bylaw requires cat owners to microchip their cats and register that microchip with the New Zealand Companion Animal Register (NZCAR). To help the public prepare for the bylaw, the Snip'n'Chip campaign provided significant discounts on microchipping and neutering procedures for pet cats in Wellington.

The goals of our project were to (1) evaluate the public's awareness of, compliance with, and perceptions of the Animal Bylaw bylaw and to (2) evaluate the effectiveness of the Snip'n'Chip campaign, including most effective advertising strategies, perceptions of the campaign, and associated public behavior change from its users.

Methodology

Successful execution of this project required a diverse range of methods and data sources, including in-person surveys conducted at various locations around Wellington, surveys emailed to Snip'n'Chip users, a focus group, and NZCAR microchip registration data.

We conducted public convenience surveys to determine Wellington residents' opinions on a variety of issues, including the Animal Bylaw, cat ownership, wildlife, and government involvement in cat management. To conduct the surveys, we deployed teams of two people to selected locations with high foot-traffic and no inherent bias.

Since the fraction of Wellington residents who used Snip'n'Chip was very small, we knew we would not be able to assess the program through these convenience surveys alone. Instead, we coordinated with the SPCA and WCC to send an online survey to Snip'n'Chip users via email. This survey had a variety of questions similar to those in our public survey, in addition to many that asked about the Snip'n'Chip campaign in particular.

Our surveys were effective for determining the public's response to the bylaw and Snip'n'Chip campaign, but not their effects on microchipping. To account for this, we obtained the number of Wellington cat microchips registered each month from January 2010 to January 2018 from the NZCAR. We were able to analyze this data for trends and determine just how significantly the Animal Bylaw and Snip'n'Chip had affected the number of cats microchipped.

Our goals, objectives, and methods are outlined in Figure 1, below.

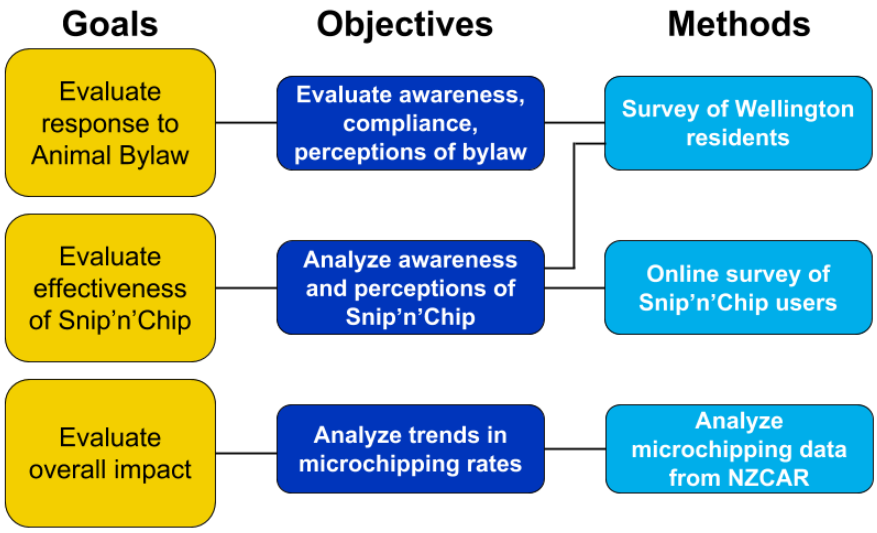

Figure 1: The goals of our project, the objectives we defined to reach those goals, and the methods used to complete each objective.

Results and Analysis

We collected 151 surveys from the Wellington population, including 48 cat owners and 103 non cat owners. From these surveys, we found that 86% of survey respondents (127 out of 148) had positive opinions on the bylaw. Reasons that respondents gave for agreeing with the bylaw are shown in Figure 2 below. Additionally, we found that 63% of cat owners (30 out of 48) were aware of the existence of the Animal Bylaw, but only 32% of non cat owners (33 out of 103) were aware of its existence. A majority of cat owners surveyed were also compliant with the bylaw at 81% (39 out of 48), but we found that awareness of the bylaw had little impact on compliance. Some of the reasons people had not microchipped their cats included having exclusively indoor cats, believing microchips are ineffective, having old cats, or thinking microchipping is too expensive.

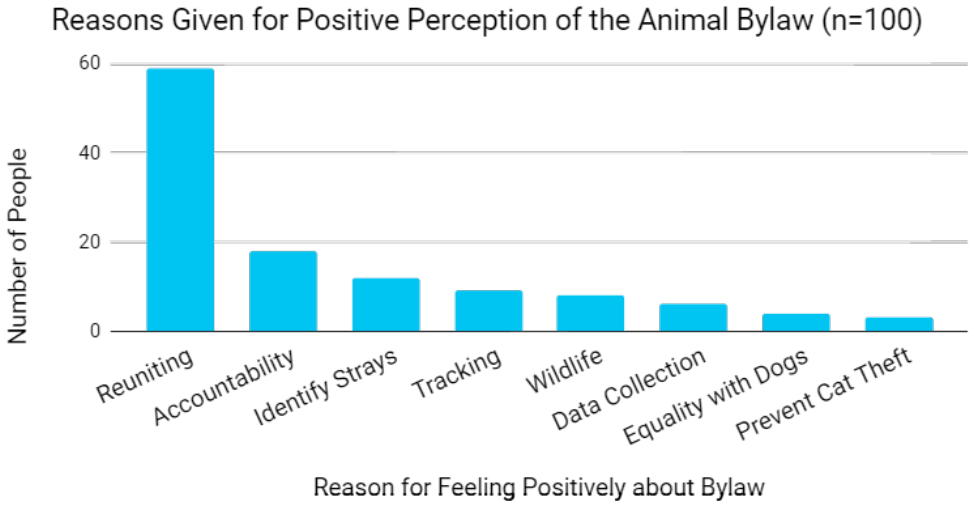

Figure 2: Why people felt positively about the Animal Bylaw

We received 153 email survey responses from people who had used the Snip'n'Chip campaign. Based on this data, 33% (n=127) reported they would have been unable to

microchip without Snip'n'Chip, and 39% (n=54) reported they would have been unable to neuter without Snip'n'Chip. Regardless of whether or not they could have afforded microchipping and/or neutering, participants noted that the discount was a huge incentive to use Snip'n'Chip. Figure 3 below summarizes reasons people would or would not have microchipped and/or neutered their cats without Snip'n'Chip.

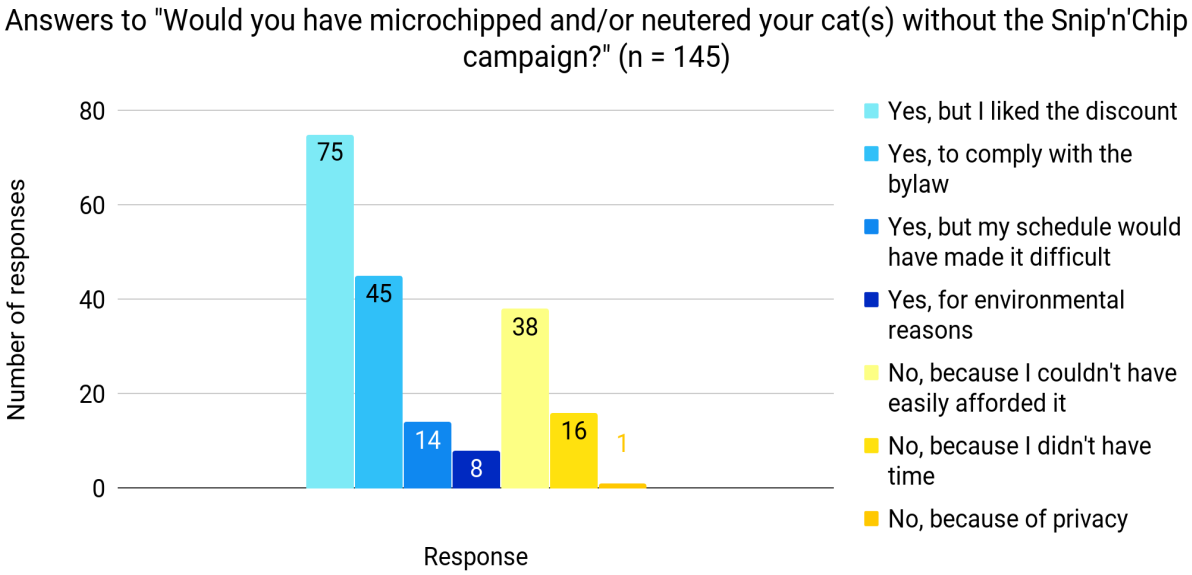

Figure 3: Why people would/would not have microchipped or neutered their cats without Snip'n'Chip

Further, we found that people learned of the campaign most effectively through social media, the newspaper, and the internet (see Figure 4 below). The campaign did reach its targeted lower-income demographics, but perhaps not as effectively as it could have – according to the 2013 census, 61% of people earn less than $50,000 annually, but only 28% of Snip'n'Chip users who answered our survey reported this income.

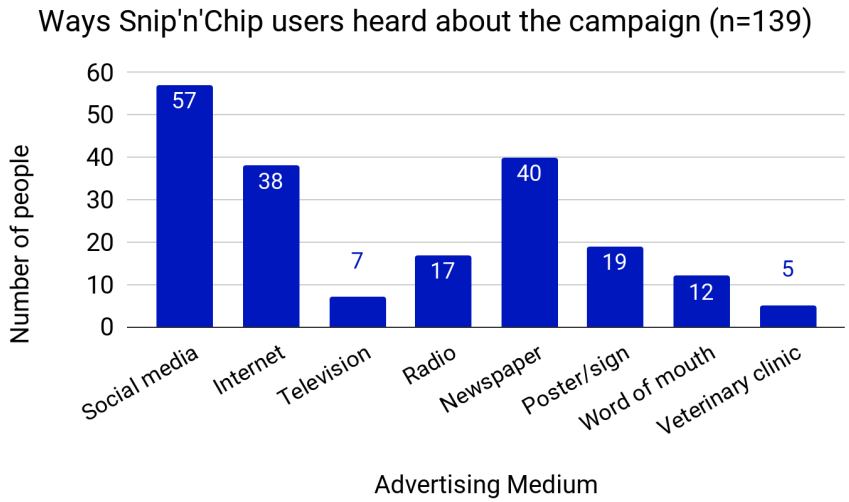

Figure 4: The ways Snip'n'Chip users heard about the Snip'n'Chip campaign

From our analysis of the NZCAR microchip registration data from 2010 through 2017, we found that there has been a significant change in microchipping trends since the introduction of the bylaw and microchipping campaigns. Over the past several years, the number of cat microchips registered has increased roughly linearly (excluding subsidized

microchipping events), but in the summer of 2017, the results deviate significantly positively from the trend. These results indicate that community microchipping events and Snip'n'Chip caused significantly more microchip implants than usually occur. A graphical representation of changes in microchipping trends is shown in Figure 5.

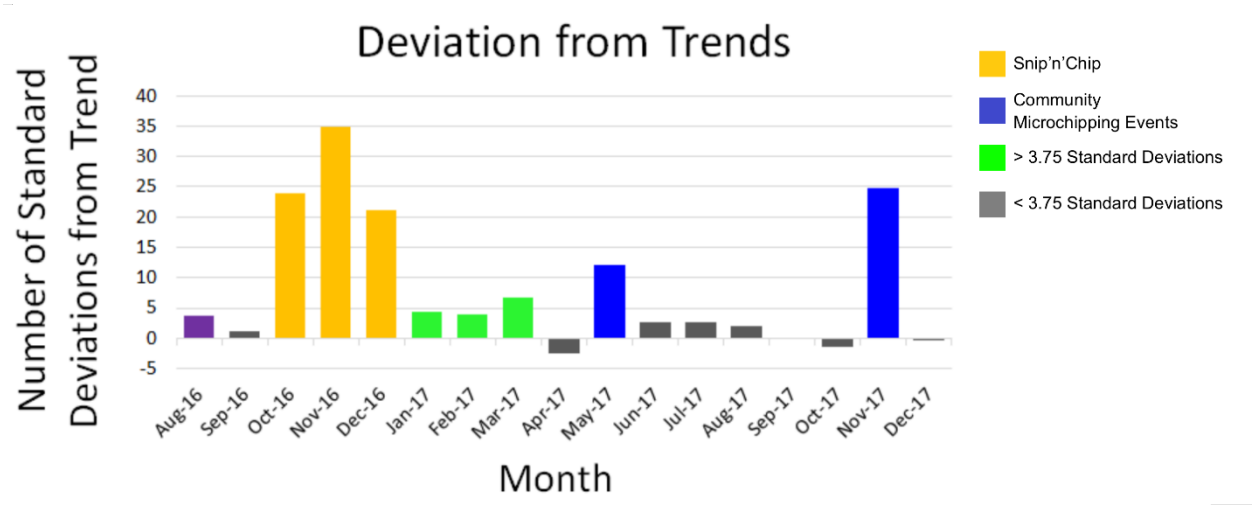

Figure 5: The deviation from the previous microchipping trendline for each month

Recommendations

From the combined results of our surveys, focus group, and research, we have produced recommendations for encouraging more responsible pet ownership and compliance with the bylaw, as well as for the Snip'n'Chip campaign (if another campaign is to happen). We recommend:

1. The WCC and SPCA use social media and work with local veterinary clinics to promote responsible pet ownership
2. Data oriented outreach that uses credible New Zealand based studies to inform people how they can better protect native wildlife from cat predation (example shown in Figure 6 below)
3. Outreach that uses testimonials to incite an emotional response and helps cat owners relate the benefits of being a responsible pet owner to their own cat
4. An eligibility verification process before Snip'n'Chip vouchers are purchased to better inform users of location requirements and medical requirements for use of the campaign
5. Extension of the Snip'n'Chip campaign to include after work hours
6. Organizations involved or invested in Snip'n'Chip predefine their expectations for each other so the campaign may be more easily evaluated in the future

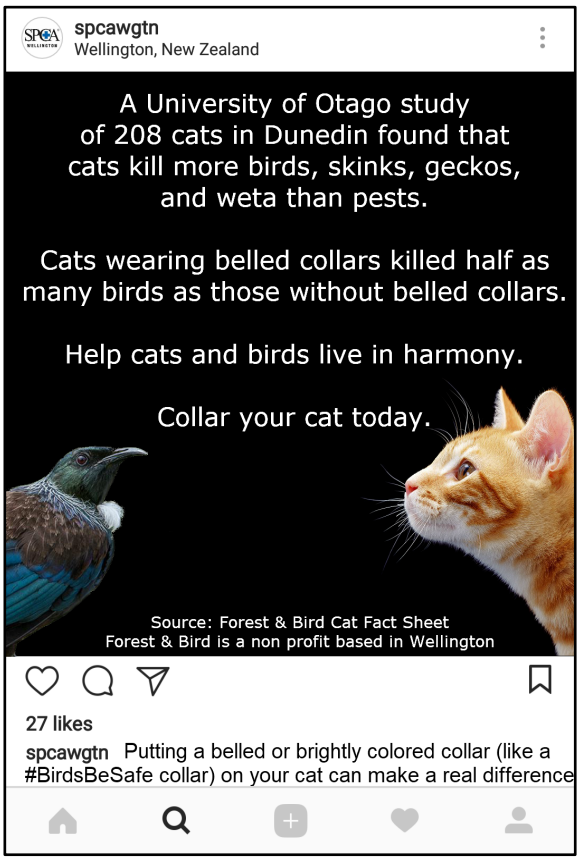

Figure 6: Example of recommended data oriented outreach using a social media post

We have also identified key areas that should be further researched to more thoroughly evaluate the effectiveness of the Animal Bylaw and Snip'n'Chip campaign. These areas include the effect of the bylaw and Snip'n'Chip on cat populations and the number of cats who are reunited with their owners, the relationship between income and compliance, the extent to which domestic cats are neutered in Wellington, and the reason for the disparity between cat owners' beliefs and their actions.

Conclusion

This project aimed to (1) determine public awareness of, compliance with and opinion on the Animal Bylaw, (2) determine the effectiveness of the Snip'n'Chip campaign, and (3) produce recommendations for future outreach methods and Snip'n'Chip campaigns. We have found that most Wellington cat owners are in compliance with the bylaw, that most residents feel positively about the bylaw, that people who used Snip'n'Chip felt overwhelmingly positively about the program, and that there has been a significant increase in cat microchipping trends over the past few years. We recommend that the WCC and SPCA use data driven and emotional outreach on social media and in vet clinics, that Snip'n'Chip's eligibility requirements are more clear, and that the WCC and SPCA communicate their goals and objectives more effectively.

Acknowledgements

Our team would like to acknowledge many individuals who have provided us with valuable advice, assistance, and guidance throughout the duration of our project. First and foremost, we would like to thank Professor Carolina Ruiz, Professor Michael Elmes, and Professor Stephen McCauley, our project advisors and ID 2050 instructor. They served as invaluable resources for us, always providing thoughtful feedback, input, and support so that we could achieve our goals. We would also like to acknowledge our wonderful sponsor liaison at the Wellington City Council, Daniela Biaggio. Her knowledge, perspective, and support guided the direction of our project tremendously.

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Without the support of these individuals, our project would not have been possible. Thank you all for your invaluable guidance and support, and for contributing to the success of our project.

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1. Introduction

Due to New Zealand's geographic isolation, it has developed many unique native species, including fish, reptiles, amphibians, birds, and a limited number of mammals.[1] Since these species evolved largely without risk of predation by mammals, mammals introduced by human settlement have caused severe harm to native species. Managing the threat posed by introduced mammals is integral to New Zealand's efforts to protect native species, especially unique endemic birds. A large amount of time and effort is invested in controlling some of these animals, such as rats, stoats, and possums. Around $77 million NZD total is spent per year by both government and private programs to help New Zealand become predator free by 2050.[2] However, the issue becomes far more complex when the threat comes from beloved pets.

Cats are the most common companion animal in New Zealand, and the cultural framework in which they are kept means they roam freely. They are also skilled hunters – in Wellington, predation by cats is a threat to the native wildlife, and perhaps more so to reintroduced vulnerable species that are spilling out of Zealandia, an urban fenced sanctuary.[3] This situation fuels controversy over what should be done (if anything) about their effects on birds, lizards, and other native wildlife.[4] Some feel that any government regulations on cats would infringe on cat owners' rights, while others feel that the welfare of birds and other native wildlife depends on such regulations. As a result, cat regulation efforts must be carefully balanced to respect the rights of cats, cat owners, and native wildlife.

The Wellington City Council (WCC) and the New Zealand Society for the Prevention of Cruelty for Animals (SPCA) have recently collaborated to promote responsible pet ownership and reduce the impact of cats on wildlife. The WCC's Animal Bylaw was reviewed in 2016, leading to the addition of a clause requiring cat owners to microchip their cats and register that

[1] "Native animals." Department of Conservation. Accessed December 01, 2017. http://www.doc.govt.nz/nature/native-animals/.
[2] "Predator Free 2050: Our Work." Department of Conservation. Accessed December 02, 2017. http://www.doc.govt.nz/predator-free-2050.
[3] "'They're killers': Zealandia calls for fewer cats." Stuff. Accessed February 25, 2018. http://www.stuff.co.nz/dominion-post/news/7288835/They-re-killers-Zealandia-calls-for-fewer-cats.
[4] Companion Animals in New Zealand 2016 Report. New Zealand Companion Animal Council Inc. 2016.

microchip with the New Zealand Companion Animal Register (NZCAR).[5]This became effective in February of 2018. To help cat owners prepare to comply with this bylaw, the WCC collaborated with the SPCA to implement the Snip'n'Chip campaign, an initiative subsidized by the WCC that provided substantial discounts for neutering and microchipping cats[6] Several other community microchipping events have also occurred after Snip'n'Chip to encourage further compliance with the bylaw.

Our project aimed to evaluate the public's response to the Animal Bylaw and the Snip'n'Chip program. This included the public's awareness and cat owner compliance with the bylaw as well as general feelings about the bylaw and cats in Wellington (e.g., perceptions on cats' impact on wildlife, attitudes towards responsible pet ownership). We also assessed the effectiveness of the Snip'n'Chip program using data from the NZCAR along with data from surveying Snip'n'Chip users. Our results included an analysis of perceptions of the bylaw and effective outreach techniques to increase compliance with the bylaw, in addition to a similar analysis of Snip'n'Chip's effectiveness. We intend our data and conclusions to inform the WCC and the SPCA on the impact of their joint programs and where to go next.

[5] "New bylaw on microchipping cats." Wellington City Council. October 10, 2017. Accessed November 04, 2017. https://wellington.govt.nz/services/consents-and-licences/animals/new-bylaw-on-microchipping-cats.
[6] "snip'n'chip" SPCA Wellington. Accessed November 05, 2017.https://www.wellingtonspca.org.nz/animal-welfare/snipnchip---desexing-and-microchipping/.

2. Background

Wellington, NZ has a complicated relationship with its cats, and that relationship will be examined in depth in this chapter. Cat and wildlife interactions, along with various efforts to reduce invasive predator populations in New Zealand, provide context that is relevant to the cat management challenges in Wellington. The opinions and perceptions of the stakeholders involved also affect the feasibility and plausibility of many proposals and solutions. Cat owner, conservationist, government official, and other perspectives also influenced our project.

In this chapter, we address the following topics: the state of New Zealand's native bird species; the current state of cats in New Zealand, including their subpopulations and effects on wildlife; the WCC's Animal Bylaw and Snip'n'Chip campaign; other introduced mammal management strategies in New Zealand; and various perspectives on cat management.

2.1 Effects of Human Settlement on New Zealand's Wildlife

2.1.1 Rapid Extinction of Native Wildlife

New Zealand is home to hundreds of bird species that do not exist anywhere else in the world. Before invasive mammals like rats, weasels, and cats were introduced by human settlers in the 14th and 17th centuries, birds filled almost every ecological niche. Two-hundred kilogram moas took the place of grazing mammals like deer and cattle, threatened by only one predator: the 15 kg Haast's Eagle.[7] On rainy nights in rocky terrain or grassland, the laughing owl could be heard cackling incessantly to potential mates;[8] in the daytime, brilliant blue-and-green North Island Takahe nibbled on grasses and small insects. Birds were everywhere: feeding on fruit, catching mouse-sized insects, and diving for fish. Many were flightless, and of those that could fly, many flew only for short bursts and spent the rest of their time in safety on the ground. This was the case – until humans arrived in New Zealand.

[7] Brathwaite, D.H, "Notes on the Weight, Flying Ability, Habitat, and Prey of Haast's Eagle," *Notornis* 39, no. 4 (1992): 239 - 247, accessed November 12, 2017, https://notornis.osnz.org.nz/system/files/Notornis_39_4_239.pdf

[8] Williams, G.R. and Harrison, M, "The Laughing Owl Sceloglaux Albifacies (Gray, 1844): A General Survey of a Near-Extinct Species," *Notornis* 19, no. 1 (1972): 14-19, accessed November 12, 2017. https://notornis.osnz.org.nz/system/files/Notornis_19_1.pdf

When humans settle a new region, they invariably bring foreign animal species along. Some of these, such as familiar livestock and pets, are intentionally imported; others, like rats and mice, arrive by stowing away on merchant vessels and other modes of transportation. These foreign animals often have devastating effects on the native wildlife: invasive herbivores compete with native herbivores for food and other resources, and invasive carnivores decimate native fauna that have not been given an opportunity to adapt. The problem is compounded in cases like New Zealand's, where the native species are poorly suited for defense against newly introduced predators. The competition and predation cause rapid extinctions of vulnerable (but nonetheless unique) local species until a new equilibrium is reached.

Birds, lizards, frogs, and insects are some of the species who have been affected most by these introduced mammals. New Zealand's native birds in particular are generally "mammal-naive," meaning that they fail to produce an adequate defensive physiological response when threatened by mammals.[9] This makes them very easy prey for the introduced predators, which collectively kill up to 25 million birds per year.[10] Predation of birds by these mammals is the leading cause of their decline, even taking into account factors like increased competition.[11] Once a population is small and isolated ("genetically bottlenecked"), inbreeding occurs – resulting in high offspring mortality rates and preventing the population's recovery.[12] By the time it reaches this stage, a species is borderline extinct – and as of 2001, 31% of New Zealand's native bird species have become extinct.[13]

2.1.2 Response to Native Species' Extinctions

Because New Zealand has been settled by humans so recently – Maori in the 1300s with European contact beginning in the 1600s – compared to other landmasses, the residents

[9] Farnworth, Mark, Petra Muellner, and Jackie Benschop. A systematic review of the impacts of feral, stray, and companion domestic cats (Felis catus) on wildlife in New Zealand and options for their management. Report. Department of Natural Sciences, Unitec Institute of Technology. October 11, 2013. http://www.epi-interactive.com/sites/default/files/documents/NZVA%20Report%20Cat%20Predation.pdf.

[10] Roy, Eleanor. "No more rats: New Zealand to exterminate all introduced predators." The Guardian, July 25, 2016. https://www.theguardian.com/world/2016/jul/25/no-more-rats-new-zealand-to-exterminate-all-introduced-predators

[11] Innes, John; Kelly, Dave; Overton, Jacob; and Gillies, Craig. "Predation and other factors currently limiting New Zealand forest birds," New Zealand Journal of Ecology 34 no. 1 (2010): 86-114, http://newzealandecology.org/nzje/2911.pdf

[12] Innes.

[13] Holdaway, Richard N. Worthy, Trevor H. & Tennyson, Alan J. D. "A working list of breeding bird species of the New Zealand region at first human contact," *New Zealand Journal of Zoology*, 28:2 (2001): 119-187, DOI: 10.1080/03014223.2001.9518262

have been able to watch and record these extinctions firsthand.[14] In the last century, New Zealand expressed a commitment to preventing more extinctions and re-establishing the dwindling populations of its unique species. After decades of research and work controlling pest animals throughout the country, conservation and government organizations have jointly introduced the Predator Free New Zealand plan, which aims to completely eradicate all rats, possums, and mustelids by the year 2050.[15] While there is broad social and financial support for eradicating those predators, other predators also have a significant impact on wildlife. To achieve a truly predator free New Zealand, the impact of these other introduced animals – including cats – will need to be lessened as well.

This goal presents a slew of technical difficulties. Predator extermination in wild areas is extremely difficult, and even if mainland regions are temporarily cleared of predators, reinvasion quickly occurs. However, by applying unrelenting trapping and poisoning over several years to *geographically isolated* (i.e., surrounded by ocean or a predator-proof fence) regions, New Zealand has developed a total of 117 pest-free islands and mainland reservations.[14] When successfully implemented, these become vital breeding grounds for critically endangered bird species like the South Island Saddleback (Philesturnus carunculatus) and Kakapo (Strigops habroptilus).[14] However, mainland reservations are extremely expensive to create and maintain; for example, the fencing alone, excluding the initial eradication effort and all annual expenditures, costs approximately (as of 2011) 3.4 million NZD per square kilometer – and this figure varies heavily based on the protected terrain.[16] For scale, New Zealand's largest fenced mainland reservation, Sanctuary Mountain Maungatautari, covers nearly 34 km^2.[16]

Many technical challenges will need to be overcome before a predator-free New Zealand can be realized. One of the challenges is that cats, valued companion animals, are one of the primary predators of native birds, and they will need to be managed just like every other invasive mammal if these birds are to return.

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[14] Kolbert, Elizabeth. "The Big Kill." The New Yorker, December 22, 2014. https://www.newyorker.com/magazine/2014/12/22/big-kill.

[15] Brulliard, Karin. "New Zealand vows to kill every weasel, rat and feral cat on its soil." The Washington Post. July 25, 2016. Accessed November 05, 2017. https://www.washingtonpost.com/news/animalia/wp/2016/07/25/new-zealand-plans-to-kill-every-weasel-rat-and-feral-cat-on-its-soil/?utm_term=.d7ba8a5e49d4.

[16] Scofield, Paul; Cullen, Ross; and Wang, Maggie, "Are predator-proof fences the answer to New Zealand's terrestrial faunal biodiversity crisis?" *New Zealand Journal of Ecology* 35 no. 3 (2011): 312-317. http://newzealandecology.org/nzje/2997.pdf

The Zealandia Eco-sanctuary was established in 1999 to reintroduce native fauna and flora to Wellington.[17] The sanctuary is located in the Karori suburb of Wellington, and its 2.25 square kilometers of land are girdled by a fence specially designed to keep out 14 species of mammalian predators as well as domesticated pets.[18] The 1 km radius around Zealandia, referred to as the 'Zealandia Halo,' is an area of special interest to our project. This area, shown in Figure 7, benefits from increased numbers of native bird life pouring out of Zealandia and into the rest of the city, and the presence of this wildlife may affect the perspectives of people in the area.

Figure 7: The 'Zealandia Halo' (shown in orange) superimposed on a map of the Wellington Central Business District. www.visitzealandia.com

2.2 Cats in New Zealand

New Zealand legislation defines three major categories of cat: companion, stray, and feral.[19] Companion cats share an environment with and have all their needs provided by a

[17] "Zealandia > About." Zealandia. Accessed February 22, 2018. https://www.visitzealandia.com/About#The-Sanctuary.
[18] "Our Fence." Karori Wildlife Sanctuary. Accessed February 23, 2018. http://www.sanctuary.org.nz/Site/Conservation_and_Research/Our_Fence.aspx.
[19] New Zealand National Cat Management Strategy Discussion Paper. The National Cat Management Strategy Group. 2017.

human caretaker. Strays have some dependence on humans (e.g., fed by humans) but no identifiable owner, while feral cats live in the wild and have no human contact.

2.2.1 Companion Cats

Cats are recognized as major contributors to the decline of bird populations, but efforts to control them face complications arising from their status as a companion animal. In New Zealand, cats are the most popular companion animal; 44% of households have, on average, 1.5 cats each, for a total of 1.1 million companion cats in 2015.[20] In Wellington specifically, about 35% of households have cats.[21]

Cats often play an important role in family life. According to Marie Carter, an author and editor of *Pets Magazine*, the emotional attachment between a cat and its owner stems from the assurance that cats are non-judgmental beings who unconditionally love their owners.[22] Cats can provide companionship to those who feel isolated, and even hope to those who suffer from mental illnesses. Studies have shown that a subtle purr or lick of a hand boosts serotonin levels, making humans feel more connected to their animals.[23] This idea of unconditional love from cats fuels a sense of trust and emotional attachment between the cat and its owner.

While cats are seen as playing an important familial role all over the world, the way owners care for their cats varies from country to country. As of July 2017, in New Zealand only 13% of cats were strictly indoor cats, 7% were strictly outdoor cats, and 80% of cats were allowed both indoors and outdoors.[24] These statistics vary significantly from the United States, where approximately 65% of cats are strictly indoor cats.[25,26] Regardless of personal reasoning for keeping one's cat indoors or letting them outdoors, allowing a cat to roam may have

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[20] Companion Animals in New Zealand 2016 Report. New Zealand Companion Animal Council Inc. 2016.

[21] Devlin, Collette. "Wellington to investigate more rules for keeping cats, and other animals, in check." Stuff.co.nz. March 09, 2017. Accessed November 05, 2017. http://www.stuff.co.nz/national/90258359/wellington-to-investigate-more-rules-for-keeping-cats-and-other-animals-in-check.

[22] Carter, Marie. "Why the relationship between owners and pets is always an unconditional one." The Independent. December 01, 2016. Accessed November 05, 2017. http://www.independent.co.uk/property/house-and-home/pets/why-pets-unconditionally-love-their-owners-dogs-cats-a7447406.html

[23] Weaver, Jane. "Puppy love -- it's better than you think." NBCNews. April 08, 2004. Accessed November 05, 2017. http://www.nbcnews.com/id/4625213/ns/health-pet_health/t/puppy-love----its-better-you-think/#.Wf9PRzvBTdk

[24] Walker, Jessica K. "A Survey of Public Opinion on Cat (Felis catus) Predation and the Future Direction of Cat Management in New Zealand" *Animals* 7, 2017. 1-20.

[25] Birdsall, Judd. "Caught in the Claws of UK Cat Culture." Huffington Post. Accessed November 10, 2017. https://www.huffingtonpost.com/judd-birdsall/caught-in-the-claws-of-uk_b_8711596.html.

[26] "Outdoor Cats: Frequently Asked Questions." Humane Society. Accessed November 10, 2017. http://www.humanesociety.org/issues/feral_cats/qa/feral_cat_FAQs.html.

significant consequences. For example, cats that are free to roam are at higher risk of being injured or even killed by moving vehicles. They may also have a negative impact on wildlife and, if they are not neutered, may breed and expand the population of stray cats. In Wellington, prior to the bylaw there was no way to tell an owned companion cat from a stray cat. One of the benefits of microchipping will be an ability to do this.

2.2.2 Stray Cats

Stray cats are cats that are not strictly owned by humans but still interact with humans in significant ways. It is estimated that there are approximately 196,000 stray cats in New Zealand. Stray cats can be classified either as colony cats, which directly have many of their needs met by humans, or as unmanaged strays, which indirectly have many of their needs met by humans.[24] For example, a colony cat may directly be fed by a human while an unmanaged stray cat may scavenge for scraps left by humans.

2.2.3 Feral Cats

Feral cats are wild cats that do not interact with humans or have relationships with humans in any significant way. Because the population density of feral cats varies greatly, the population of feral cats in New Zealand has not been accurately determined.[24] According to the New Zealand Veterinary Association, there are anywhere between 8 and 14 million feral cats in the country, meaning there are 1.7 to 3 times as many feral cats as there are people in New Zealand.[27] Feral cats are strictly considered pests and can be controlled under the Biosecurity Act. As discussed above, it is often theorized by ecologists that feral cats have the greatest impacts on wildlife and native bird populations due to their numbers and uncontrolled behavior.[28]

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[27] "A vision for responsible cat ownership and humane cat management." NZVA. September 21, 2016. Accessed November 9, 2017. http://www.nzva.org.nz/news/309728/A-vision-for-responsible-cat-ownership-and-humane-cat-management.htm.

[28] "Feral cats." New Zealand animal pests and threats. Accessed February 28, 2018. http://www.doc.govt.nz/nature/pests-and-threats/animal-pests/feral-cats/.

2.2.4 Characteristics and Complications of Cat Subpopulations

While New Zealand recognizes the impact of predation by cats, controlling these cats is a difficult proposition. Each primary subpopulation (companion, stray, and feral) poses its own set of problems, and each is managed in different ways to varying degrees of success.

Intact companion cats can interbreed with other companion cats as well as stray cats, ultimately contributing to the stray cat population. Stray cats pose perhaps the most complicated problem of the three major cat populations: they lack identifiable owners, meaning their breeding is typically not controlled; perhaps worse, they do not represent a closed population like ferals do. Instead, the stray cat population is replenished through the addition of abandoned companion cats and through interbreeding with companion/stray cats; the SPCA notes that inter-breeding produces cats with low quality of life and high rates of suffering and death.[29]

Feral cats roam freely in the wild and have little or no human contact. Their population is self-sustaining and independent, with little interchange between the stray and companion cat populations. Lethal control (subject to humane constraints) can be used on this population; however, this is difficult to perform in areas that are not extremely remote unless there is a way to confidently identify a domestic cat as such.

2.2.5 Cat Management in Wellington

New Zealand pet owners are encouraged to be especially responsible with their pets since domesticated predators like cats can have such a large impact on native bird populations. According to the SPCA, the core areas of responsible pet ownership are:

1. the microchipping of one's pet,
2. the registering of one's pet in the national database, and
3. the neutering of one's pet

along with using an identification tag or collar and keeping one's microchip registration information up to date.[30] Microchipping is a quick, relatively painless procedure that injects a microchip smaller than a grain of rice just beneath the surface of a pet's skin. The microchip has a unique identification number associated with it and can be scanned at nearly any pet

[29] "Desexing Works!" SPCA Wellington. Accessed November 05, 2017. https://www.wellingtonspca.org.nz/animal-welfare/desexing/.
[30] "Animal Welfare." SPCA Wellington. Accessed November 05, 2017. https://www.wellingtonspca.org.nz/animal-welfare/.

care facility, including veterinary clinics and animal shelters like the SPCA. The goal of microchipping pets is to minimize the amount of time a lost pet spends on the street or in a shelter and to maximize the chance that the pet will be reunited with their owner. According to the SPCA, more than 80% of microchipped animals are reunited with their owners within only minutes or hours after escaping or becoming lost.[31]

Though the SPCA is primarily concerned with animal welfare, the responsible behavior they advocate also has environmental benefits. Microchipping minimizes the amount of time lost cats spend in shelters, allowing shelters to host more strays and keep them away from the native wildlife. Furthermore, neutered cats are unable to reproduce with other cats they may encounter outdoors. Microchipping and neutering are both vital methods for controlling cats' breeding and mitigating their negative impact on local bird populations.

At the Environment Committee meeting on August 4, 2016, the WCC passed the Animal Bylaw, making microchipping compulsory for domesticated companion cats over 12 weeks of age.[32] As of February 2018, when the bylaw went into effect, all companion cats need to be microchipped and those microchips registered with the NZCAR.

On October 4th, 2016, in a joint effort between the Wellington SPCA, the WCC, and the NZCAR, the Snip'n'Chip social campaign launched in order to prepare citizens for the implementation of the new Animal Bylaw.[33]

The Snip'n'Chip campaign had several other purposes in addition to helping residents become compliant with the bylaw:

1. To provide discounts for neutering, microchipping, and registering companion cats
2. To reduce the number of unwanted litters of kittens
3. To improve the chances a lost cat will be reunited with its owner
4. To educate owners on how pets and native wildlife can better share their urban and suburban surroundings

Though the WCC did not make neutering companion cats mandatory, it was able to indirectly influence people and promote neutering by subsidizing Snip'n'Chip. Vouchers could be purchased online and redeemed at any participating clinic for either a $9 NZD "Snip + Chip"

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[31] "Microchip Your Pet." SPCA Wellington. Accessed November 05, 2017. https://www.wellingtonspca.org.nz/animal-welfare/microchipping/.

[32] "New bylaw on microchipping cats." Wellington City Council. October 10, 2017. Accessed November 04, 2017. https://wellington.govt.nz/services/consents-and-licences/animals/new-bylaw-on-microchipping-cats.

[33] "The official launch of Snip 'N 'Chip." Facebook. 2016. Accessed November 05, 2017. https://www.facebook.com/events/1761621077433485/.

service or a $4 NZD “Vet Chippin’” service. Both services microchipped the cat and registered the microchip; the “Snip + Chip” service also provided neutering.

Wellington’s Snip’n’Chip campaign ran from October 2016 to December 2016.[34] As of July 2017, in New Zealand as a whole, 94% of companion cats were neutered, 37% were microchipped, and 81% of microchipped cats were registered.[35]

Upon completion of the microchipping and/or neutering procedure, the SPCA intended for participating pet owners to receive pamphlets that advocate for further responsible pet ownership behaviors. The SPCA identified four significant areas cat owners can focus on after their cat has been microchipped, registered, and neutered. The four areas are:

1. **Collar and Bell:** “A collar with a bell is a great way to deter cats from catching wildlife and helps to keep them safe. The bell makes a noise when the cat moves which alerts wildlife to the presence of the cat, giving them the opportunity to move away from danger. Another option is a *Birdsbesafe* collar. Cats normally rely on being stealthy and unseen, but with Birdsbesafe’s bright colors around their necks, they are easily spotted.”
2. **Keeping pets full and busy:** “Ensure that your pets have plenty of food, and feed them indoors. If you feed them at least twice a day, it means they are more likely to stay closer to home. Feed them before they head out in the morning to ensure they have full tummies when they are most likely to show interest in catching a bird. Cats are naturally curious and playful, so they need things to do throughout the day and night. Cats love it when you play with them, think about giving them exercise just like you would with a dog! This stops them from being bored and looking for feathered things outside to play with.”
3. **Crepuscular creature curfew:** “Did you know that cats are crepuscular? Other than being a great word, crepuscular refers to animals that are most active at dawn and dusk. Cats are the perfect example, frequently hunting prey animals from evening to morning. Pick a curfew time and settle your cat safely indoors with you overnight from evening to morning when their hunting instinct is at its strongest. They can come in for dinner, and then have breakfast before they head out again in the morning. This also

[34] "snip’n’chip" SPCA Wellington. Accessed November 05, 2017.https://www.wellingtonspca.org.nz/animal-welfare/snipnchip---desexing-and-microchipping/.
[35] Walker.

keeps your cat safe as cats kept in at night are less likely to be hurt in fights, pick up diseases or be hit by cars."

4. **Wildlife safe havens:** "You can provide safe havens in your garden for wildlife. Place bird feeders in sites that do not provide your cat with cover to wait in ambush. And to prevent cats from climbing to birds' nests, you can put animal guards around any trees in your garden that may have nesting birds. You can also make shelter for lizards by using rocks and planting spiky and tangled species that give the lizards somewhere safe to hide."

2.2.6 The Shelter Buddy Database System

Shelter Buddy is an online animal shelter database system designed to keep track of companion animals that go through any given country's animal care system. In New Zealand, this means animals brought to the SPCA.[36] The data is intended to completely represent each animal's life, and includes information on how the animal was brought into the shelter and how it left, their medical history, and which people the animal is associated with. Shelter buddy also includes adoption information, breeder information, and animal rights abuser information.[37]

2.2.7 The New Zealand Companion Animal Register

The New Zealand Companion Animal Register is an online animal database system designed to catalogue companion animal microchips. Information associated with each microchip includes the owner's name, home address, email, phone, and optionally, other contacts in case the owner's contact information becomes outdated or does not work for some reason. The data's purpose is to ensure the owner can be reunited with their pet if it gets lost or goes missing. At the SPCA and during the Snip'n'Chip campaign, owners had to fill out a microchip registration form with their contact information before their cat could be microchipped. In some instances, however, pet owners forget to update their contact information as it changes. This means that though their pet is microchipped, the information in the database is useless and the pet may not be reunited with the owner. In some rare cases,

[36]Van Beyen, Jack. "SPCA to launch nationwide animal-tracking software." Stuff.co.nz. March 27, 2015. Accessed December 2nd, 2017. http://www.stuff.co.nz/national/67532156/spca-to-launch-nationwide-animaltracking-software

[37]Marshall, Candice. "RSPCA Queensland software Shelderbuddy adopted by animal welfare agencies worldwide." abc.net.au. July 28th, 2015. Accessed December 2nd, 2017. http://www.abc.net.au/news/2015-07-28/rspca-software-shelterbuddy-used-worldwilde/6653348

due to owners forgetting to fill out a registration form, pets can even become microchipped without their microchip being registered in any database.

2.3 Invasive Mammal Management Case Studies

2.3.1 Cat Management Strategies in Other New Zealand Cities

Wellington is not alone in its pursuit to reintroduce native bird species. Many cities in New Zealand at one point or another have proposed or implemented their own legislation to try to curb the negative impact of cats on the ecosystem. Popular legislation proposals include nightly curfews for cats, collaring cats with belled collars, microchipping and registering, and neutering.[38]

Additionally, many individuals are taking it upon themselves to solve the problem through alternative means. Erin Willson, for example, an Animal Science Master's student and founder of the Kiwi Cat Collars startup, invented her own solution to the problem of outdoor cats preying on wild birds.[39] The Kiwi Cat Collar is a brightly colored soft tube of fabric that slides over the cat's collar (while leaving the tags prominently visible) as shown in Figure 8. The Kiwi Collars come with a variety of noisemaking options, such as bells. Though a scientific study has yet to be done in New Zealand regarding these specific collars, studies from Australia and the United States suggest cats catch 50% to 70% fewer birds when wearing the collars because the collars use colors that birds are highly aware of.[40] Another example of a popular collar used by cat owners is the Birdsbesafe cat collar, which is also brightly colored and belled to ensure that cats appear prominently to give birds more time to fly to safety. According to Birdsbesafe LLC's website, the Birdsbesafe collar is "scientifically validated and was shown to reduce birds caught by 87%."[41]

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[38]Wilson, Libby. "Cat control: many Kiwi councils ready to lobby for national rules." Stuff.co.nz. July 10, 2017. Accessed November 11, 2017. https://www.stuff.co.nz/national/94558676/cat-control-many-kiwi-councils-ready-to-lobby-for-national-rules.

[39]Willson, Erin. Kiwi Cat Collars. Accessed November 11, 2017. https://www.facebook.com/pg/kiwicatcollars/about/?ref=page_internal.

[40]Susan Teodoro. "Shannon-made cat collar may save native birds." Stuff.co.nz. September 7, 2015. Accessed November 11, 2017. http://www.stuff.co.nz/manawatu-standard/news/71676929/shannonmade-cat-collar-may-save-native-birds.

[41] "We help birds be safe from cats." Birdsbesafe. Accessed February 28, 2018. https://www.birdsbesafe.com/.

Figure 8: Kiwi Cat Collar on a cat. facebook.com/kiwicatcollars

2.3.2 Dog Management Policies in New Zealand

The Animal Bylaw is not without precedent. Similar legislation requiring microchipping and registering of dogs came into effect on July 1st, 1996. The objective of the Dog Control Act is to improve and regulate the care and control of dogs in New Zealand. In addition to specifying the rights of dogs and care and treatment requirements for owners, the Dog Control Act defines registration and management requirements.[42] Dog owners or caretakers must register their dogs in the national database by filling out extensive information about their dog, especially its appearance and whether it has a violent history. Dogs that are considered dangerous or menacing and dogs that are registered for the first time on or after July 1st, 2006, must also be microchipped as part of registration.[43] The Dog Control Act requires the neutering of dogs in some cases, primarily when dogs are dangerous or menacing. Lastly, territorial authorities must appoint dog control officers and dog rangers to help in the enforcement of laws and management of dogs.[43]

[42] Dog Control Act 1996, Reprint March 2017.
http://www.legislation.govt.nz/act/public/1996/0013/latest/DLM374410.html
[43] Dog owner legal responsibilities. dogsafety.govt.nz. Accessed December 10th.
http://www.dogsafety.govt.nz/Dog-Owners-Legal-Responsibilities-Index

2.3.3 Cat Management Strategies in Australia

Like New Zealand, feral cats pose a major threat to wildlife in Australia. In contrast to the predominant "outdoor cat" culture of New Zealand, Australia has imposed cat curfews and has created cat enclosures in an effort to reduce the impact of cats.[44] Public cat enclosures provide an alternative to strictly keeping a cat indoors and allow owners to bring their cat to a specially made enclosure at night where they can play, socialize, and exercise, all without the opportunity or ability to hunt native wildlife.

2.4 Differing Opinions on Cats in New Zealand

2.4.1 General Public Perspectives

New Zealand cat owners have varying opinions on cats and cat management that often depend on whether the cats in question are companion, stray, or feral. In a 2017 study, 83% of people believed action should be taken to manage colony stray cats, 90% supported action to manage unmanaged strays, and 85% supported action to manage feral cats.[45] In contrast, fewer people supported management of companion cats and their behavior. About 60–70% of people agreed with a limit on the number of cats per household and mandatory microchipping, registering, and neutering, indicating there is generally widespread support of some measures to control all types of cats.[45]

Many cat owners agree that native birds should be reintroduced but maintain that their companion cats do not eat birds, while others agree with managing cats and think companion cats need to stay indoors.[46] In contrast, there also exists a more extremist view that ecologists falsely exaggerate the negative impacts of cats and want to deny people the right to keep their pet cats.[47] These people see attempts to manage cats as a form of eco-extremism that threatens their pets and infringes on their pets' rights and their rights as pet owners. On the

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[44] "Councils across Australia to introduce cat curfews to limit prowling at night." Stuff.co.nz. February 12, 2017. Accessed December 01, 2017. http://www.stuff.co.nz/world/australia/89331333/Councils-across-Australian-to-introduce-cat-curfews-to-limit-prowling-at-night.

[45] Walker.

[46] APNZ. "Cat meeting goes feral." NZ Herald. February 20, 2013. Accessed November 05, 2017. http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10866685.

[47] Rose, Pete. "Feline Rights New Zealand." Feline Rights. March 04, 2016. Accessed November 05, 2017. http://www.felinerights.org/.

opposite end, some people agree with cat management so strongly that they set their own cat traps – which are legal and can be easily purchased – to kill feral cats.[48]

2.4.2 Notable Environmentalist Perspectives

Generally, environmentalists agree that cats are a threat to native birds and need to be managed responsibly to protect endangered native birds. Gareth Morgan, for example, an outspoken environmentalist and founder of the "Cats to Go" project, believes a cat-free New Zealand is the only way the extinction of native birds can be stopped. Morgan urges cat owners to keep their cats indoors, to not replace their cats when they die, and to lobby for cat regulation.[49] He suggests that wandering cats should be euthanized.[50] Although Gareth Morgan's stance on companion cats is seen as extreme by many, it is not uncommon among some environmentalists and ecologists. United States Ecologist and Cat specialist Peter Marra, for example, believes companion cats need to remain indoors and stay completely isolated from the surrounding environment. He says that if cats' owners cannot responsibly manage them and keep them indoors, the cats need to be completely eradicated to preserve bird populations.[51]

2.5 Creating Effective Behavior Change

An effective behavior change strategy begins by identifying what motivates the target population to perform an undesirable behavior, and then identifies barriers that prevent the uptake of a desirable behavior. To incite a change in the undesirable behavior, one or more things need to happen: barriers to behaving desirably must be reduced, barriers to behaving undesirably must be raised, and the target population must be motivated to change to the desirable behavior. Through application of this strategy on several fronts (e.g., legislation, advertising), a behavior change can be realized.

A relevant behavioral change study was completed recently by Edy MacDonald, the manager of Social Science at the Department of Conservation (DOC) in Wellington, New Zealand. This study sought to analyze the degree to which various factors influence whether or

[48] "Kill Traps." Pest Control Research Store. Accessed November 05, 2017. https://www.traps.co.nz/kill-traps.
[49] "Cats to Go." The Morgan Foundation. Accessed November 05, 2017. http://morganfoundation.org.nz/cats/.
[50] APNZ.
[51] Gross, Rachel E. "The Moral Cost of Cats." Smithsonian.com. September 20, 2016. Accessed November 05, 2017. https://www.smithsonianmag.com/science-nature/moral-cost-of-cats-180960505/.

not people keep their cats indoors. This study was performed on cat owners in 40 veterinary clinics amongst five different cities. The study included three "treatments" in the form of physical pamphlets, which were administered at random to cat owners after a clinic visit. The three types of pamphlets administered are described below:

1. A pamphlet with a picture of a veterinarian holding a cat and explaining that cats should be kept in at night for the sake of not getting hit by cars
2. A pamphlet with a picture of a young girl holding a cat and explaining that she needs her cat to be indoors to keep her company at night
3. A control group pamphlet

Owners were surveyed in the waiting rooms of veterinary clinics and given one of the three pamphlets. They were then contacted six weeks after receiving the pamphlets, and asked questions related to cat welfare. Specifically, they were asked (indirectly) whether or not they had started changing their behavior towards keeping their own cat(s) indoors. The greatest behavior change was observed in subjects who were given the second pamphlet – the young girl who enjoyed the cat's company – indicating that people were most motivated to change their behavior and keep their cat indoors when presented with an emotional appeal. Further, the results show that the emotional appeal must be targeted towards the welfare of the cat – not the welfare of the wildlife threatened by the cat.[52]

[52]MacDonald, Edy. "Creating an Effective Behavior Change Programme: Lessons from Cats". Presentation, Department of Conservation (DOC).

3. Methods

The goals of this project were to (1) evaluate the Animal Bylaw and (2) evaluate the effectiveness of the Snip'n'Chip campaign. To achieve these goals, we defined three objectives, as follows:

1. Evaluate the public's response to the Animal Bylaw, including:
    - awareness of the bylaw,
    - compliance with the bylaw, and
    - views and perspectives towards the bylaw, cat ownership, wildlife, animal welfare, and the responsibility of government towards animals
2. Evaluate the response to the Snip'n'Chip campaign including:
    - the public's awareness of the campaign,
    - use of the campaign, and
    - behavior changes of people who used the campaign
3. Empirically observe the combined impact of the bylaw and microchipping campaigns by measuring changes in the rates at which Wellington cats are microchipped

3.1 Objective 1: Evaluation of Public Response to Bylaw and Cat Management

The purpose of our first objective was to determine the general public's response to the Animal Bylaw and determine perspectives or circumstances that may have contributed to their awareness and compliance or lack thereof. The main method that we used to determine this was a structured, in-person survey of the Wellington public.

This survey asked questions regarding:

- Cat owners' awareness, compliance (whether intentional or not), and opinions on the Animal Bylaw
- Non cat owners' awareness of and opinions on the Animal Bylaw
- Factors that could contribute to why people may or may not be in compliance with the bylaw, including their awareness of the bylaw, their attitudes towards cats, and their perspectives on the government and wildlife
- Opinions on what "responsible pet ownership" entails

To conduct our surveys, we used two teams of two team members, allowing one team member to ask the questions while the other recorded the participants' answers. We wore Snip'n'Chip shirts provided by the SPCA to show our association with an organization and to distinguish us from others on the street. The sampling locations were primarily chosen based on three main criteria. The locations must: (1) receive enough foot traffic to provide a large sampling size, (2) allow us to survey residents of suburbs all over Wellington, and (3) avoid inherent biases in favor of or opposed to cats (such as veterinary clinics).

Locations near grocery stores were determined to be the best for surveying Wellington residents because people shopping at grocery stores are usually residents and not tourists, there is no inherent bias for or against cats, and there is a limited number of grocery stores in Wellington for people to shop at (so they likely attract people of multiple suburbs). Cafes during lunch, public transportation stops, and libraries were also identified as unbiased locations that would fit our criteria. The locations we chose as survey sites were verified by the WCC Research and Evaluation Team and are shown in Figure 9 below.

Figure 9: Survey locations in Wellington (adapted from Google maps)

Before we began surveying, our questions were revised and approved by the WCC Research and Evaluation Team and tested on WCC staff to make sure the introduction and question ordering flowed well together.

We began surveying by introducing ourselves and asking if the intended participant lived in Wellington. If they did, we proceeded with the survey; if they did not, we thanked them

for their time and we did not conduct the survey, as the WCC is only interested in the compliance and opinions of its constituents. After introducing ourselves, describing our goals, and asking for the necessary permissions (as shown in Appendix A), we first asked the participant if they owned a cat or cats. This established which set of questions – cat owner questions or non cat owner questions – were relevant for us to ask that particular participant. If they did own a cat, we asked the participant the name of their cat and referred to it by name to keep the survey personal. Participants who had recently had a cat pass away were still considered cat owners if (1) their cat was alive during the Snip'n'Chip campaign and (2) they were not too emotional to discuss their cat without getting upset. Besides questions specifically regarding the cat owners' cats, both the cat owner and non cat owner survey question sets had identical wording and questions to ensure analysis compatibility between both parties' responses. We asked demographic questions at the end to determine how representative our sample size was of the overall Wellington population and to expose possible correlations. To ensure accurate data and minimize the chance of participants being untruthful, we gave our participants the demographic questions as a form for them to fill out themselves after they completed the survey.

3.1.1 Survey Format

Our structured public survey comprised three different formats of questions based on the type of data we sought to obtain from the question. The three question formats were: (1) open response, (2) loose response, and (3) scale response.

For open response questions, important keywords and phrases were recorded as verbatim as possible to accurately reflect the participants' language and opinions. An example of an open response question was "*What do you think of the Animal Bylaw in Wellington?"* where the participants' own wording was particularly telling and important for such an opinion-based question. For loose response questions, there were only so many answers a participant could give, so we predefined answers we expected to be common. This allowed us to quickly record responses by circling an answer from the list of common answers on our response form and only writing their answer if it differed from the anticipated answers. An example of a loose response question might be "*Have you heard of the new Animal Bylaw?*" where we predicted common answers such as "yes," "no," and "I'm not sure," but were also interested in any unforeseen answers as well. For scale response questions, the answers were recorded on a

scale from 1 to 5 to gauge participants' level of agreement or how strong their attitudes towards a certain subject were.

3.1.2 Research Questions

To determine the overall **awareness** of the Animal Bylaw, we determined if participants were aware of the existence of the bylaw, if they knew what the bylaw requires from cat owners, and how they heard about it. In our surveys, we asked questions about participants' awareness of the bylaw before asking whether or not their cat was microchipped. We also asked this before asking about their feelings towards preserving wildlife so that we would not allude to what the bylaw might involve. The questions relating to awareness of the bylaw and their significance are listed in Table 1.

Table 1: Sample awareness questions

Survey Questions to Determine Awareness of Animal Bylaw	
Question	**Purpose**
Have you heard of the new Animal Bylaw in Wellington?	Determines the participant's awareness of the bylaw at a base level.
If yes: Do you have an idea of what it requires from cat owners?	Determines how familiar the participant is with the bylaw and what it requires.
If yes: How did you first hear about it?	Indicates which outreach methods were most effective.

These questions allowed us to determine precisely how aware people were of the Animal Bylaw. By asking if participants have heard of it and then what it expects of cat owners, we were able to distinguish between people who were only aware of the bylaw's existence and people who were aware of what it entails as well. Asking where they first heard of it allowed us to assess the strengths and weaknesses of the WCC's different outreach methods.

While the most essential questions for assessing public awareness have been outlined above, the awareness portion of the survey also involved asking cat owners if they knew how and where to neuter, microchip, and register their cats if they wished. This allowed us to determine if cat owners knew how to adhere to the bylaw.

To understand whether people were **compliant** with the Animal Bylaw or not, we asked about the microchip and registration status of their cats. To be compliant with the bylaw, participants needed to have their cats microchipped, and the microchip must have been registered specifically with the NZCAR. The most essential questions in observing anticipated compliance are shown in Table 2.

Table 2: Sample compliance questions

Survey Questions to Determine Compliance with Animal Bylaw	
Question	**Purpose**
Is your cat microchipped?	Determines whether or not the participant currently complies with the bylaw and allows for partitioning.
If yes: when were they microchipped?	Determines whether the bylaw or Snip'n'Chip may have influenced the participant's decision to microchip/register.
If yes: Is the microchip registered with NZCAR?	Determines whether or not the participant currently complies with the bylaw.
Is your cat neutered?	Determines the participant's compliance with the SPCA's responsible pet ownership guidelines and allows for partitioning.
If yes: When were they neutered?	Determines whether the bylaw or Snip'n'Chip may have influenced the participant's decision to neuter.

Gauging the public **perspective** on the Animal Bylaw and a variety of topics related to cat management was essential to our project. By asking participants about their feelings towards cats' effects on wildlife and cat management in general, we were able to find reasons they may not be in compliance with the bylaw and identify ways the WCC could appeal to these people. The primary question in this category asked about cat owners' and non cat owners' opinions on the Animal Bylaw. This helped explicitly gauge whether people felt positively or negatively about the bylaw, their reasons for these opinions, and ways the WCC could potentially change negative perceptions of the bylaw. Participants were also asked to rank how they felt about the statement, "*domestic cats are a threat to Wellington's native wildlife.*" on a scale of 1 to 5, where 1 is "strongly disagree" and 5 is "strongly agree." This

information allowed us to quantitatively determine people's opinions and helped determine the public's perception of cats' effect on wildlife populations. The same scaled question was asked of the statement, "*local government should play a role in managing cats.*" This question determined whether people wanted the WCC to play a greater role in cat management of if they felt there was already too much involvement.

Another important aspect of our project was to suggest recommendations to encourage **responsible pet ownership**. By asking participants about their responsible pet ownership behaviors and what they consider responsible or not, we were able to determine reasons people may or may not be in compliance with the bylaw and identify methods the WCC and SPCA could use to appeal to the general public. To do this, we posed open-ended questions about this topic. Since this question encompasses responsible pet ownership as a whole, we were also able to consider opinions from other types of animal owners (the most prevalent being dog owners). Non cat owners were asked what they thought responsible pet ownership entailed and what they thought should be expected of cat owners. Cat owners were asked the same questions in addition to questions relating to the care of their cat(s) and possible motivating factors for complying with the bylaw (i.e., whether their cat has gone missing, whether it is indoor or outdoor, and if it wears a collar). Examples of these questions are shown in Table 3 below. All of these questions were asked in a friendly, casual way to increase the chances that cat owners were comfortable answering sensitive questions honestly and without suspicion. An example of such a sensitive question is whether or not their cat has ever killed native wildlife.

Table 3: Sample cat ownership questions

Survey Questions on Cat Ownership	
Question	**Purpose**
What does responsible pet ownership mean to you?	Understand common pet ownership behaviors used by the general public and see what is important to pet owners and non pet owners.
Is your cat an indoor or outdoor cat? Are there specific times when you keep your cat indoors?	Determines how many people keep their cats indoors and outdoors. This information establishes a baseline upon which the SPCA and WCC can measure change over time.

Does your cat wear a collar? Why or why not?	Determines how many people utilize and do not utilize cat collars and their reasons for doing so. This information establishes a baseline upon which the SPCA and WCC can measure change over time.
Has your cat ever been lost or gone missing?	Evaluate how many incidences of lost cats microchipping could improve, further allows us to look for correlation of behaviors in people whose cats have gone missing.
Does your cat ever bring home rats or birds or anything like that? If so, what do they bring? Do they have a favorite?	Casually learn whether or not an owner's cat hunts and if their awareness of this behavior correlates with wider perception of the level of threat their cat is to wildlife.

The initial methods for analyzing our survey responses were (1) coding of open-response answers and (2) partitioning into distinct groups, but we also applied other methods appropriate for our specific data.

3.1.3 Focus Groups

To conclude both our in-person survey and our Snip'n'Chip user email survey, we asked participants whether or not they were interested in participating in a focus group discussion in the coming weeks. If they were, we gathered their contact information (in the form of a name and email address) and told them that we would contact them with a time and place later on. The goal of these focus groups was to deepen our understanding of motivations behind cat owner behaviors and to find out what cat owners believe to be the problems and possible solutions regarding cat ownership in Wellington. We saw focus groups as an opportunity to gain insight into the barriers that prevent cat owners from being compliant with the Animal Bylaw and from participating in other responsible pet owner behaviors such as keeping cats indoors, utilizing cat collars, or making attempts to mitigate their cat's threat to native wildlife.

We organized our focus group about two weeks after concluding our in-person surveys and about a week after our Snip'n'Chip user surveys. We sent an email to interested survey participants describing our project, stating the intention of the focus group, and asking which days and times (from a list we provided) would be ideal for them. The full text can be found in Appendix E. Though we sent the invitation email to 33 in-person participants and 7 Snip'n'Chip user participants, only two answered with the days they would prefer. Forced to improvise, we

chose a time and day ourselves and offered a $25 NZD Prezzy Card (effectively a prepaid debit card) to anyone who participated.

We received a total of 5 “Yes, I’m coming” and 2 “Maybe” responses to our final email informing people of the date, time, and the financial incentive. Of these 7 people, three arrived – all of whom had been participants in our in-person survey. Because all attendees participated in our in-person survey and not in Snip’n’Chip, we did not ask or seek to explore discussion topics regarding Snip’n’Chip, but rather chose to focus the questions on **cat policy**, **responsible pet ownership, what could be done (if anything), and barriers to becoming a more responsible pet owner.** A room at the WCC was selected as the focus group location and refreshments in the form of pizza, crackers, hummus, and juice were offered.

We started the focus group with a brief introduction about ourselves, followed by three ice breakers:

1. What are your cats’ names?
2. Are they indoor or outdoor cats?
3. What do you think is the best part of owning a cat?

The questions we intended to ask and the reasoning behind each question are shown below in Table 4. To ensure we did not run out of questions, we wrote more than could be reasonably addressed in the 45 minutes we had allotted for the focus group. We identified Question 2 and Question 7 as questions of lower priority that could be skipped if necessary. For the most part, however, the discussion at hand in the focus group is what determined which questions we asked and in what order (with numbers assigned to questions only for ease of reference). We also divided the questions we asked into categories – cat policy, owner perceptions, wildlife interactions, and responsible cat ownership – to address the information gathered during the focus group in terms of themes, rather than individual questions.

Table 4: Focus group questions and their reasoning

Focus Group Questions and Reasoning	
Question	**Purpose**
Q1 – Cat Policy What gaps are there in existing cat policy? Is there anything missing?	Inform the WCC about favorable and unfavorable directions for cat policy in the future.

Q2 – Owner Perceptions As a cat owner, have you experienced any negativity? What was your experience?	See how the WCC's advertising could challenge any negative views of cat owners.
Q3 – Wildlife Interactions What can people do to reduce their cat/cats' impact on wildlife? • What are your thoughts on putting a Birdsbesafe collar on your cat? • What are your thoughts on keeping your cat indoor at night? • How could we best foster responsible cat ownership?	Gather opinions about responsible pet ownership behaviors and understand what strategies may be most effective in helping people to reduce the impact of cats on wildlife.
Q4 – Wildlife Interactions What prevents you from adopting some of the behaviors we mentioned before?	Understand barriers in motivating people to take part in responsible ownership behaviors.
Q5 – Wildlife Interactions Out of what we previously mentioned, what do you think are the easiest changes to make as a cat owner and why? • Would you consider keeping a new kitten you got from the SPCA as a full time indoor cat, or building a cat enclosure or catio?	Determine the most practical avenues to encourage responsible ownership. What avenues are most realistic?
Q6 – Responsible Cat Ownership We know that cats roaming out at night are more likely to be injured from fighting with other cats, be harmed or even killed by a vehicle, and contract infectious diseases. In light of this, why do you think many cat owners still believe that keeping cats out overnight is best for it?	Understand motivations for keeping cats outdoors at night.
Q7 – Cat Policy Under the Dog Control Act, dogs must be registered with the council every year, confined to the owners property, and leashed in public spaces. What do you think of the current differences in legal responsibilities? between owning a dog and owning a cat? Logical? Legitimate?	Determine how people feel about the differences between dog and cat management in Wellington.
Q8 – Responsible Cat Ownership	Understand other ways in which responsible pet ownership can be encouraged.

How could responsible pet ownership be encouraged without creating laws?	
Q9 – Owner Perceptions Is there anything else you feel WCC could be doing to assist cat owners or address responsible cat ownership?	Determine how the WCC can continue to aid cat owners.

Though not originally intended as a question for this focus group, we also impromptu asked *"Would you trust data from a study that was done somewhere other than New Zealand?"* regarding information about feral, stray, and domestic cats, pests (such as mice, rats, weasels, stoats, and possums), and dogs, and their impact on native wildlife.

When conducting the focus group, questions were posed nearly verbatim from our Focus Group Questions document in Appendix F. The team members spoke very little, except to ask these questions. One team member recorded responses, made notes, and paid particular attention to the demeanor of the attendees while the other team member asked the questions and listened conversationally to the discussion at hand. Though we posed questions throughout the duration of the focus group, we carefully avoided introducing ideas, stances, or specifics on the topic whenever possible – preferring to observe and document the conversation that naturally arose between attendees. Disagreements and points of contention that arose from the participants' interactions exposed viewpoints and positions that our public surveys were not able to thoroughly investigate.

As soon as our focus group began, we used a standard WCC focus group consent form to obtain the attendees' permission to record them and use their quotes. After the focus group concluded, we thanked each attendee for their time, distributed Prezzy Cards, and had the attendees sign to verify they had received their financial compensation.

3.2 Objective 2: Analyze Public's Awareness and Perceptions of Snip'n'Chip

This section of our project analyzed the public's awareness of the Snip'n'Chip campaign as well as the perceptions of the campaign from past Snip'n'Chip users. The purpose of this objective was (1) to understand the effectiveness of the outreach methods used by the SPCA and WCC and (2) to determine whether or not the messages from Snip'n'Chip (such as those in pamphlets handed out after participation) caused a change in the behavior of its users. We looked for an uptake in responsible pet ownership behaviors from users such as putting Birdsbesafe collars on their cats, keeping their cats indoors at night, and ensuring their cats are well-fed before they leave the house. These behaviors were identified by the SPCA as things any cat owner could do to keep their cat safer and protect native birds.

The methods we used to fulfill this objective included:

1. Asking questions about Snip'n'Chip in our general public surveys
2. Surveying previous Snip'n'Chip users via emails collected during voucher purchase

As mentioned in the previous section, we administered in-person surveys to the general public in Wellington. To determine the overall **awareness** of the Snip'n'Chip program, we included questions about whether or not participants were aware of the existence of the Snip'n'Chip campaign, if they knew what it offered, and how they heard about it. We asked questions about participant awareness first to ensure that other questions would not allude to what the bylaw or Snip'n'Chip program might involve. The most essential questions and why they needed to be asked are as follows in Table 5.

Table 5: Sample awareness questions

Survey Questions to Determine Awareness of Snip'n'Chip	
Questions	**Purpose**
Have you heard of the Snip'n'Chip campaign?	Determines the participant's awareness of the Snip'n'Chip program at a base level.
If yes: Do you have an idea of what it offered? How did you first hear about it?	Determines how familiar the participant is with the program and its goals. Indicates which outreach techniques were most effective.

These questions allowed us to determine precisely how aware people are of the Snip'n'Chip program. Asking where they first heard of the campaign allowed us to assess the strengths and weaknesses of the WCC and SPCA's different outreach methods. It also allowed us to make realistic recommendations for how to improve these advertising strategies and outreach methods for the future.

To obtain the perspectives of those who actually used Snip'n'Chip to microchip or neuter their cats, the general public survey was not particularly useful because such a small proportion (x of y) of the Wellington population used Snip'n'Chip. However, since all vouchers were purchased online and because the purchase required an email, the SPCA was able to send an online survey to 807 Snip'n'Chip users who had agreed to be emailed.

We designed a 27 question survey (shown in Appendix D) for the SPCA to send to campaign users to determine if their approach towards pet ownership has changed since using the campaign. The purpose of these surveys was two-fold: on one hand, we were able to determine whether or not users had adopted any of the SPCA's recommendations since utilizing Snip'n'Chip, and on the other hand, we were able to determine users' perception of the program and parts of the campaign they thought went particularly well or particularly poorly. These user perceptions allowed us to develop a more well-rounded perspective on the empirical effectiveness of the Snip'n'Chip campaign and what could be improved in the future.

3.2.1 Snip'n'Chip User Survey Questions

Past users of Snip'n'Chip who had previously agreed to be emailed by the SPCA received the following email prompting them to participate in our survey. In addition to SPCA imagery and logo, the Snip'n'Chip's logo was also included in the email (shown in Figure 10).

Figure 10: The email that was sent to Snip'n'Chip users who had agreed they could be emailed for feedback on the campaign

Unlike our in-person, public survey questions, we wanted to minimize the amount of free response answers the participant had to endure. As such, rather than shying away from typically "open ended" questions, we carefully constructed mutually exclusive answers that accounted for different scenarios. For example, the open-ended question "*What does responsible pet ownership mean to you?*" became "*Thinking about 'responsible pet ownership' and what this term means to you, how important are the following factors:*" followed by several areas (e.g., medical care, keeping cats indoors) that were to be assigned an importance from "very unimportant" to "very important." By restructuring the question this way, we eliminated

most open-response questions while ensuring that the information gathered in our email survey would be somewhat comparable to the information from our in-person, public surveys.

In Table 6 below, the questions are in the left column and the reasoning for asking each question is in the right column. The type of question and possible responses are listed in grey under each question in the left column.

Quicker and easier-to-answer questions were asked first as to not bombard participants with anything too difficult to immediately answer. These questions asked whether or not their cat(s) were microchipped or neutered prior to participating in Snip'n'Chip, whether they would have microchipped and/or neutered their cat(s) without the Snip'n'Chip campaign, whether they were familiar with what the Animal Bylaw mandates, and how they had heard of the Snip'n'Chip campaign.

Table 6: Snip'n'Chip survey multiple choice questions and their purposes

Snip'n'Chip Survey Multiple Choice Questions	
Question	**Purpose**
Q1 – Was your cat microchipped or desexed prior to taking part in Snip'n'Chip? ❑ Yes, microchipped ❑ Yes, desexed ❑ No	Determines what was done before and what they could have had done at most.
Q2 – Would you have microchipped and/or desexed your cat(s) without the Snip'n'Chip campaign? Select all that apply: ❑ Yes, but I liked the discount ❑ Yes, but my schedule would have made it difficult ❑ Yes, to comply with bylaw ❑ Yes, for environmental reasons ❑ No, I had privacy concerns ❑ No, I couldn't have easily afforded it ❑ No, I didn't have time ❑ Yes, other: _____ ❑ No, other: _____	Determines necessity of Snip'n'Chip for cat owners and if there were cats getting microchipped and/or neutered that would not have been under any other likely scenario.
Q3 – The Animal Bylaw sets forth certain requirements for cat owners. To the best of your knowledge, which of the following does it	Determines the respondent's awareness of the bylaw and knowledge of the specifics. Can be almost directly

require? Select all that apply: ❑ Registering cats with the City Council ❑ Desexing cats ❑ Microchipping cats ❑ Keeping cats indoors at night ❑ Registering cats' microchips ❑ I don't know	compared to the same question in our in-person, semi-structured surveys.
Q4 – How did you hear about the Snip'n'Chip campaign? Select all that apply: ❑ Social Media ❑ Internet ❑ Television ❑ Radio ❑ Newspaper ❑ Poster/sign/billboard ❑ Friend/relative ❑ Veterinary Clinic ❑ Other: _____	Determines effective outreach and advertising techniques. Can be almost directly compared to the same question in our in-person, semi-structured surveys.

The more thought provoking questions surrounding cat owner behavior followed the quicker and easier-to-answer questions. The goal behind cat owner behavior questions was to determine if the Snip'n'Chip campaign influenced participants' behavior as cat owners and what responsible pet ownership means to them. First, we asked which, if any, of the SPCA's four responsible pet owner recommendations the participant did prior to Snip'n'Chip. This established a baseline for the next question, which asked which behaviors the participant adopted after using the Snip'n'Chip campaign (and were possibly adopted because of it). Lastly, we asked the participant to rate each of the responsible pet ownership terms on a scale from very unimportant to very important in terms of what they feel pets need. This helped us determine the pet owner's ideology and enabled us to compare their responses to responsible pet ownership on our Snip'n'Chip survey to the responses from our in-person, public surveys. These questions and the reasons we asked them are shown in Table 7 below.

Table 7: Snip'n'Chip survey behavioral questions and their corresponding purposes

Snip'n'Chip Survey Behavioral Questions	
Survey Question	**Purpose**
Q5 – Which of the following, if any, did you do PRIOR to Snip'n'Chip? Select all that apply:	Determines which, if any, of the four SPCA recommendations were

❑ Keep cat(s) indoors at night ❑ Put collar with bell and/or bright colors on cat(s) ❑ Make sure cat(s) is fed before leaving home ❑ Provide toys for cat(s) to keep them entertained ❑ None of the above	already done in the household.
Q6 – Which of the following, if any, did you start doing AFTER Snip'n'Chip? Select all that apply: ❑ Keep cat(s) indoors at night ❑ Put collar with bell and/or bright colors on cat(s) ❑ Make sure cat(s) is fed before leaving home ❑ Provide toys for cat(s) to keep them entertained ❑ None of the above	Determines which, if any, of the four SPCA recommendations were adopted after the Snip'n'Chip campaign (and were likely influenced by it).
Q7 – Thinking about "responsible pet ownership" and what this term means to you, how important are the following factors: (very unimportant, unimportant, neutral, important, or very important) • Providing food and water • Providing shelter • Medical care • Keeping cats indoors • Letting cats roam free • Putting collars on cats • Affection • Financial stability • Desexing • Microchipping • Keeping cat away from other people's property/cats	Characterizes the participant's ideology. Can be almost directly compared to the same question in our in-person, semi-structured surveys.

After the most important cat owner behavior questions, the survey lessened in difficulty again and switched over to cat owner opinion questions. The first two questions were identical to those in our in-person survey. The questions also asked for their opinions on the Snip'n'Chip campaign. Level of agreement questions could be directly compared to the in-person survey responses, and suggestion questions were to be analyzed to potentially incorporate the more revealing responses into our recommendations. We concluded our actual questions in the same fashion as our in-person surveys – by asking if they had any other comments to add. See Table 8 below for the questions and their intended purposes.

Table 8: Snip'n'Chip survey questions for comparison and suggestions

Snip'n'Chip Survey Questions for Comparison	
Question	**Purpose**
Q8 – Please state your level of agreement with the following statements: Domestic cats are a threat to Wellington's native wildlife. (Strongly disagree, disagree, neutral, agree, or strongly agree)	Determines feelings towards domesticated cat's threat towards Wellington's native wildlife.
Q9 – Local government should play a role in managing cats. (Strongly disagree, disagree, neutral, agree, or strongly agree)	Determines feelings towards local government managing cats.
Q10 – How likely would you be to recommend Snip'n'Chip to a friend? • Not at all likely • Somewhat likely • Very likely • Extremely likely	Determines if they deemed Snip'n'Chip worthwhile and beneficial.
Q11 – What would you like to see repeated if Snip'n'Chip were to happen again? What would you like to see improved?	Determines potential recommendations. Also provides more in-depth understanding of Snip'n'Chip process.
Q12 – Any other comments you would like to add about your experience with the Snip'n'Chip campaign?	Typical "final question" on surveys; done on in-person survey.

On the last page of the survey, the respondent was prompted for their demographic information – identical to our in-person participants. That way, the demographic groups could be directly compared and analyzed. Respondents were also asked if they wanted to participate in our focus group, and if so, were prompted for their name and email address.

3.3 Objective 3: Analyze Trends in Cat Microchipping Rates

3.3.1 Microchipping trends

Analysis of cat microchipping trends over time provided evidence of Snip'n'Chip's success and helped reveal the combined effects of Snip'n'Chip and the new bylaw. Since the Animal Bylaw mandates microchipping, and since the Snip'n'Chip campaign provided it,

microchipping trends were valuable tools for the evaluating the effectiveness of both programs in regards to inciting a behavior change. Throughout this analysis, we relied heavily on Microsoft Excel for data visualization and processing.

The NZCAR contains data associated with microchipped cats, such as the date of microchipping and the owner's address. To obtain microchipping data, we contacted the manager of the NZCAR, Nygllhuw Morris, to obtain numbers of Wellington cat microchips registered by month from 2010 to 2018.

For the discussion of our analysis, we will define some key concepts and terms:

- Data Point: For this analysis, a "data point" is the ordered pair: (month, microchips registered). It represents the number of Wellington pet cat microchips registered with the NZCAR in a given month.
- Data Point of Interest: A data point that can be associated with an important event or that answers an important question. For example, Snip'n'Chip ran from October, November, and December 2016. Every point that occurs after the Animal Bylaw was passed in August 2016 is a point of interest.
- Least-squares regression line: A best-fit line (or its equation) for a series of data points. In this case, the regression line predicts the number of cats microchipped in a given month and year.
- r^2: A measure of how well a regression line fits its associated data. Values of r^2 close to 1 indicate a very strong fit, where values of r^2 close to 0 indicate a very poor fit
- Residual: The vertical distance between a given data point and a least-squares regression line. The residual for a given data point indicates how well the regression line predicts that particular data point's value: a residual of 0 occurs when the regression line passes directly through the data point, predicting its value perfectly. In the case of this analysis, the regression line predicts the number of Wellington cat microchips registered in a given month and year, and the data point indicates how many Wellington cat microchips were actually registered that month. Thus, the residual indicates how many microchips more or fewer than the regression line's prediction were registered in reality.
- Residual plot: A plot where each point represents the magnitude of a residual. Apparent trends in the residuals can indicate that a line is a poor function to fit the data, and the standard deviation of the residuals can be a metric for goodness-of-fit of the regression line.

Because microchipping rates vary with season, we divided our data by month. For example, we plotted the data points from January 2010, January 2011,..., January 2016 in one graph, February 2010, February 2011,...,February 2016 in a second graph, and so on. Grouping like this ensured that we were comparing time periods with consistent microchipping rates, instead of comparing months with typically high microchipping rates to months with typically low microchipping rates.

We compared data from corresponding months across each year to find trends in number of cats microchipped during each month. For each month's seven years of data, we calculated the least-squares regression line through the data points prior to August 2016 (when the Animal Bylaw was passed).

Once the regression line was determined, we calculated residuals from that line for all of that month's data points, including the data points of interest. To determine deviation of a data point of interest from the trend, we first calculated the standard deviation of the residuals of the data points prior to the data point of interest in the graph, and then expressed the residual of the data point of interest as a multiple of this standard deviation. (Note that properties of the least-squares regression line guarantee that the mean of the residuals is 0.) Any residuals more than 3.75 standard deviations from the trend for a given month were considered significant and merited further investigation. 3.75 was chosen as a rigorous threshold to reject random variation of points about the regression line.

Some of our most important considerations for this analysis were:

1. Microchipping data likely exhibits seasonal trends, so we divided the data by month to make sure we were comparing periods with consistent microchipping rates.
2. Other subsidized microchipping events occurred after the Snip'n'Chip program concluded, so these also contributed to increased rates of microchipping. Because these are all in support of the same ultimate goal, the contributions from these events were acceptable to include in our data analysis.
3. Nygllhuw Morris warned us that there was a bulk data load in September 2012, and this appears in our data as a huge artificial spike. This data point was excluded from our analysis.
4. This analysis relies on the assumption that the overall domestic cat population has not significantly changed its pattern of growth over the time period of this analysis.

4. Results and Discussion

The goals of this project were to evaluate the effectiveness of the Animal Bylaw and the Snip'n'Chip campaign. In this section, we will present the results obtained from applying the methodology presented in Chapter 3. The chapter is organized by objective, and results for each objective are immediately followed by corresponding discussion. We had several data sources to analyze for each of these objectives, and these data sources are summarized in Table 9 below.

Table 9: Summary of data sources.

Data Source	Description	Supported Objective(s)
Public in-person surveys	Convenience surveys administered in public areas by IQP team members.	Objective 1, Objective 2
Snip'n'Chip email surveys	Surveys emailed by the SPCA to all Snip'n'Chip users who had granted the SPCA permission to contact them.	Objective 2
NZCAR	Provided the number of cat microchips registered in Wellington each month from January 2010 to January 2018.	Objective 3

4.1. Objective 1: Evaluation of Public Response to Bylaw and Cat Management

4.1.1 Results of Objective 1

To evaluate the public response and perceptions on the bylaw and cat management, we conducted 151 surveys with Wellington residents. The survey for cat owners had 28 questions and took approximately 10 minutes. The survey for non cat owners had 14 questions and took approximately 5 minutes.

Awareness of Bylaw

Based on our surveys of 151 residents from various suburbs of Wellington, 63% of cat owners (30 out of 48 cat owners surveyed) were aware of the existence of the Animal Bylaw,

but 32% of non cat owners (33 out of 103 non cat owners surveyed) were aware of its existence (see Figure 11).

63% of cat owners (n=48) are aware of the Animal Bylaw.

We found that 60% of cat owners who were aware of the bylaw's existence (n=30) could recall that it included "microchipping," while 56% of non cat owners who were aware (n=33) knew this. Additionally, 13% of cat owners and 6% of non cat owners who said they had heard of the bylaw gave incorrect answers such as "neutering" for what it required.

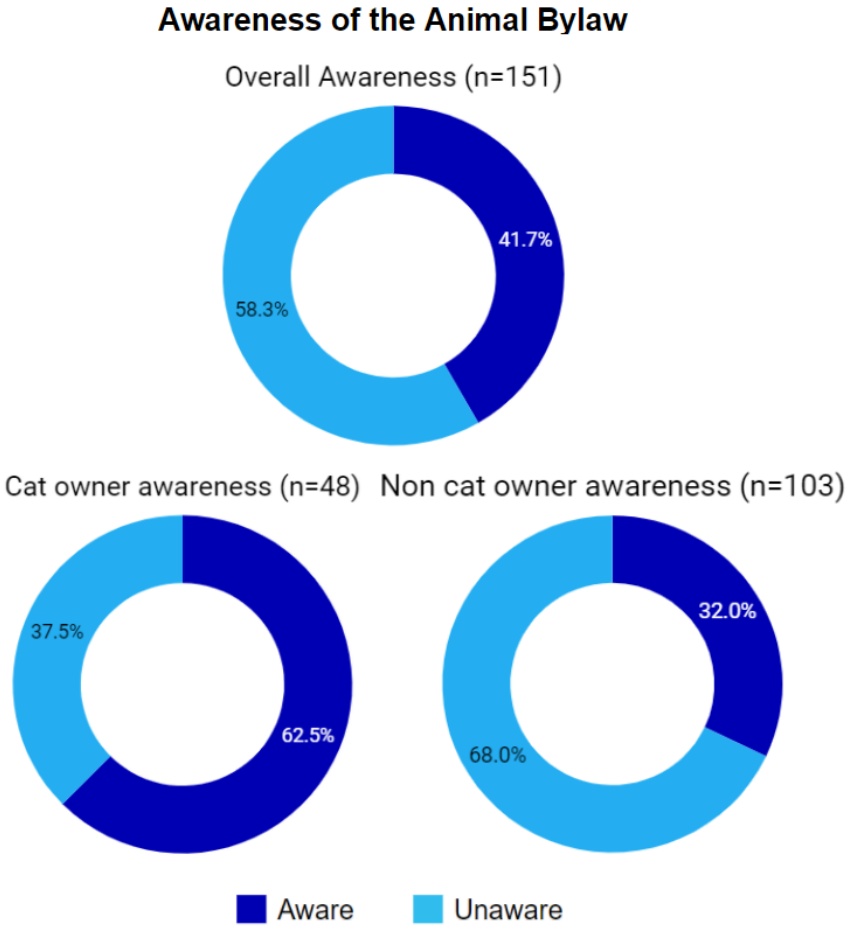

Figure 11: Total, cat owner, and non cat owner awareness of the Animal Bylaw

We also identified the most common mediums of communication by which public survey participants initially heard about Wellington's Animal Bylaw. Figures 12 and 13 below show the forms of communication through which cat owning and non cat owning participants claim to have first heard of the bylaw (if they could remember). If a participant mentioned

multiple forms of communication, the first one they mentioned was assumed to be the first or primary way they heard of the bylaw.

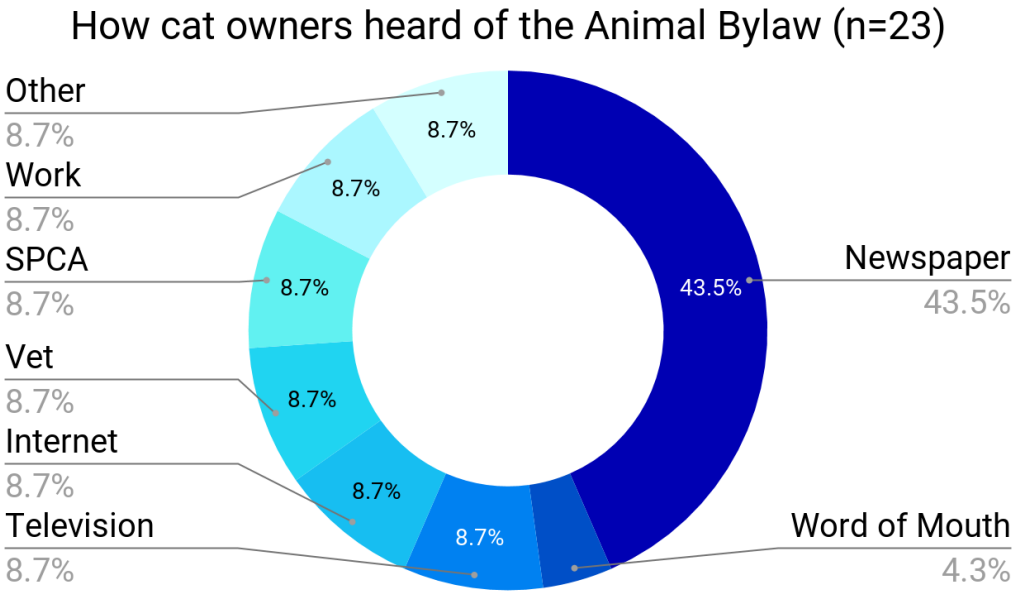

Figure 12: Chart showing how cat owning participants heard of the bylaw, if they were able to recall how they first heard of it.

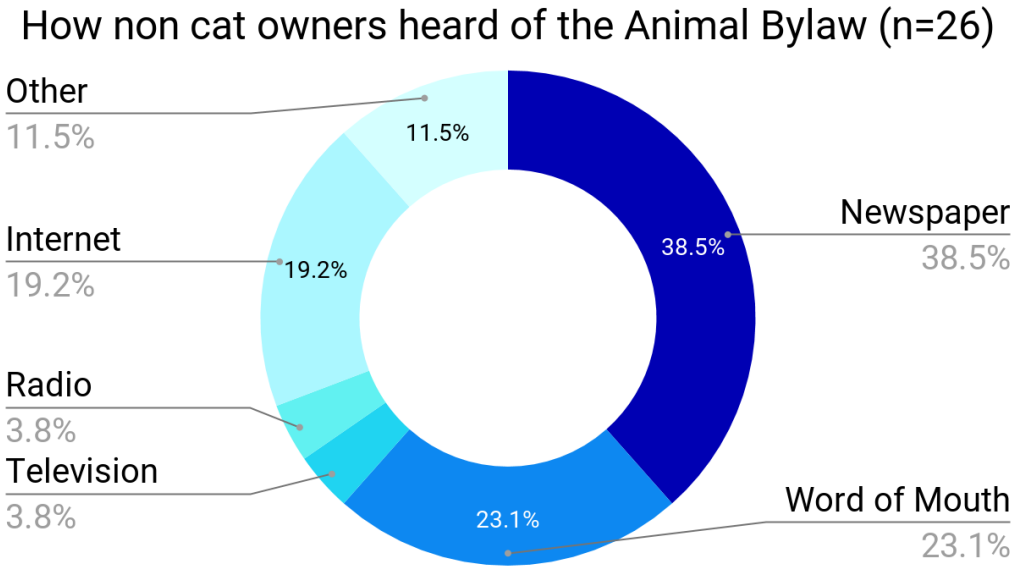

Figure 13: Chart showing how non cat owning participants heard of the bylaw, if they were able to recall how they first heard of it.

We were also able to evaluate the awareness of the Animal Bylaw from the survey emailed to Snip'n'Chip users. Of the Snip'n'Chip users who answered this question on the survey, 81% (117 out of 144) were aware that the bylaw required microchipping. However, of

those who were aware microchipping was required, 42% (49 out of 117) did not think registering cats' microchips was required and 44% (52 out of 117) were under the impression that incorrect things such as neutering or registering cats with the city council were required.

Compliance with Bylaw

As a result of our public survey, we found that 79% (38 out of 48) of cat owners interviewed had their cats microchipped and the microchips registered with the Companion Animal Register, meaning they were compliant with the Animal Bylaw. For this finding, the one participants who answered "I do not know" when asked if their cat was microchipped was counted as noncompliant since – unless the cat was already microchipped when they obtained it – they would most likely be aware of the cat being microchipped. Of the 10 who did not have their cats microchipped and were therefore not compliant, 1 participant stated that he would have microchipped his cat if it were still alive when the bylaw went into effect, meaning only 9 cat owners out of the 48 cat owners surveyed, or 19%, were truly noncompliant and 39, or 81%, were truly compliant.

81% of cat owners (n=48) surveyed were in compliance with the bylaw.

One important comparison we were able to make was the correlation between awareness and compliance. Of the 9 cat owners who were not in compliance with the Animal Bylaw, 4 were aware of the bylaw to some degree while 5 had not heard of it.

We partitioned cat owners based on whether or not they were compliant with the bylaw and then compared their level of agreement (disagree, neutral, agree) towards the two scale questions, *"What is your level of agreement that domesticated cats are a threat to Wellington's native wildlife?"* and *"What is your level of agreement that local government should play a role in managing cats?"* in Figure 14 below.

We found that those who were compliant with the bylaw had stronger opinions about whether cats pose a threat to native wildlife – "neutral" was the least frequent category for compliant cat owners at 28%. By contrast, "neutral" was the noncompliant owners' most common response at 50%. Thirty eight percent of compliant cat owners and noncompliant cat owners disagreed that cats posed a threat to native wildlife. Cat owners who were compliant

were much more likely to agree cats are a threat to native wildlife at 33%, compared to noncompliant cat owners' 13%. Of the 8 noncompliant cat owners, 3 disagreed, 4 felt neutral, and 1 agreed. Of the 39 compliant cat owners, 15 disagreed, 11 felt neutral, and 13 agreed. We did not include cat owners who failed to respond to either or both of the questions regarding their cat's microchipping status or their level of agreement with cats posing a threat to wildlife.

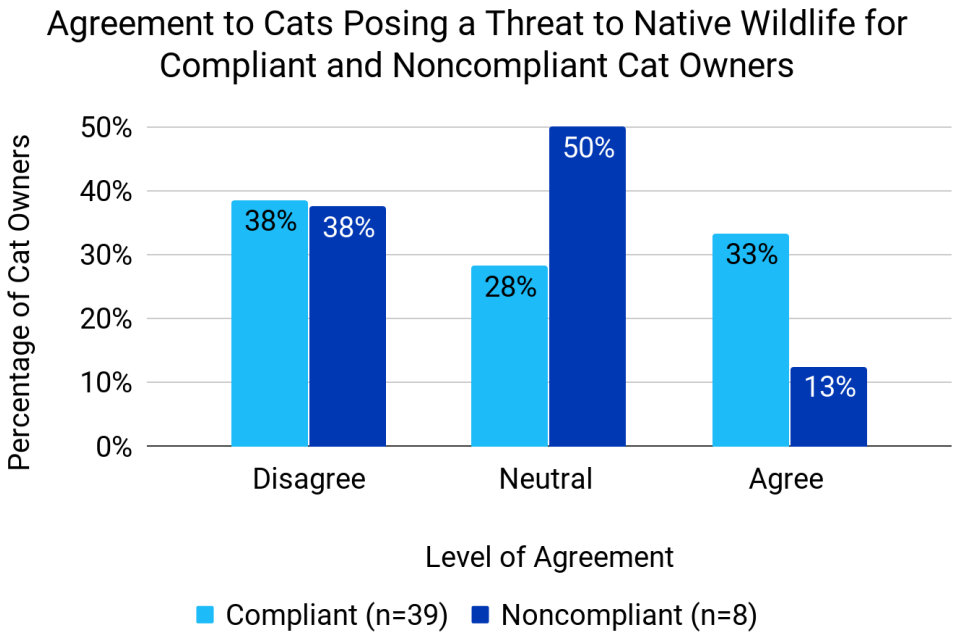

Figure 14: Perceptions on cats' threat to wildlife for compliant and noncompliant cat owners

We found that those who were compliant with the bylaw (n=39) were more likely to agree that the local government should play a role in managing cats at 45%, opposed to those who were noncompliant (n=8) at 29%. Participants who were *noncompliant* with the bylaw *disagreed* that local government should play a role in cat management 43% of the time, and those who were *compliant* with the bylaw *agreed* with the statement 45% of the time. Another finding is that compliance with the bylaw does not seem to impact "neutral" response rates, with compliant cat owners feeling neutral 29% of the time and noncompliant cat owners feeling neutral 26% of the time. Of the 7 noncompliant cat owners, 3 disagreed, 2 felt neutral, and 2 agreed. Of the 38 compliant cat owners, 11 disagreed, 10 felt neutral, and 17 agreed. Again, we did not include cat owners who failed to respond to either or both of the questions regarding their cat's microchipping status or their level of agreement with local government playing a role in managing cats.

When asked why their cats were not microchipped, noncompliant owners provided reasons such as keeping their cats indoors all the time and therefore not needing to, having old cats, expenses associated with microchipping, and believing that their own cat would never run away. Six out of nine (67%) noncompliant cat owners knew, however, that they could microchip their cat at their local vet or the SPCA if they so desired. Furthermore, when looking at the income breakdown of our noncompliant owners, 6 of the 9 (67%) have an annual household income of $70,000 or less. More specifically, 4 out of 9 (44%) have a household income of less than $50,000.

Though neutering cats is not required under the Animal Bylaw and was not considered in our findings on cat owner compliance, we found that 100% of cat-owning participants (n=48) had their cats neutered regardless of whether or not they complied with the bylaw.

100% of cat owners surveyed (n=48) had their cats neutered.

Perception of Bylaw

After asking participants about their awareness of the bylaw, we asked for their individual opinions about it. For those who were not originally aware of the Animal Bylaw, our team stated what it required of cat owners in order to gauge participants' opinions regardless of their previous understanding of the bylaw. Overall we found that 86% of people (127 out of 148 people who answered the question) gave positive responses to the bylaw and 11% (16 out of 148) gave negative responses. Only 3% (5 out of 148) felt neutral or had mixed feelings. Cat owners who provided their opinions on the bylaw responded positively 89% (41 out of 46) of the time and negatively or mixed 9% (4 out of 46) of the time, while non cat owners responded positively 83% (86 out of 103) of the time and negatively or mixed 16% (16 out of 103) of the time.

86% of participants (n=148) had positive feelings towards the Animal Bylaw.

To analyze people's reasoning for how they felt about the bylaw, we coded each open response for predominant themes. For example, someone who felt positively about the bylaw

because it's "useful if [a] cat gets lost" was coded by the term "reuniting." This code means the participant felt the bylaw was good because it helps reunite lost cats with their owners.

In terms of the perception of the Animal Bylaw as a whole amongst both cat owning and non cat owning participants, the most common reason people stated they felt positively about the bylaw (59 out of 127 people) was because it helps reunite lost cats with their owners. The second and third most common reasons participants felt positively were because they felt it would hold owners accountable for their cats' behavior and because they thought it was helpful for identifying stray cats. A more detailed account of reasoning participants gave for positive feelings towards the bylaw is shown in Figure 15 below. Out of people who felt negatively about the bylaw, the most commonly cited concern was that it is ineffective (6 out of 16 people), and the second most common reason was the idea that microchipping is unethical. See Figure 16 for a more detailed analysis of the reasons participants felt negatively about the bylaw. We also had a variety of unique comments by survey participants about their opinions on the bylaw.

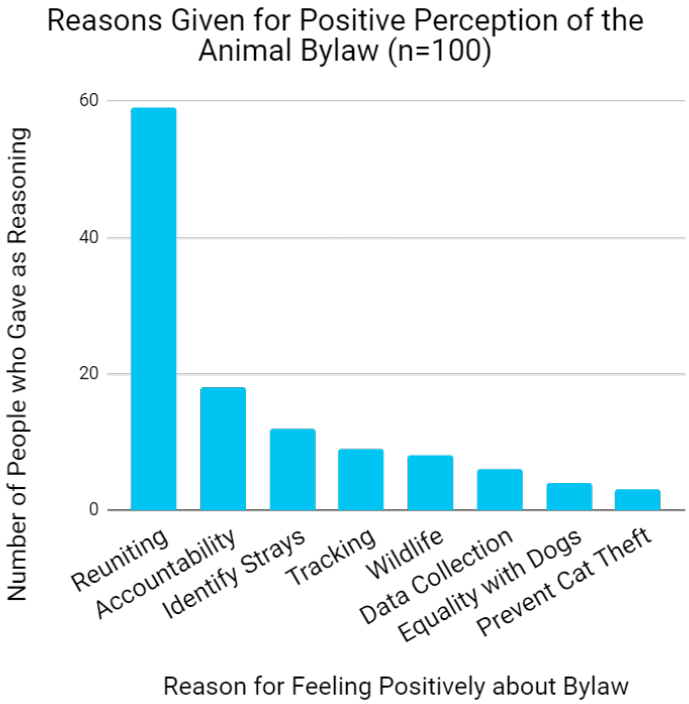

Figure 15: Reasons given for why people felt positively about the Animal Bylaw and the number of people who gave them as responses.

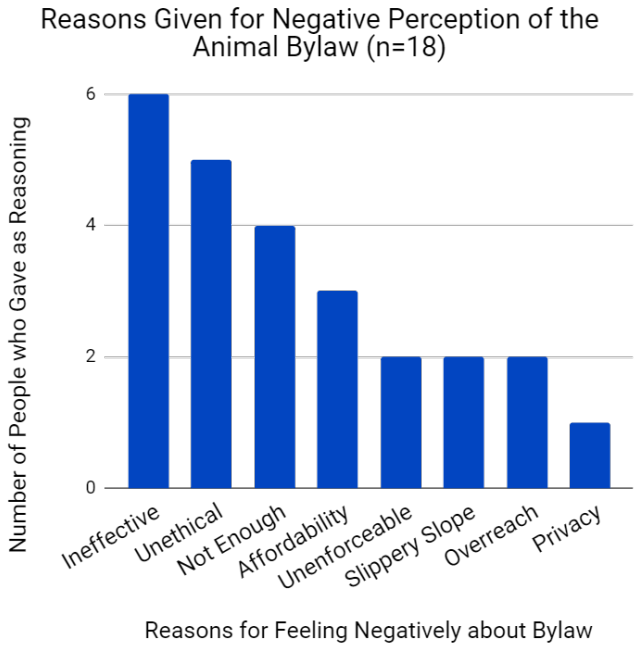

Figure 16: Reasons given for why people felt negatively about the Animal Bylaw and the number of people who gave them as responses.

Another result of our survey was the correlation between feelings about the bylaw and the scaled response for whether a participant agrees or disagrees that "domestic cats pose a threat to Wellington's native wildlife." Those who responded to the scaled question with a 4 or 5 were considered to "agree" with the statement and those who responded with a 1 or 2 were considered to "disagree." Those who responded with a 3 were "neutral." We found that 57 out of 127 people who felt positively about the bylaw agreed with the statement that cats pose a threat to Wellington's native wildlife, 39 out of 127 were neutral or gave no response, and 31 out of 127 disagreed. For those who had negative feelings about the bylaw (n=16), 7 agreed with the statement, 1 was neutral, and 8 disagreed.

Similarly, we analyzed the correlation between those who agreed with the bylaw and the scaled response for whether or not a participant believes local government should play a role in managing cats. Again, the scaled responses were interpreted in the same way as mentioned above. Out of people who felt positively about the bylaw (n=127), 67 were also in agreement with the statement that "local government should play a role in managing cats," 31 were neutral or gave no response, and 29 were in disagreement. Out of the 16 who felt negatively, 6 agreed with the statement, 3 were neutral, and 7 disagreed. We found that out of all participants who gave us scores for how they felt about local government involvement (n=143), 54% (77 out of 143) agreed local government should play a role in managing cats,

20% (29 out of 143) were neutral, and 26% (37 out of 143) disagreed with the idea of government involvement.

54% of survey participants (n=143) agreed local government should play a role in managing cats.

Perspectives on Cat Ownership

To better understand the context of the response to the Animal Bylaw, we needed to more generally understand participants' perspectives on cats and cat ownership overall.

Out of cat owners surveyed, 8 out of 48 (17%) had strictly indoor cats while 40 out of 48 (83%) had outdoor cats. We found that 6 out of 7 cat owners (86%) with indoor cats felt positively about the bylaw, claiming that its ability to reunite cats with owners was the main reason for their perception. Similarly, for those who have outdoor cats, 35 out of 39 (90%) felt positively about the Animal Bylaw, and 18 out of 39 (46%) cited its ability to reunite cats with owners as the main reason for this. Second most common (6 of 39, or 15%) was the idea that a microchipped cat's owner could be held accountable for the cat's nuisance behaviors. For cat owners who have outdoor cats, we found that 7 out of 39 (18%) keep their cats indoors explicitly at night.

We partitioned the answers from our question, "*How strongly do you agree that cats are a threat to Wellington's native wildlife?*" by cat owner, non cat owner, and all responses by age group. As previously defined, "agreement" refers to those who rated above 3, "disagreement" refers to those who rated below 3, and "neutral" refers to those who rated exactly 3.

Shown in Figure 17 below, we found that only 30% of cat owners agreed that cats were a threat to wildlife, with the plurality, 38% disagreeing that cats were a threat. The most common scale responses given by cat owners were 3, at 32%, and 1, at 28%, shown in Figure 18.

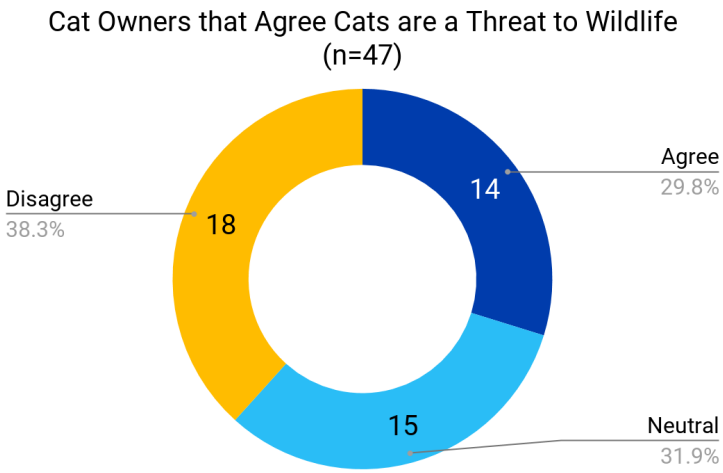

Figure 17: Percentage of cat owners that agree cats as a threat to Wellington's native wildlife

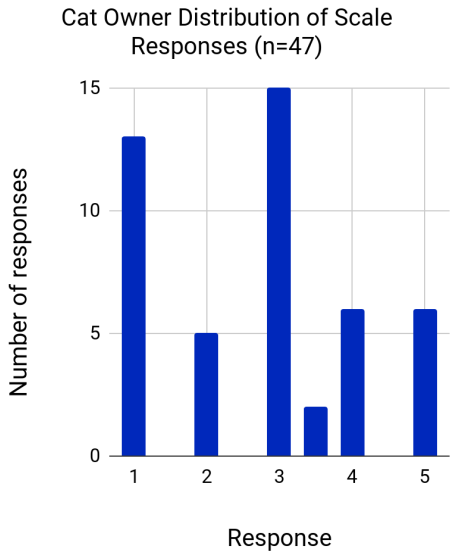

Figure 18: Distribution of scale responses from cat owners regarding their agreement that "Domesticated cats are a threat to Wellington's native wildlife"

Shown in Figure 19 below, we found that the majority of non cat owners (51%) agreed cats were a threat to wildlife, with the remaining non cat owners disagreeing and feeling neutral about the issue at almost the same percentage, 23% and 27%, respectively. The most common scale responses given by non cat owners were 5 and 3, tied at 27%, shown in Figure 20.

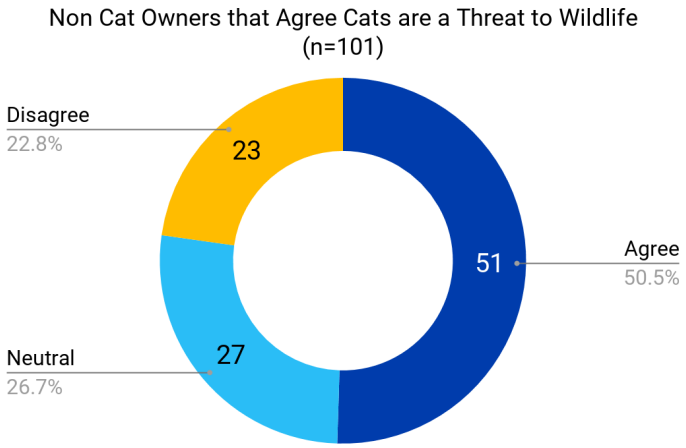

Figure 19: Percentage of non cat owners that agree cats as a threat to Wellington's native wildlife

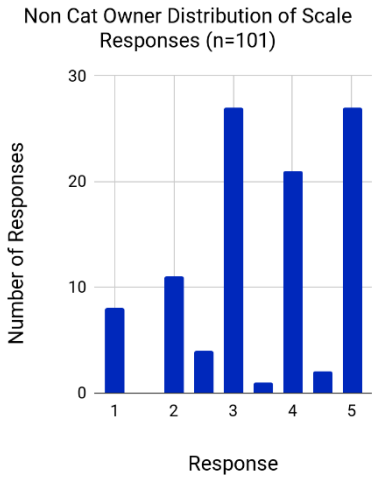

Figure 20: Distribution of scale responses from non cat owners regarding their agreement that "Domesticated cats are a threat to Wellington's native wildlife"

We found that when we grouped by age, 66+ and 26-45 year olds were the most likely to be in agreement with the statement that domesticated cats are a threat to Wellington's native wildlife, each at 50%, shown in Figure 21 below.

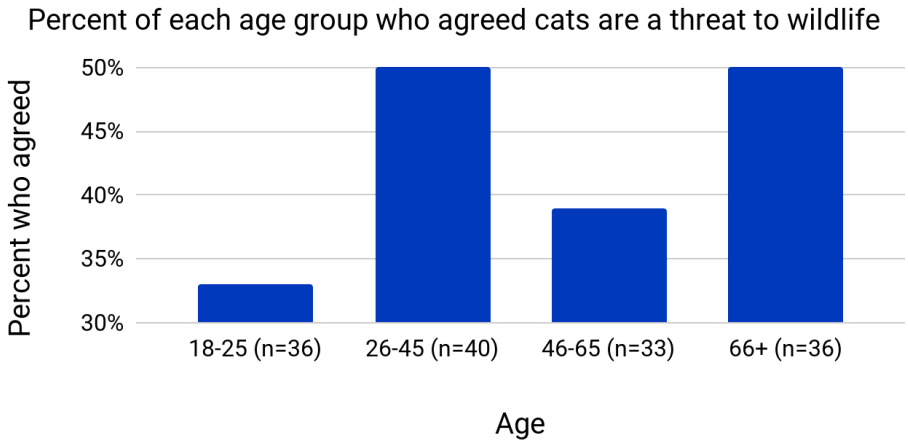

Figure 21: The percentage of each age group who agreed cats pose a threat to native wildlife

Out of our 48 total cat owners, 31 reported that their cats bring home prey. Of these 31 owners, 11 witnessed their cat bring in only pests (such as rats, mice, and vermin), 10 witnessed their cat bring in only native wildlife (such as birds and lizards), and 10 claimed that their cats brought home both.

Out of the 11 cat owners whose cats brought in pests, 3 believe that domestic cats pose a threat to Wellington's native wildlife. Similarly, of the 10 cat owners whose cats brought in birds, only 2 agreed that domestic cats are a threat. For those owners who have seen their cats bring back pests **and** native wildlife, 4 out of 10 believed domestic cats were a threat, and for owners whose cats brought in neither pests nor native wildlife, 5 out of 17 believed domestic cats pose a threat to Wellington's native wildlife.

Next, we investigated the reasons that people agree and disagree with the statement, "Domestic cats are a threat to Wellington's native wildlife." Of 18 cat owners who disagreed with the statement, 8 (44%) said that owners could take up specific behaviors (like putting belled or brightly colored collars on cats) to mitigate their cats' impact on wildlife. Non cat owners who disagreed that domestic cats are a threat to wildlife also provided this reasoning most frequently, with 8 of 23 (38%) feeling that owners could effectively control their cats' impact. Additionally, 4 cat owners and 4 non cat owners mentioned that cats also *protect* native wildlife by killing rodents.

Note responses were not mutually exclusive; the same person could have said two or more of these things. Out of 14 cat owners who agreed that domestic cats were a threat to native wildlife, 7 (50%) made some claim that cats were natural hunters or natural killers, and that this behavior really could not be controlled. The majority of non cat owners (29 of 50, or 58%) who believed cats are a threat also said that this behavior was natural and

uncontrollable. Sixteen agreeing non cat owners (32%) also mentioned that they had seen cats preying on wildlife firsthand or had seen other evidence of predation by cats.

Of the 15 cat owners whose feelings are neutral on the subject, 4 (27%) mentioned that cats are natural hunters, 4 (27%) mentioned that the cat's location (e.g., near Zealandia) played an important role, and 3 (20%) said that owners could take action to mitigate their cats' impact on wildlife. Of the 27 non cat owners who felt neutrally, 7 (26%) claimed that owners could mitigate their cats' impacts, 4 (15%) mentioned that it was natural for cats to kill birds, 3 (11%) thought the cat's location played an important role, and 3 (11%) thought domestic cats were a minor threat compared to others (e.g., feral cats or rodents).

Out of cat owners in our public survey who agreed cats pose a threat to native wildlife, we wanted to see how many actually tried to mitigate the effect their cat has on wildlife. Out of people who agreed with the statement, "Domestic cats pose a threat to Wellington's native wildlife" (n=14), 7 out of 14 (50%) keep their cats indoors either completely or at night, and 5 out of 14 (36%) put collars on their cats. More specifically, 3 out of 14 (21%) put collars on their cats for the purposes of protecting wildlife. However, 4 out of 14 (29%) of cat owners who agreed with the statement cited protecting wildlife as a principle of responsible pet ownership. Out of cat owners in our public survey who disagreed that cats pose a threat to native wildlife (n=18), we found that 3 out of 18 keep their cats indoors either completely or at night, and 6 out of 18 (33%) utilize collars. Further, 4 out of 18 (22%) cat owners use collars on their cats explicitly for the purpose of protecting wildlife. In regards to responsible pet ownership, 4 out of 18 cat owners (22%) cited wildlife protection as an important habit.

For the scaled question that asked participants to rate their agreement with the statement, "Local government should play a role in managing cats," 14 out of 45 cat owners (31%) disagreed, 12 (27%) were neutral, and 19 (42%) agreed. Non cat owners favored government involvement much more strongly, with 60 out of 101 (59%) agreeing, 24 (24%) disagreeing, and 17 (17%) remaining neutral.

Cat owners who disagreed with the statement (n=14) most frequently claimed that cat owners were responsible themselves and did not need local government imposing regulations; 6 cat owners who disagreed (43%) had this view. Others felt even more strongly: 4 disagreeing cat owners (29%) said that attempts to manage cats were intrusive and infringed on cat owners' rights. Disagreeing non cat owners shared these opinions, with 11 of 23 (48%) stating that owners should be responsible for their own animals and 5 of 23 (22%) claiming that government management would be intrusive.

Cat owners who agreed with the statement most often said that some or all cat owners were not responsible for their pets and needed additional oversight. Of the 19 cat owners who agreed with the statement, 6 (32%) shared this view. Further, 4 of 19 agreeing cat owners (21%) said that local government needs to be the entity that provides this oversight or regulation. Agreeing non cat owners (n=60) usually claimed that cat owners were irresponsible and therefore needed government regulation (16, or 27%), that making laws is simply the local government's job (16, or 27%), that local government really should be the entity that regulates cat ownership (9, 15%), or that the local government must do what it can to protect native wildlife (8, 13%).

Cat owners who had a neutral perspective (n=12) said that cat owners were responsible for their own cats (3, or 25%) and that cat owners could not be trusted to responsibly manage their cats (also 3, 25%). Three cat owners (25%) also made alternative suggestions to local government or suggested specific ways that local government could manage cats, and 2 (17%) mentioned that it was probably infeasible for local government to make any real impact. Neutral non cat owners (n=17) most often claimed that a cat should be its owner's responsibility (4, or 24%), that cat owners could not be trusted to responsibly manage their cats (2, or 12%), or that the local government has a responsibility to manage stray and feral cats but not necessarily domestic cats (2, or 12%).

Additionally, there were 16 cat owners out of 48 (33%) who claimed that their cat has come home hurt or injured. Out of these 16 people, 11 (69%) claimed that their cat has come been injured because of cat fights, while 5 (31%) claim it was because of a car accident. Surprisingly, out of the 16 cat owners whose cats have been injured or come home hurt, only 2 (13%) take preventative measures such as keeping their cats indoors.

People who live within the 'Zealandia Halo' (introduced in section 2.1.1) were of particular interest to us because of the idea that their proximity to the Zealandia wildlife reserve makes them more conscientious of the environment and wildlife. Out of the 142 public survey participants who gave us the suburb they live in, 42 participants lived in suburbs that fall, at least in part, within the 'Halo.' Those who lived within the 'Halo' agreed cats are a threat to Wellington's native wildlife 5% more than participants outside of the 'Halo;' a small difference considering 'Halo' residents' proximity to endangered wildlife.

We also looked at views on responsible pet ownership within and outside of the 'Halo.' We found that 21% (23 out of 108) of non-'Halo' participants cited keeping pets away from wildlife or mitigating the impact pets have on wildlife as principles of responsible pet

ownership, while only 16% (6 out of 38) of 'Halo' participants suggested either of these behaviors. Common ways to protect wildlife, as mentioned by non-'Halo' participants, included keeping cats in at night and using belled collars.

There were a variety of non cat owners who gave reasons for not owning a cat (n=96). We coded these responses and then determined the number of each response, as shown below in Figure 22. Our coded responses are shown in more detail in Appendix C. Some answers that were not coded but still noteworthy include: having a cat that died recently, not wanting a cat, hating animals in general, being too old to have cats, and no longer having children at home.

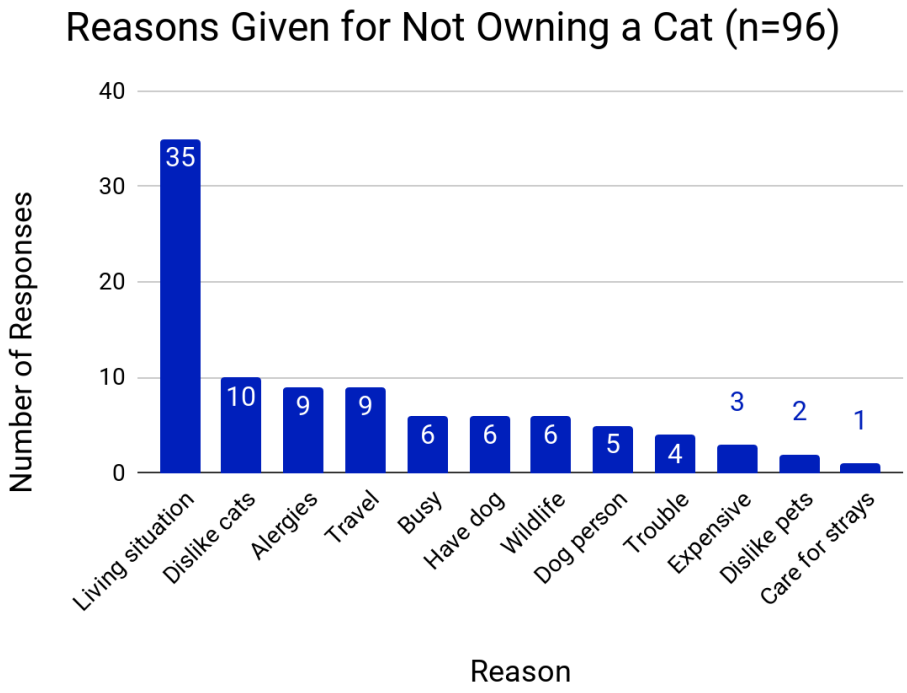

Figure 22: Reasoning for why non cat owners did not have a cat

Those who responded with "living situation," "travel," and "busy" are all possible cat owners; that is, their situation determines whether or not they own a cat, not their opinions or preferences. This means that they may obtain cats at any time that the hindrance is removed.

Focus Group Results

From the focus group we conducted with 3 cat owners, we were able to gain a deeper understanding of how cat owners feel about cat policy, responsible pet ownership, what can

be done to mitigate cats' effects on wildlife (if anything), as well as barriers to becoming a more responsible pet owner.

When asked Question 1, regarding gaps in cat related policy, all three attendees indicated that current rules did not address the entirety of the issue. One attendee advocated that "as cat owners, we should be under the same obligations as dog owners." One pro-management participant even noted that "when a dog gets out, if it's not registered, it gets put in the pound. Should a cat that's [found and] not registered be put down?...Do you set up cat traps for cats that aren't neutered or are feral and immediately exterminate them? I don't know." Though the other participants did not explicitly agree with this hypothetical, they worked off it, proposing that "maybe there should be a limit on the number of cats you can have. Maybe two cats per household." When asked about confining cats to a yard, the attendees recognized that it might be a happy medium between letting cats roam and keeping cats indoors all the time, or even at night. They all acknowledged that cats and birds do not live in harmony and legislation must exist to maintain a balance.

One attendee repeatedly brought up the notion that cat owners in Wellington (and New Zealand) need to philosophically determine for themselves what kind of Wellington/New Zealand they want to live in: one where their cats are unmanaged and unregulated, or one where more birds are calling and native birds begin moving back into the city.

When asked Question 3, regarding how cat owners can reduce their cat's impact on wildlife, the attendees initially showed skepticism towards Birdsbesafe collars and blamed dogs. Of the three attendees, two had never heard of Birdsbesafe collars and none had heard of "catios" or similar methods to enrich the lives of indoor cats. The one attendee who had experience with a Birdsbesafe collar was certain that, because her cats could get out of the collars, they were categorically ineffective and that she would never consider them again. One of the attendees who had never heard of Birdsbesafe collars wanted proof they worked before considering them.

One attendee even mentioned that they would prefer to keep their cat inside entirely rather than keep an outdoor cat in at night, stating it was cruel to confine (even temporarily) a sentient being that had previously experienced the outdoors. They noted, however, that while they would not ever keep their current cat indoors, they may keep a future kitten indoors. Most importantly, a new kitten would only be kept indoors if they had rigorous data that definitively showed domesticated cats significantly threaten bird populations.

Our attendees shared skepticism that domesticated cats contributed significantly to bird deaths and endangerment of species. On multiple occasions, one attendee or another would qualify a statement they had just made with statements like, “that is, if domesticated cats actually turn out to be harmful,” “I’d like to see how dogs compare to cats, dogs can cause harm too – maybe more than cats,” or “I just don’t see how cats could cause more damage than pests.” Our attendees were adamant that pests have a larger impact than cats.

One attendee thought there should be better advertising about the options that exist, advocating for vets and the SPCA to inform people during visits. “I wouldn’t know where to buy [a Birdsbesafe collar]. I mean, I’ve never [even] seen it [advertised].” Another attendee thought the SPCA and WCC should be focusing on the benefits – especially long term benefits for Wellington as a whole. The last attendee suggested encouraging behavior through repercussions and emotion, stating that the SPCA and WCC should “[try to get cat owners] to accept that if their cat isn’t microchipped and registered, they might lose them.”

When asked a reworded question 4 regarding what the attendees do individually to mitigate their cats’ impacts on wildlife and what barriers they may have experienced in trying to do so, one attendee replied, “I think if I was presented with really hard evidence, I would really love to know the figures…and then, I think if I was presented with those facts, I would be much more likely to act on them.” The attendees unanimously agreed that cat owners need evidence and would do more if they were presented with facts and direct actions that they could take.

Our attendees also suggested improvements to the WCC and SPCA’s outreach strategies to encourage more responsible behavior. For example, a common theme was the necessity of a data-oriented approach. They suggested that the information presented be digestible and easily communicable across multiple platforms of media to reach various demographics. This information should be reinforced continuously over time until people associate cats with a clear threat to wildlife.

We asked our focus group participants whether or not data from other countries with similar wildlife issues would effectively communicate the impact on wildlife in New Zealand. The response was overwhelmingly negative, as participants felt that New Zealand’s fauna are incredibly unique and that any study from another country would be inherently incompatible with New Zealand’s situation.

According to attendees, to motivate a cat owner to change their behavior, the owner needs to see the clear benefits of performing the action and the action has to be simple. One clear barrier to behavior change is the concept of New Zealand as a “free range” country – one

where many people do not like boundaries, especially for independent behaviors like pet ownership. However, it was suggested that the local government find a way to help people see the bigger picture of their cats' actions and make it easier to respond. For example, the WCC and SPCA should promote health benefits of keeping cats indoors and wearing collars. Our attendees suggested teaching schoolchildren to protect New Zealand's native species through environmentally friendly behavior. This way, children will bring home the information and hopefully influence their parents to be more responsible cat owners. Another interesting idea that arose was the concept of a healthcare plan for cats, where owners would get discounts for their loyalty to their vet clinics if they had their cats treated with recommended procedures like microchipping and neutering. Such a healthcare plan would incentivize responsible pet ownership behaviors.

When asked Question 6, regarding why cat owners still think allowing cats out at night is better for them even though it significantly increases their chances of getting hurt, the attendees were split. One attendee stated, "I think [cats getting hit by cars] is just the natural order of things. I could, I could *consider* [the information given] as a reason to keep my cat indoors at night." Another attendee took the idea further, explaining, "I think it's about education. [The information given] is a good way to get people to start keeping their cats inside…By reinforcing [that] their actions aren't that great for their cat."

When prompted further about how to help cat owners agree what constitutes responsible cat ownership, an attendee asserted "You'd have to do a multi-faceted communication [campaign]...It's that reiteration of the message [that really makes it stick]." "And over time. You have to have that repetition," another added. The last attendee advocated for using social media campaigns to inform with the intention of changing cat owner behavior over time. "[You have to] make people feel like they're the exception to the norm" (where "the norm" is responsible pet ownership).

When asked Question 9, regarding what the WCC could provide, an attendee expressed interest in educational programs for veterinary clinics such that they could spread information on responsible pet ownership and methods to mitigate cats' damage. Further, since definitions of "responsible pet ownership" differ between cat owners, one attendee suggested that the WCC and SPCA collaborate to clearly define this concept and communicate expectations for cat owners.

When asked spontaneously how the attendees felt about data regarding cats and their impact on wildlife that came from other countries, the attendees responded from skeptical to

critical. One attendee cautiously proceeded, “I think you have to be careful with it. We have different flora and fauna.” The next attendee was less diplomatic, clearly stating their dislike of the idea: “There’s no other country in the world that has just birds [like us]...We have this unique situation [here in New Zealand] that we really need to [approach] uniquely.” They concluded that if they were expected to change their behavior or implement new precautions to protect birds, they needed to be convinced – and would only be convinced through research that was performed in New Zealand data that strictly pertained to the unique wildlife in New Zealand.

4.1.2 Discussion of Objective 1’s Results

Awareness of Bylaw

From our public survey results, we found that the majority of cat owners were aware of the Animal Bylaw to some degree and that the majority of non cat owners were unaware. These results are unsurprising since the bylaw sets requirements for cat owners while non cat owners are generally unaffected by the bylaw. However, 38% of cat owners were previously unaware of the bylaw, meaning they could have been noncompliant with the bylaw if they had not already had their cats microchipped and registered for other reasons. We also found that cat owners most frequently learned of the Animal Bylaw by reading the newspaper, meaning they were most likely hearing of it from a third party since the WCC did not have information about the bylaw in the newspaper.

From our Snip’n’Chip online survey, the majority of participants were aware microchipping was required, but almost half of participants who said microchipping was required also said that incorrect things such as neutering were also required. This suggests that many of these users may not have previously been aware of the Animal Bylaw and were likely guessing. Since Snip’n’Chip provided both neutering and microchipping, it would be reasonable to assume that the bylaw requires both. Because of this, it is impossible to know how many Snip’n’Chip users were aware of the bylaw prior to participating in the campaign, but this number is mostly unimportant since everyone who participated is now compliant regardless of whether they were aware of the bylaw beforehand.

Compliance with Bylaw

According to our results, most cat owners surveyed were compliant with the Animal Bylaw, meaning most cat owners surveyed had their cats microchipped and registered that microchip with the Companion Animal Register. Since a cat owner's compliance did not seem to correlate with the cat owner's awareness of the Animal Bylaw, a number of cat owners must be microchipping for reasons other than complying with the bylaw. Furthermore, the fact that 6 out of 9 (67%) of noncompliant owners knew where they could get their cat microchipped if they wanted to suggests that it is not a matter of awareness, but rather a matter of motivation. Finance may also be a barrier to consider, given that 6 of the 9 (67%) noncompliant owners have an annual household income of $70,000 or less. Since we had such a small sample size (n=9), we could not draw conclusions about the relationship between income and bylaw compliance. However, moving forward this would be an excellent avenue to explore with a larger sample size.

Though neutering cats is not required under the Animal Bylaw or any other laws, it is one of the responsible pet ownership behaviors encouraged by the SPCA and WCC (see section 2.2.5). According to the responses given in our public surveys, most cat owners (100% of those surveyed) have their cats neutered and, furthermore, had had their cats neutered soon after they got them or had gotten them already neutered. While neutering cats – unlike microchipping – has been a common practice for years, it is still encouraging that our data shows that most cat owners neuter their cats.

Perception of Bylaw

Based on our analyses, the majority (86%) of people surveyed had a positive response to the Animal Bylaw. With cat owners feeling positively 89% of the time and non cat owners 83% of the time, cat owners and non cat owners were approximately equally likely to give a positive response to the bylaw. A small portion of participants had mixed feelings or responded negatively to the bylaw. Given that the most frequent reason people felt positively about the bylaw was reuniting lost cats with their owners, both cat owners and non cat owners most frequently thought about the welfare of the cat in deciding how they felt. More wildlife-centric or society-centric reasons such as holding owners accountable or identifying stray cats were also mentioned frequently, but reuniting lost cats was mentioned at least three times as frequently as any other reason. For the 16 people who felt negatively about the bylaw, the top

reasons for their opinion were: (1) the bylaw is ineffective, (2) microchipping is unethical, and (3) the bylaw does not do enough. Notably, participants who considered microchipping unethical often posed the idea that microchipping cats will eventually lead to microchipping people.

Those who felt positively about the bylaw were more likely to agree with the statement that "Domestic cats pose a threat to Wellington's native wildlife." This implies that concerns about cats' impact on wildlife may have been a significant factor in participants' feelings towards the bylaw, regardless of whether they explicitly stated it. This could suggest that even though microchipping does not have a clear or direct positive effect on wildlife, people still associate government regulations on cats with helping the environment. Similarly, those who agreed with the statement that local government should be involved in cat management were also more likely to feel positively about the bylaw. This shows that participants' feelings on the government, not just on cats or cat ownership, play a significant role in their perception of the bylaw. This is a reasonable result, as someone who believes the local government should not regulate cat ownership in any way most likely will not agree with the bylaw even if they agree microchipping is beneficial.

Perspectives on Cat Ownership

According to our results on cat ownership, people whose cats bring home animals do not seem to connect this behavior with a threat to wildlife. Proximity to Zealandia also does not seem to affect people's perception of whether cats are a threat to wildlife, although it should be noted that we cannot determine from our data exactly which people live inside and outside the 'Zealandia Halo,' only which people could *potentially* live within the 'Halo.' People (cat owners and non cat owners) who disagree that domestic cats pose a threat to wildlife frequently mention that cat owners can mitigate their cats' impact, and 50% of disagreeing cat owners (9 of 18) do take action to mitigate their cats' impact. People who believe cats are a threat often claim that their natural hunting instincts make them dangerous to native wildlife regardless of precautions owners take. The question about government management of cats produced an even clearer dichotomy between people who thought cat owners should be responsible for their own animals and people who thought cat owners could not all be trusted to handle their cats responsibly – and needed direction and management from local government.

Furthermore, we found that people who tend to agree that domestic cats are a threat to Wellington's native wildlife have seen their cat bring in both pests and native wildlife.

Surprisingly, people who have seen their cats explicitly bring in native wildlife do not agree most. In fact, there are actually more people in agreement who have never seen their cat bring in pests or native wildlife. This suggests that seeing is not necessarily believing, and whether or not a cat owner has seen their cat interact with wildlife may not have a bearing on how an owner feels about domestic cats being a threat.

In terms of the differences in preventative measures taken by cat owners who agree and disagree that cats are a threat to wildlife, we found that people who agree with the statement are more likely to keep their cats indoors more than those who disagree. This suggests that people who agree cats are a threat to wildlife are more likely to take preventive measures. This was not the case for collars, however, as agreement that cats pose a threat to wildlife seemed to have no bearing on whether or not an owner uses a collar on their cats. This suggests that people are more likely to keep their cats indoors as a preventative measure rather than the utilize collars for the same purpose. Given that our sample size was small for this analysis (n=18), it is important to note that this may not be an accurate representation of cat owner behaviors.

Surprisingly, it seems that even cats who come home injured are not kept inside by their owners (except for the time it takes for the cat to recover – sometimes). 16 of our 48 non cat owners (33%) said that their cats had come home injured from either cat fights or car accidents, both of which are more likely to happen at night – but only two of those 16 cat owners kept their cats indoors at night. This could be a failure to connect being out at night with an increased chance of injury, or it is possible that owners believe that the cat's freedom to roam at night outweighs the injuries it may suffer.

Interesting Survey Responses

This section is intended to highlight the particularly noteworthy and interesting responses we had in our in-person survey. These participants not only answered our survey questions but also painted us a vivid picture of their experience owning cats in Wellington. Some of our survey participants shared extremely strong feelings about local government involvement in cat management. For example, one mentioned that he would never tell the WCC about a stray cat for fear that they would "destroy" it. This particular participant also shared that government rates should not go towards cat management since cats are extremely capable predators of pest animals. This was a common worry for many of our survey

participants, as they feared a reduction in the cat population would cause an explosion in pests throughout New Zealand.

Other participants had strong opinions about the bylaw and microchipping cats; one called it “evil” and considered it unnecessary since most cats are found by neighbors or after distributing posters. Another said something to the effect of, “if you wouldn’t microchip a human then why would you microchip a cat? It’s still a living creature.” This was a frequent response for many people who had negative perceptions of the bylaw, as many people worried that the next step from microchipping cats would be microchipping humans. However, this participant in particular was quite upfront about their opinions on the ethics of microchipping any living creature.

One noteworthy participant did not have a strong opinion on the bylaw and was not particularly educated on the issue, but informed us that her son was very into ecology and had entirely dictated how her cat should be taken care of, including putting a Birdsbesafe collar on it and keeping it indoors. Even though she did not understand the reasoning for the actions or how they helped native wildlife, she insisted that her son had done all the research and so she knew it must be helping somehow.

Focus Group Discussion

During our focus group, it was frequently difficult to determine whether attendees were expressing their genuine opinions or simply conjecturing. Regardless, it was informative to hear the perceptions and ideas of cat owners who seemed informed and very open to new ideas.

At the end of the focus group, we verified the key points of our notes with the attendees. Attendees all strongly agreed that the biggest barriers to the uptake of responsible cat ownership behaviors were the lack of information and the inaccessibility of information on the issue. To solve this problem, they suggested **multifaceted media campaigns that communicated information in small, digestible bits that could be easily verified from studies and shared with others.** They also clarified that **only data and studies done in New Zealand could convince them to change their behavior.** They also suggested that the SPCA and vets advocate and inform certain behaviors. Attendees unanimously found it **difficult to gauge the impact of domesticated cats on native birds relative to other threats**, and lacking **rigorous data that showed them the problem and how to mitigate it,** they were skeptical about the necessity of their actions.

4.2 Objective 2: Analyze Awareness and Perceptions of Snip'n'Chip

Because our in-person surveys reached only a small group of people who had even heard of Snip'n'Chip, further testing was needed to gather data on the Snip'n'Chip campaign. We sent Snip'n'Chip users a separate online survey through the SPCA. Out of the 807 Snip'n'Chip users that were emailed, we received 153 responses, or 20% of our possible respondents.

4.2.1 Results of Objective 2

The purpose of Objective 2 is to analyze Wellington residents' response, including the awareness and perceptions, to the Snip'n'Chip campaign to evaluate its effectiveness.

Awareness of Snip'n'Chip

The awareness of the Snip'n'Chip campaign was evaluated using our public, in person surveys. Both cat owners and non cat owners were asked if they were aware of the Snip'n'Chip campaign's existence, and if they were, they were asked how they had first heard of Snip'n'Chip.

From our public surveys, we found that 29% (42 out of 145) participants surveyed were aware of the Snip'n'Chip campaign's existence. Partitioning by cat owner and non cat owners, we found that 30% (14 out of 46) of cat owners were aware of Snip'n'Chip and 28% (28 out of 99) non cat owners were aware. While 70% of cat owners were unaware of the campaign, 15% (n=32) of those who were unaware could have potentially benefitted from the campaign (i.e., had cats that were either not microchipped or not neutered). The other 85% (n=32) of those who were unaware of the campaign had already microchipped and neutered their cats without the help of the program.

Survey participants who were aware of the campaign had most commonly heard of the campaign through the newspaper, as shown in Figure 23. As shown in Figure 24 below, cat owners specifically had most commonly heard of the campaign from the newspaper, radio, or social media.

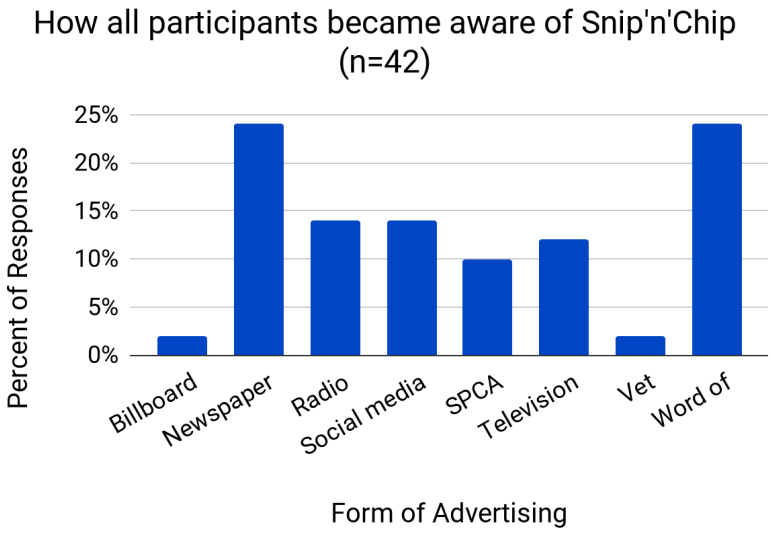

Figure 23: How cat owners and non cat owners heard of Snip'n'Chip

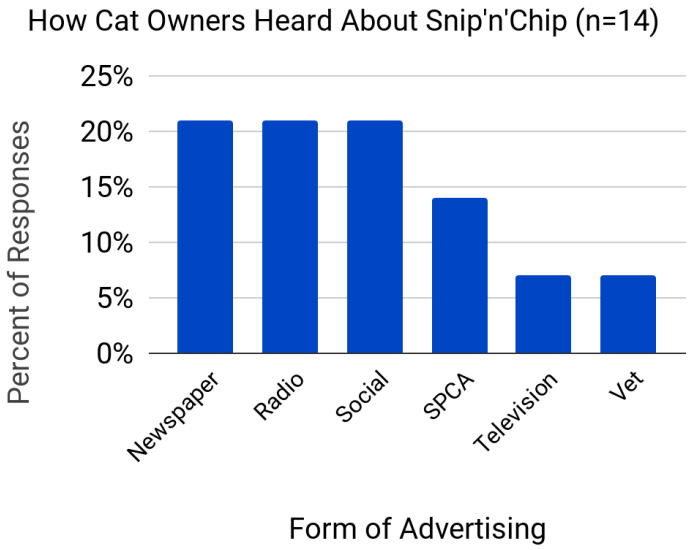

Figure 24: How cat owners heard about Snip'n'Chip

People who participated in the Snip'n'Chip campaign and completed our online survey most commonly heard of the campaign through social media. The effectiveness of the various forms of communication through which people may have heard of Snip'n'Chip campaign are shown in Figure 25. To look specifically at the most effective advertising methods for Snip'n'Chip, we discounted "indirect" mediums from our list of advertising methods, such as "friend or relative" or "word of mouth." This revealed that the leading direct advertising method

was social media, followed by the newspaper and the internet with 57 people, 40 people, and 38 people mentioning each, respectively.

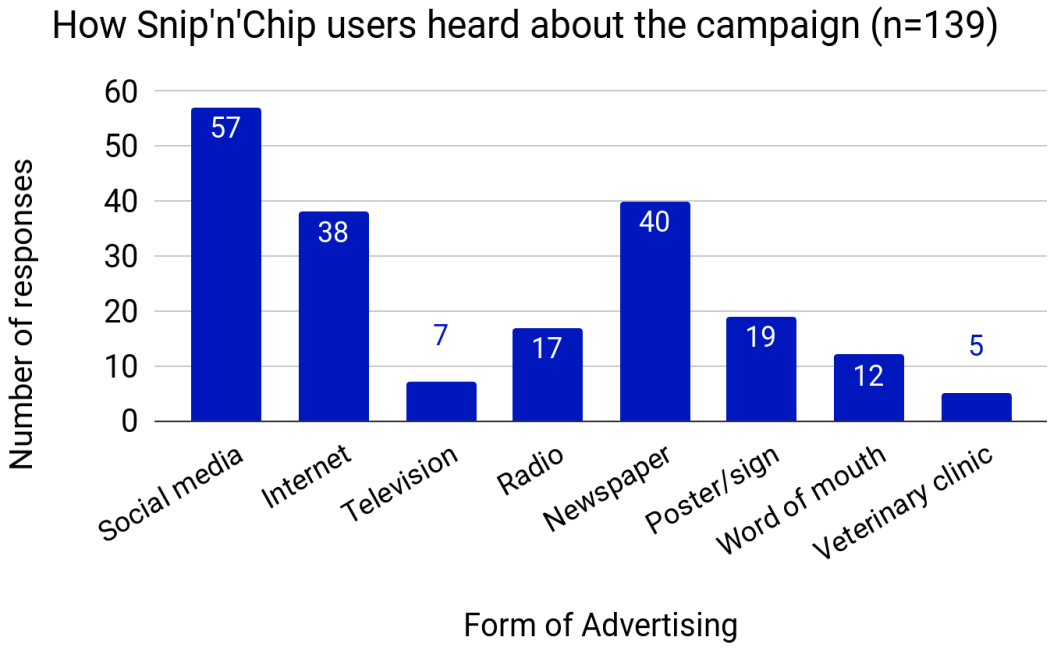

Figure 25: How Snip'n'Chip users heard about Snip'n'Chip

The above analysis was analyzed by income and by age to ensure that the groups that could make most use of Snip'n'Chip were the ones hearing about it. Social media was most effective for those aged 18–25, 26–35, and 36–45, and for all income levels except $100,000–$150,000. The internet – however respondents interpreted it apart from social media (since "internet" and "social media" were given as multiple choices) – was most effective for those aged 46–55. The newspaper was most effective for those aged 56–65, 66–75, and equally as effective as social media for those aged 75+; it was also most effective for those who make $100,000–$150,000. This analysis was useful for us in identifying which age groups and income levels may be targeted best by what advertising medium.

Changes in Cat Owner Behavior from Snip'n'Chip

The email survey also sought to establish whether or not those who participated in Snip'n'Chip were adopting the SPCA's four recommended responsible pet ownership behaviors. To reiterate, the four recommendations are (1) keeping one's cat indoors at night and during prime hunting times, (2) collaring one's cat with a bell and/or bright colors specifically designed to alert birds, (3) feeding one's cat before it is allowed outside of the house to disincentivize hunting, and (4) providing many toys for one's cat to keep it busy and

entertained to disincentivize hunting. From the 151 total responses, 145 respondents gave complete responses which included their cat owner behavior prior and after Snip'n'Chip. Out of these 145 respondents, 3% (4 out of 145) adopted keeping their cat indoors at night, 1% (2 out of 145) adopted collaring their cat with a bell and/or bright colors, 1% (2 out of 145) adopted specifically feeding their cat before it left the house, and 1% (1 out of 145) adopted providing additional toys for their cat. Different cat owners made each of these behavior changes, so 6% (9 out of 145) of respondents appear to have changed their behavior after Snip'n'Chip and may have been influenced by the messages of the Snip'n'Chip campaign. Four respondents reported no longer collaring their cat after the Snip'n'Chip campaign, which we interpreted to mean the cat's collar was only (or at least predominantly) intended for identification purposes – so once their cat was microchipped, they deemed the collar no longer necessary. These results are summarized in Table 10 below.

Table 10: Behaviors adopted by Snip'n'Chip users after Snip'n'Chip.

	Adopted keeping cat indoors at night	Adopted collaring with bell and/or bright colors	Adopted feeding cat before it leaves the house	Adopted providing more toys to cats
Total respondents	145			
People who adopted behavior	4	2	2	1
Percentage	3%	1%	1%	1%
Total people who changed behavior	9			
Total percentage	6%			

Our email survey also asked cat owners which of the SPCA's four responsible pet ownership recommendations they had been doing prior to Snip'n'Chip. Out of the same 145 respondents, 46% (67 out of 145) already kept their cat indoors at night, 29% (42 out of 145) already collared their cat with the intention of alerting birds, 83% (120 out of 145) already fed their cat specifically before it left the house, and 66% (96 out of 145) already provided toys for their cat(s). Only 4% (6 out of 145) of the respondents had not done any prior to Snip'n'Chip (see Table 11 below). Figure 26 below shows which of these behaviors Snip'n'Chip users were already doing.

Table 11: Behaviors Snip'n'Chip users took part in before Snip'n'Chip.

	Already kept cat indoors at night	Already had belled and/or brightly colored collar for cat	Already made sure cat was fed before it left the house	Already provided more toys for cat	People who did not already do any
Total respondents	145				
Number of owners doing behaviors	67	42	120	96	6
Percentage of owners already doing behaviors	46%	29%	83%	66%	4%

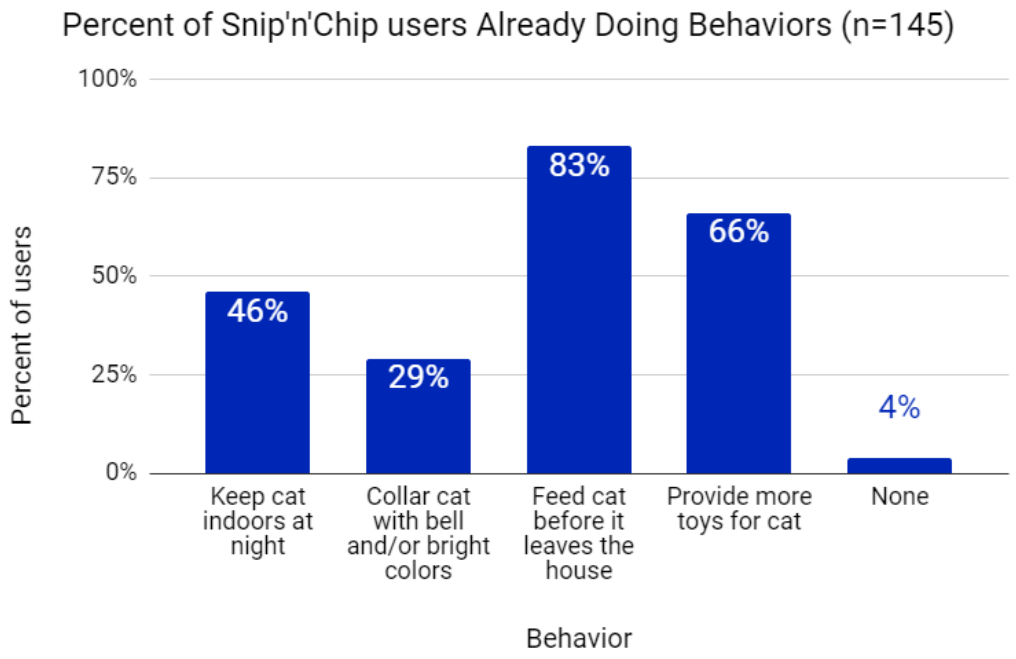

Figure 26: Percent of Snip'n'Chip users already doing each responsible behavior

Perceptions of Snip'n'Chip

Based on the results of our email surveys, 14% (20 out of 147) of Snip'n'Chip participants had microchipped their cats prior to participating in the campaign, implying 86% of Snip'n'Chip users got their cats microchipped during the campaign, since both services – "Vet Chippin'" and "Snip + Chip" – included microchipping. When asked if they would have

microchipped and/or neutered their cat(s) without the Snip'n'Chip campaign, 75 of the 145 respondents answered "Yes, but I liked the discount," 45 answered "Yes, to comply with the bylaw," and 38 answered "No, I could not have easily afforded it." Answers were not mutually exclusive. Shown below in Figure 27 is the total number of responses for each reason, both for and against microchipping and/or neutered, without Snip'n'Chip. From these responses, we found that 26% (38 out of 145) of respondents reported that they could not have afforded (or at least not easily afforded) to microchip and neuter their cats without the discount from Snip'n'Chip.

26% of Snip'n'Chip users (n=147) could not have afforded to microchip without Snip'n'Chip.

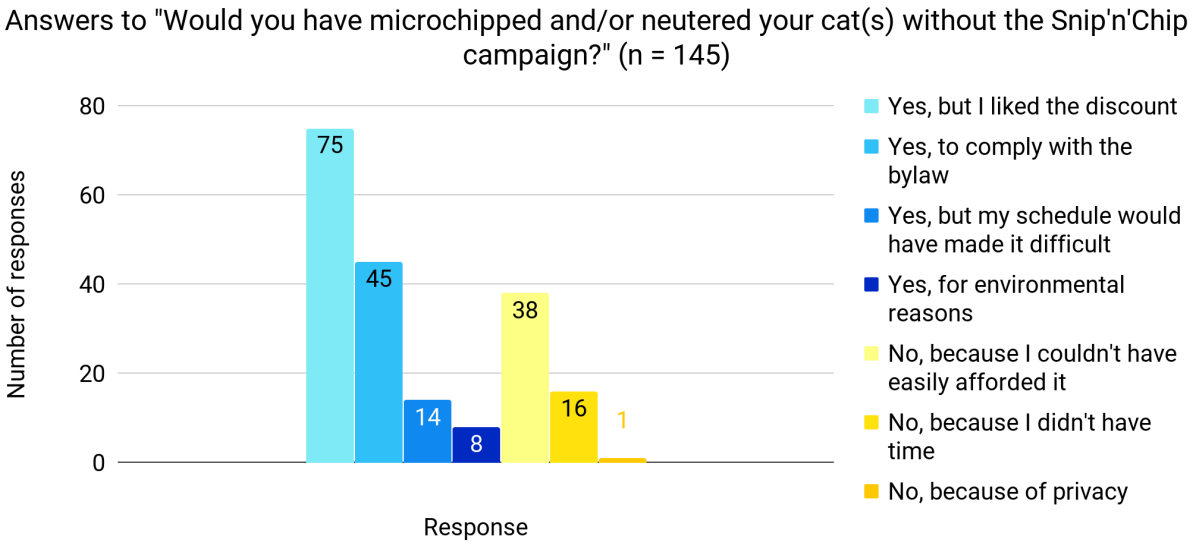

Figure 27: Snip'n'Chip users' responses to whether or not they would have microchipped and/or neutered their cats without the Snip'n'Chip campaign.

Out of the 153 total responses, 139 respondents reported their income including "I prefer not to answer." From these 139 responses, we removed the 36 respondents who answered "I prefer not to answer" to determine the income breakdown of those who used the Snip'n'Chip campaign. We found that 28% have annual household incomes of $50,000 or less, 22% have annual incomes of $50,000–$70,000, 17% have annual incomes of $70,000–$100,000, 17% have annual incomes of $100,000–$150,000, and 14% have annual incomes of $150,0001 or more. In Figure 28 below, it is evident that the percentage of respondents who utilized Snip'n'Chip decreases as income increases. However, the distribution of incomes represented by people who used Snip'n'Chip does not match the distribution of incomes of

Wellington residents (see Figure 29) – it appears that the number of users who earn $50,000 or less was disproportionately small and that the number of users who earn $150,001 or more was disproportionately large.

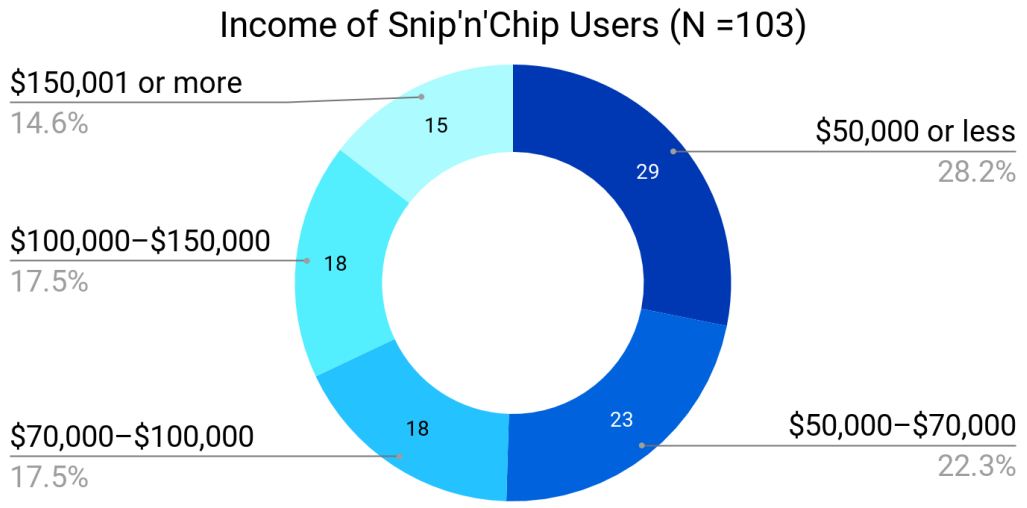

Figure 28: Income distribution of Snip'n'Chip users

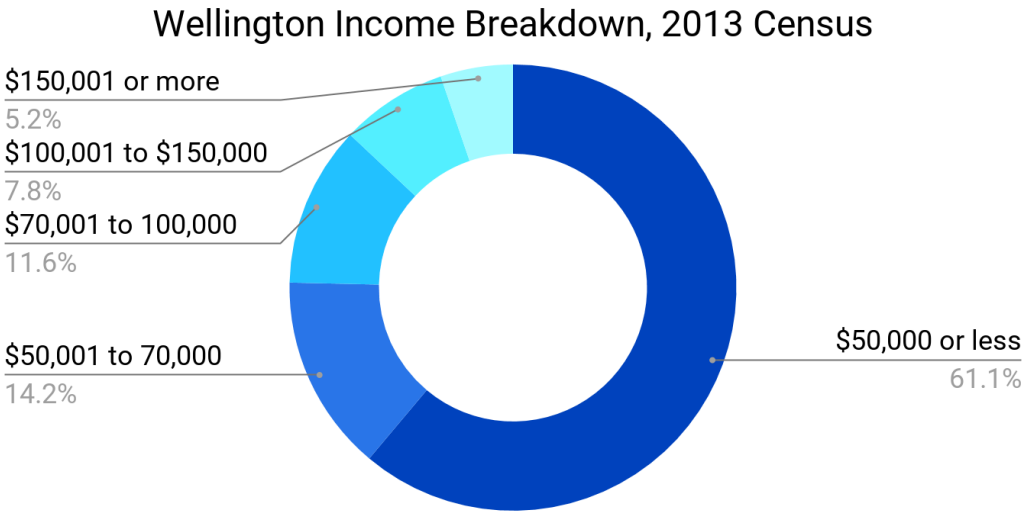

Figure 29: Income distribution of Wellington population, 2013 census

Of 140 respondents who answered the question, "How likely would you be to recommend Snip'n'Chip to a friend?" only 3 (2%) replied "not at all," and only 6 (4%) replied "somewhat likely." The other responses were 19 (14%) who said "very likely" and an overwhelming majority of 112 (80%) who said "extremely likely," These results are presented in Figure 30 below.

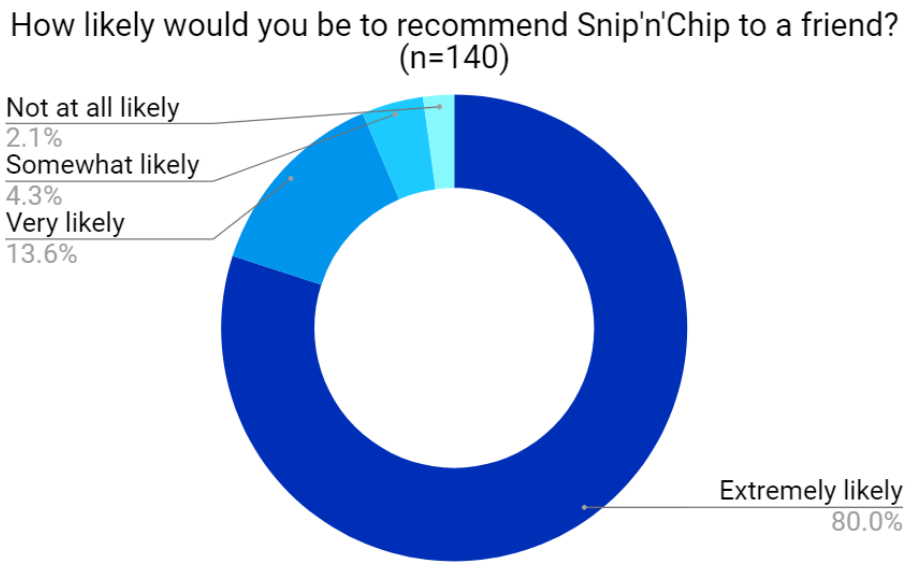

Figure 30: How likely Snip'n'Chip participants were to recommend the campaign to a friend

In our online survey, we asked Snip'n'Chip users to comment on the program and suggest aspects that could be improved, and their responses provided valuable insight. According to campaign users, one potential improvement is providing greater flexibility with appointments. For example, some people had difficulty planning an appointment during 9-5 work hours, and they would have preferred to schedule the appointment after hours. Others noted that having a means of easier transportation for people with limited access would be beneficial.

A main area of improvement that Snip'n'Chip users mentioned was clearer communication before voucher purchase. Some users were not aware ahead of time that the campaign was only taking place in Wellington or that their local vet clinics were not participating. This meant that they either (1) could not use the purchased vouchers at all or (2) had to make special arrangements and travel to use them (note that in this case, Wellington ratepayers were paying for people who did not live in Wellington). One user stated, "*I live in Hutt and none of them did it. Was lucky they would let me drive to the city to be involved.*" A related issue was clarity of eligibility requirements when purchasing vouchers: kittens needed to be a certain age and weight to be neutered, which was not communicated when buying vouchers and additional fees and vet checkups may have been needed depending on the vet clinic.

Furthermore, several participants recommended better and more widespread advertising of the Snip'n'Chip campaign, claiming that advertisement was sparse in certain

locations so it was difficult to get more information about the program. Another suggestion involved advertising additional deals through the Snip'n'Chip program in addition to microchipping and neutering. For example, these deals could include discounted bells and collars. Others suggest advertising other benefits of microchipping; for example, "*You might like to mention in your advertising that once your cat has a microchip, you can use a microchip cat flap, which lets in only your cat (i.e., keeps all other cats out).*" Finally, many Snip'n'Chip users suggested extending the offer period beyond just three months, citing concerns that the discount could push owners to neuter kittens when they were too young.

4.2.2 Discussion of Objective 2's Results

Awareness of Snip'n'Chip

Our finding that 29% of cat owners were aware of Snip'n'Chip's existence was somewhat discouraging – especially since all cat owner participants had one or more cats during the timeframe Snip'n'Chip was advertised and active. We hypothesize that awareness is so low because people are generally less likely to remember something that does not apply to them or would not benefit them. Since all of the public survey participants had already had their cats neutered and the majority had their cats microchipped as well, there would be no reason for them to internalize Snip'n'Chip advertising they may have been exposed to. Another consideration is the fact that our surveys were performed more than a year after the end of the campaign, and that people may have simply forgotten in that time.

When looking at our public survey responses specifically, newspaper played the largest role in advertising the campaign for non cat owners, while overall social media was the most common way people heard about the campaign. When looking at our survey responses for just Snip'n'Chip users, social media was the most effective medium through which cat owners heard about the campaign. Given that social media was a consistent response for both groups, it suggests that this may have been an effective outreach strategy for the SPCA. However, given that only 27% of people (both cat and non cat owners) from our public survey were aware of the campaign, it suggests that either (1) the social media advertisement itself was not effective enough or (2) social media was effective for targeting a subset of people but advertising as a whole did not reach a wider audience.

Perceptions of Snip'n'Chip

We found that 26% of people who used Snip'n'Chip and responded to our survey (n=147) could not have afforded to microchip and/or neuter their cats without the campaign. This is good to know – one of the campaign's purposes was to help low-income households to comply with the bylaw. However, the income distribution of our respondents does not nearly match the income distribution of Wellington residents according to the 2013 census. In general, we received many fewer responses from low-income residents than the census would predict – indicating either (1) that the campaign did not reach this demographic as effectively as it reached others, (2) that there was response bias in our survey, and we did not capture an accurate cross-section of the people who used Snip'n'Chip.

Regardless of their income, we found that Snip'n'Chip users provided overwhelmingly positive feedback, with 80% saying it was "extremely likely" that they would recommend the campaign to a friend and 14% saying "very likely." We take this to mean that there is extremely strong support for the campaign among its users, and that there would likely be support for a future campaign.

Errors of Analysis Method

In our Snip'n'Chip user email survey, Question 5, which asked about pet owner behavior prior to and after the Snip'n'Chip campaign, had an answer that said "Make sure cat(s) is fed before leaving the house." While this question was intended to mean that the owner intentionally feeds the cat(s) before the cat(s) leave the house, we realize it may have been interpreted by some respondents to mean that they, as cat owners, feed their cat(s) before they, the cat owners, leave the house. However, specific feeding times for cats is by far the easiest of the four recommendations to integrate into one's life and may be the easiest to come up with individually. Because of this, we are uncertain whether it is just an easy way cat owners can try to suppress their cat(s)'s hunting instincts or if respondents interpreted our poorly worded question in different ways.

Also in our Snip'n'Chip user email survey, Question 6 asked which, if any, of the SPCA's four recommended responsible pet ownership behaviors did the respondent start doing *after* participating in Snip'n'Chip. This is another question that a respondent could interpret two different ways. On one hand, the respondent could answer with behaviors they only *started* doing after Snip'n'Chip – as we expected them to. On the other hand, they could answer with behaviors that they had performed before, during, and after Snip'n'Chip. This

inconsistency could cause problems with our data, as we cannot assume that a behavior that started after Snip'n'Chip would be continued in all cases. For example, some people may think that a microchip may reduce the need for a cat to wear a collar.

After analyzing the data and inspecting each response on a person-by-person basis, we did not see any evidence of respondents misinterpreting our question. In all cases, one of two things occurred: either they filled out which of the behaviors they did before Snip'n'Chip and which they did after Snip'n'Chip or they filled out which behaviors they did before Snip'n'Chip and indicated "none of the above" for what they adopted after the Snip'n'Chip campaign. In both cases, it is absolutely evident what the respondent wanted to convey about their cat owner behavior.

4.3 Objective 3: Analyze Trends in Cat Microchipping and Neutering Rates

4.3.1 Results of Objective 3

As a gauge of the Snip'n'Chip program's effectiveness, we analyzed the change in cat microchipping trends in Wellington. The NZCAR was able to provide us with monthly rates of cat microchips registered (a good gauge of cats microchipped) from 2010 to 2017. This data can be seen in Figure 31. We first separated the cyclic data by month and calculated regression lines through each month's data, as shown for January in Figure 32. The final step was measuring residuals to find data points that deviated from the trend.

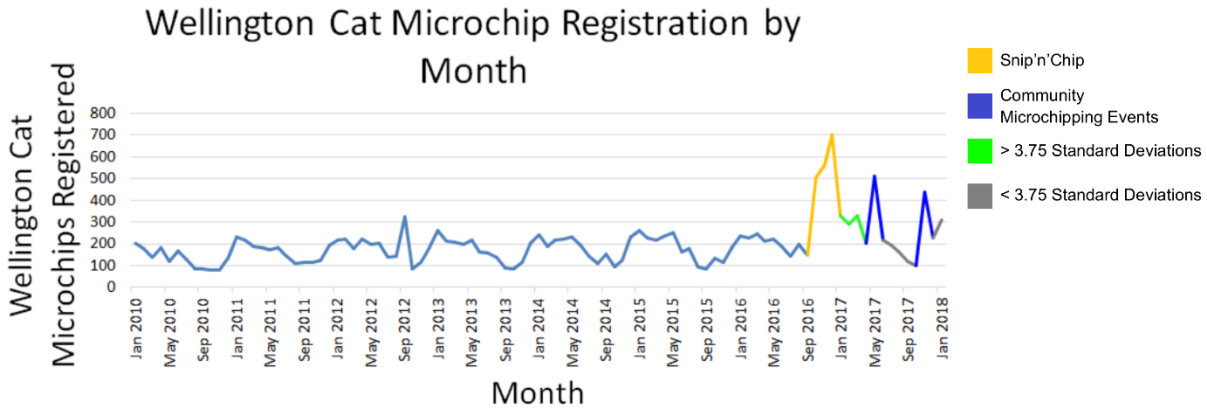

Figure 31: NZCAR Raw Data. Note the highly cyclic trend that prompted us to separate our data by month.

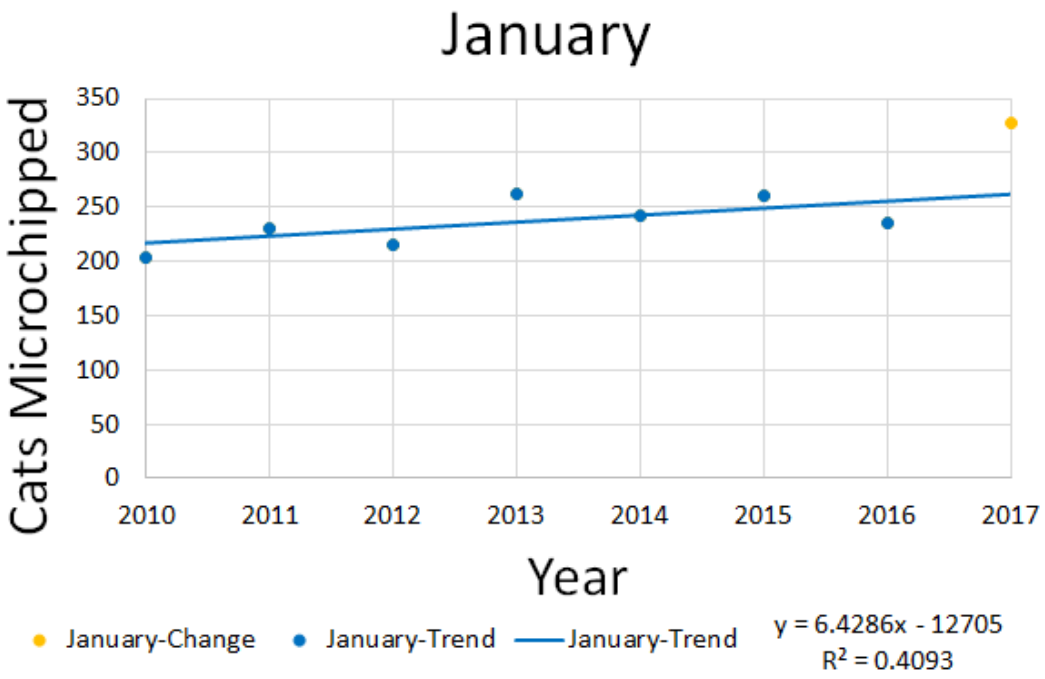

Figure 32: Calculating a regression line through the data points prior to the point of interest

The result is the number of standard deviations by which the point of interest differs from the established trend.

The results from this analysis are collected in Table 12, Table 13, and Table 14, and are visually presented in Figure 33 below:

Table 12: The standard deviation of residuals and the number of standard deviations from the trendline for August to December 2016

	August 2016	September 2016	October 2016	November 2016	December 2016
Residual of Data Points of Interest	78	30.686	388	427.733	475.533
Standard Deviation of Residuals of Data Points Prior to Events of Interest	20.545	24.765	16.189	12.226	22.527
(Z-score) Residual of the Data Point of Interest Expressed as a Multiple of the Above Standard Deviation	3.797	1.239	23.966	34.986	21.110

Table 13: The standard deviation of residuals and the number of standard deviations from the trendline for selected January through July 2017

	January 2017	February 2017	March 2017	April 2017	May 2017	June 2017	July 2017
Residual of Data Points of Interest	66.571	59.143	72.571	-34.143	235.429	36.286	29.000
Standard Deviation of Residuals of Data Points Prior to Events of Interest	15.447	15.405	10.688	13.252	19.547	14.171	11.023
(Z-score) Residual of the Data Point of Interest Expressed as a Multiple of the Above Standard Deviation	4.309	3.839	6.790	-2.576	12.044	2.561	2.631

Table 14: The standard deviation of residuals and the number of standard deviations from the trendline for August through December 2017.

	August 2017	September 2017	October 2017	November 2017	December 2017
Residual of Data Points of Interest	42.714	-2.465	-22.714	303.562	-7.552
Standard Deviation of Residuals of Data Points Prior to Events of Interest	20.545	24.765	16.189	12.226	22.527
(Z-score) Residual of the Data Point of Interest Expressed as a Multiple of the Above Standard Deviation	2.079	-0.100	-1.403	24.830	-0.335

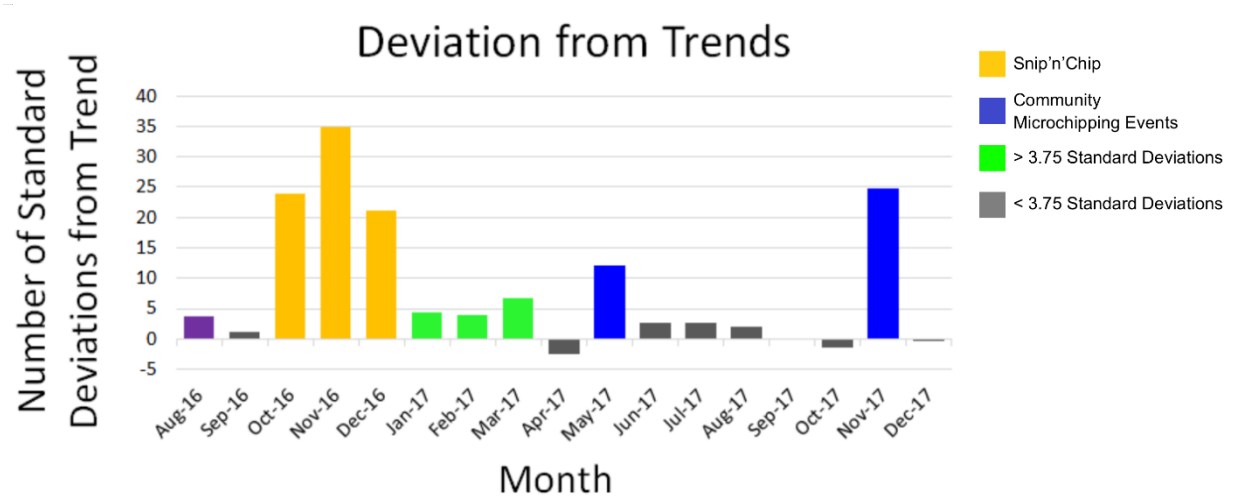

Figure 33: Distance from each point of interest to its associated trend, measured in standard deviations

As shown in Table 12 and Figure 33, the months affected by Snip'n'Chip (highlighted in yellow) show an extremely large increase in microchipping. The next two largest spikes (highlighted in blue) occur in May and November 2017, and these can be attributed to WCC/SPCA community microchipping events which ran every weekend in May and November 2017. The other significant increases occur in August 2016 (purple) and January, February, and March 2017 (green). A "significant increase" occurs when a given point is 3.75 or more standard deviations above the trend, and this threshold was chosen to strictly reject increases that could be accounted for by random variation in the small data set. August 2016 is the month that the WCC passed the bylaw mandating microchipping of cats, and this may explain that month's microchipping increase. January, February, and March 2017 all show significant microchipping rate increases, but we could find no obvious explanation for those increases – therefore, we believe that these are evidence of a public change in behavior possibly due to increased public awareness of microchipping (through the Animal Bylaw and Snip'n'Chip).

4.3.2 Discussion of Objective 3's Results

As mentioned previously, there has been a significant change in microchipping rates during and after Snip'n'Chip. This indicates that between the Snip'n'Chip campaign, the subsequent community microchipping events, and the bylaw, there has been a significant change in the microchipping trends. We hypothesize that the Animal Bylaw and Snip'n'Chip contributed in 2 ways: (1) by increasing pressure to microchip pet cats, and (2) by raising awareness of microchipping as a technique for responsible pet ownership.

We were cautioned by the NZCAR that the number of microchips registered per month includes some non-Wellington residents who used Wellington's Snip'n'Chip campaign. Though these non-resident users do impact the analysis of Snip'n'Chip's success without increasing the positive effects of the campaign in Wellington city specifically, these non-residents are assumed to be insignificant since Snip'n'Chip encouraged users to use their vouchers at their local veterinary clinics and the campaign was not intentionally advertised outside of Wellington. Another consideration for our analysis was that community microchipping events occurred in Wellington every August starting in 2012, making August's plot chaotic and nonlinear (see Figure 34). For consistency with other months, we did not exclude August from this analysis.

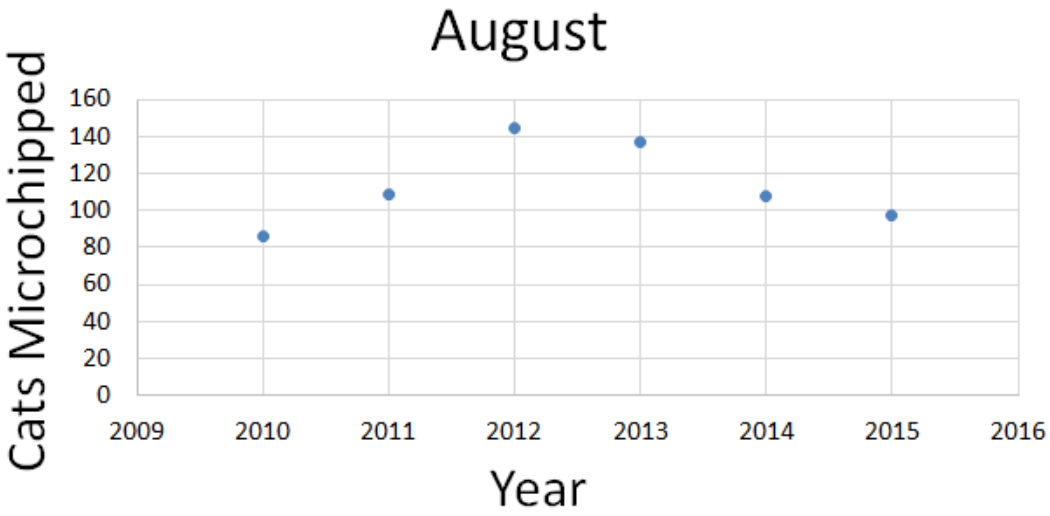

Figure 34: Nonlinear data due to community microchipping events in August

4.4 Discussion Summary

Throughout this project, we have found that the majority of cat owners and the minority of non cat owners are aware of the Animal Bylaw. Though 63% of cat owners knew what the bylaw requires, 81% of cat owners were in compliance with the Animal Bylaw. This suggests that for many cat owners, complying with the bylaw is not a primary motivation for microchipping their cat. Most people felt positively about the bylaw, and the most common reason that cat owners felt positively about the bylaw was that lost cats could be reunited with their owners. This could imply that cat owners' primary consideration in forming an opinion on the bylaw was the welfare of their cat, not their cats' potential to be a nuisance towards others or their effect on wildlife. While most (100% of those surveyed) cat owners have already neutered their cats, the benefits to the cats (like preventing unwanted litters or various cancers)

have been well publicized for years. Though neutering cats does positively impact the environment by indirectly reducing the number of stray cats, it is unlikely that cat owning participants neutered their cats for this reason, and most likely did it for cat welfare related reasons as well.

Looking at responses to the scaled question of whether participants agree domestic cats are a threat to Wellington's native wildlife, it appears that a large (61% or 90 out of 147) number of participants either agree cats are a threat to native wildlife or feel that cats are not a threat because owners can effectively mitigate their negative impacts on wildlife. This is encouraging until we see that only 53% of cat owners surveyed in our public survey actually take action (like putting belled/brightly colored collars on their cats or keeping cats indoors at night) to mitigate their cats' effects on native wildlife. From these results, it appears people are generally aware that domestic cats have a negative impact on native wildlife but either (1) expect that cat owners will responsibly control that impact or (2) simply do not care or prioritize the issue enough to do anything about it themselves.

Looking at other possible factors that may motivate cat owners to participate in responsible ownership behaviors, we found that a cat owner's agreement that cats are a threat to native wildlife has no strong correlation to the type of prey cats bring home (or at least the prey owners are aware of). This could be due to our small sample size or an inability of owners to connect their own cat's behavior to the collective threat cats pose.

The results from agreement that local government should play a role in managing cats revealed similar concepts. Though the plurality of cat owners and the majority of non cat owners both agreed that local government should play a role in managing cats, there seemed to be a strong dichotomy between people who believed cat owners are irresponsible (necessitating government involvement) and people who believed cat owners are responsible enough by themselves. Interestingly, there was not a large percentage difference between how many cat owners agreed and how many non cat owners agreed. While non cat owners were slightly more likely to agree than cat owners, it is interesting that there is not a bigger disparity considering more government involvement would likely mean more regulations for cat owners to follow. The reason for similar rates of agreement/disagreement could be attributed to the fact that many cat owners associated the Animal Bylaw with reuniting lost cats and likely had this positive association with government involvement on their mind when answering this question.

Regarding Snip'n'Chip, we found that users had an extremely positive opinion of the campaign. Almost everyone (94%) who responded to our email survey said that they were either "extremely likely" or "very likely" to recommend the campaign to a friend. From this result, users were clearly very happy with their experience despite the numerous improvements that were suggested. A large proportion (about 26%) of Snip'n'Chip users who answered our email survey could not have afforded to microchip and/or neuter their cats without the program, suggesting that the campaign was effective in supporting lower-income households. Further, around a third of all people who got their cats microchipped would not have been able to without the campaign, and about a third of those who got their cats neutered would not have been able to without the campaign, showing that Snip'n'Chip helped people who otherwise would have un-microchipped and intact cats.

People who used the campaign had extremely positive perceptions, but from our results, it appears that the majority of cat owners *could not* use the campaign because they had not heard of it – suggesting that better advertising may be required. Several responses to our free-response questions in the online survey supported this conclusion, claiming that advertising for the campaign was scarce. This implies that while Snip'n'Chip was a great program for people who used it, it fell short of its potential through ineffective advertising.

5. Recommendations and Conclusion

The research we have performed has allowed us to make recommendations for the WCC and SPCA. We aimed to produce insightful recommendations for how the WCC and SPCA can improve their outreach strategies, improve future Snip'n'Chip campaigns, and encourage responsible pet ownership amongst residents of Wellington. This section will reference the current advertising strategies of the WCC and SPCA regarding the Animal Bylaw and Snip'n'Chip campaign. It will also touch upon the Snip'n'Chip process as a whole and how coordination between the WCC and SPCA can be improved for potential, future Snip'n'Chip campaigns. This section will also reference the opinions of the general public towards responsible pet ownership, and produce realistic recommendations for how to encourage further compliance with the bylaw and encourage pet owners to follow the SPCA's guidelines for "responsible pet ownership."

5.1 Outreach Recommendations

We recommend that the WCC and SPCA expand the ways they encourage responsible pet ownership by promoting it from two main angles: a focus on cat welfare as well as a more data-oriented approach. From an outreach perspective, it appears as though the WCC and SPCA do not share enough numerical data about how wildlife is being affected by the cat population in Wellington. Many people in our surveys and focus group had "heard" that domestic cats have contributed to a decrease in the native wildlife population, but wished they had the numbers from trustworthy organizations to support this claim. Some participants could easily see how the responsible ownership behaviors the WCC and SPCA advocate could be good in theory, but failed to connect those behaviors with the care of their own cat. Thus, we recommend the WCC and SPCA work together to promote responsible pet ownership from two fronts: (1) from a data oriented approach and (2) from an emotional appeal approach. By giving cat owners the data and allowing them to draw their own conclusions, the WCC and SPCA can appeal to those who would love to help wildlife and protect their cats but do not know how to start or question why certain behaviors are encouraged. Supplementing the data oriented outreach methods with methods using emotional appeals, as our background research has shown to be effective (see section 2.5) will help cat owners connect behaviors

they likely already see the benefits of with their own cats. It will also help expand their perceptions of the behaviors from just benefiting wildlife to benefiting their cat too.

We recommend the WCC and SPCA advertise using the above techniques with a series of posts on social media and with posters in veterinary clinics. Social media was found to be the most effective advertising method for cat owners for the Snip'n'Chip campaign and would therefore most likely work well for advertising responsible pet ownership as well. Additionally, because of the sheer amount of cat-themed social media accounts, information posted about cats by the SPCA or WCC on social media would have the capacity to spread much further through sharing than if they tried to spread the information themselves using methods such as fliers or newsletters. Through the Snip'n'Chip campaign, the SPCA has built a strong relationship with local veterinary clinics in Wellington. This relationship may allow the WCC or SPCA to hang up posters in vet clinics where people are already thinking about their cat's care and are already in a situation where they are able to get their cats microchipped if they so wish.

As found in our focus group, cat owners expressed that because New Zealand is a unique place with unique species, they would only trust data and studies that had come from New Zealand. This finding was verified by Mya J. Gaby from the Victoria University of Wellington.[53] This concept, along with a desire for data oriented outreach, has led us to create the example Instagram post shown in Figure 35 below. This example Instagram post could be posted to the Wellington SPCA's Instagram or any other form of social media and incorporates persuasive yet factual data from a credible, New Zealand based source from a study that was done in New Zealand.[54]

[53] Gaby, Mya J. "A Report on Free-Roaming Domestic Cat Activities in Urban Areas: What do owned free-ranging domestic cats get up to?" Wellington City Council. Accessed February 28, 2018. https://wellington.govt.nz/~/media/about-wellington/research-and-evaluation/natural-environment/2014-what-do-owned-free-ranging-domestic-cats-get-up-to.pdf.

[54] "Cat Fact Sheet." Royal Forest and Bird Protection Society of New Zealand. Accessed February 28, 2018. http://www.forestandbird.org.nz/files/file/CatFactsheet.pdf.

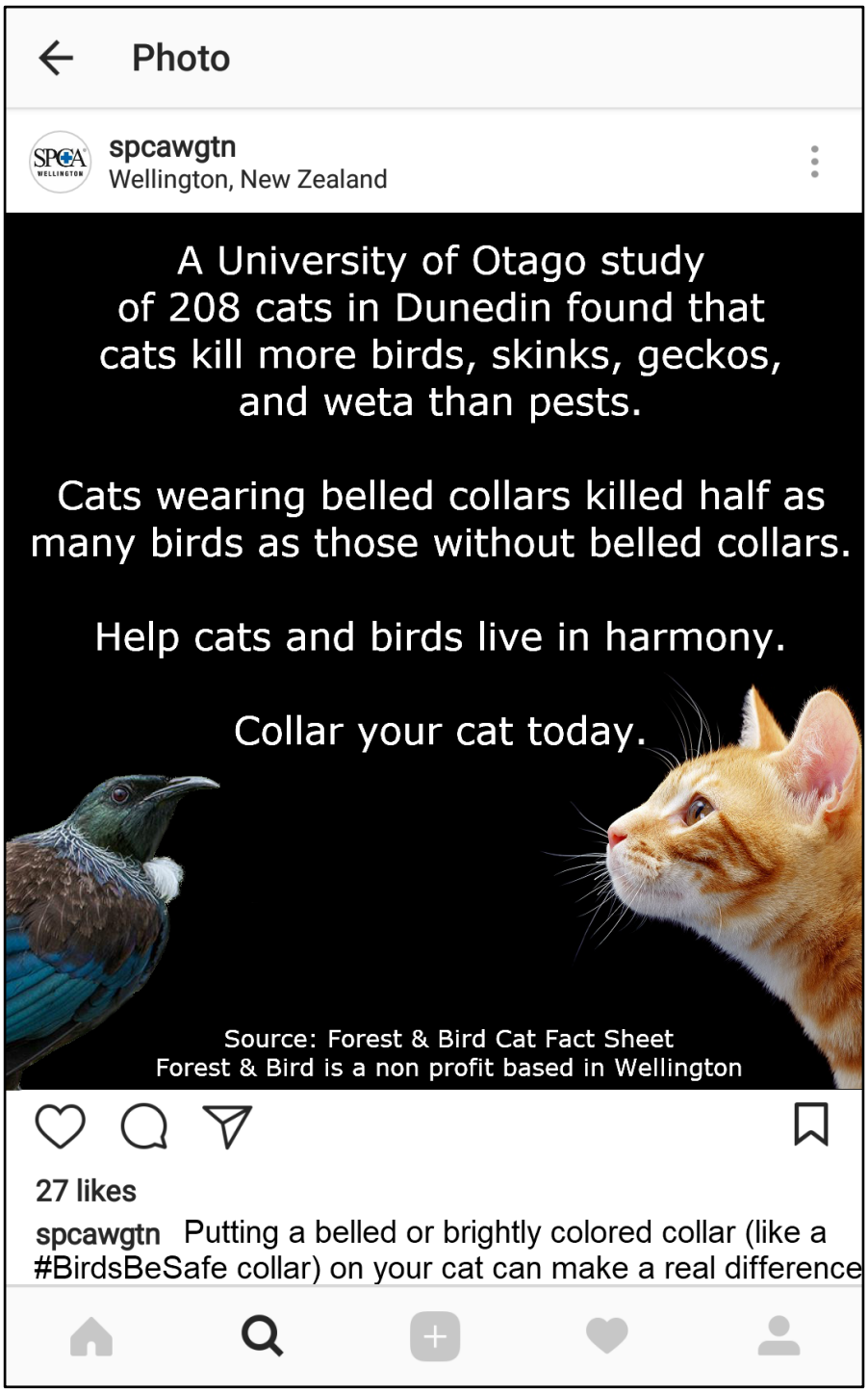

Figure 35: An example social media post using a data oriented approach and New Zealand based data encouraging cat owners to put belled collars on their cats.

To make emotional appeals and encourage cat owners to connect responsible ownership behaviors with their own cats, we recommend testimonials be used to help cat owners realize how these responsible behaviors can positively impact their own cats. In the

example shown in Figure 36 below, there is a testimonial from a child about being reunited with their lost cat because he was microchipped, eliciting an emotional response, associating a feeling of happiness with microchipping, and hopefully making the risk of losing a cat and the benefits of microchipping more relatable to their own cats.

Figure 36: An example poster with a testimonial and emotional appeal to encourage microchipping

To encourage greater compliance with the bylaw, we also recommend promoting more benefits of microchipping, such as the usage of microchip doors. In our in-person survey we encountered quite a few people who were frustrated by roaming cats who entered into their household. Some Snip'n'Chip users even explained that their motivation for microchipping stemmed from the need for a microchip cat door in order to prevent other cats from coming onto their property.

5.2 Snip’n’Chip Recommendations

There are a variety of areas we believe the WCC and SPCA can improve upon in regards to the Snip’n’Chip campaign. First and foremost, from a logistical perspective, **the process of signing up to purchase a voucher should be changed to make eligibility requirements clearer before voucher purchase occurs.** This means that when cat owners want to purchase a voucher, they should be immediately alerted that they must live in Wellington to participate, and if they are purchasing a “Snip + Chip” voucher, that their cat must be at least 8 weeks of age and 1 kg to be neutered. This would prevent cat owners from buying the voucher without being able to actually use it. This will also prevent people from trying to take advantage of the discounts if their cat is underage or underweight. On the “purchase voucher” screen, it should also be communicated clearly that in addition to the voucher cost, Snip’n’Chip users may be subject to additional fees or additional vet visits if the vet who performs the procedure deems it necessary (see Figure 37 below).

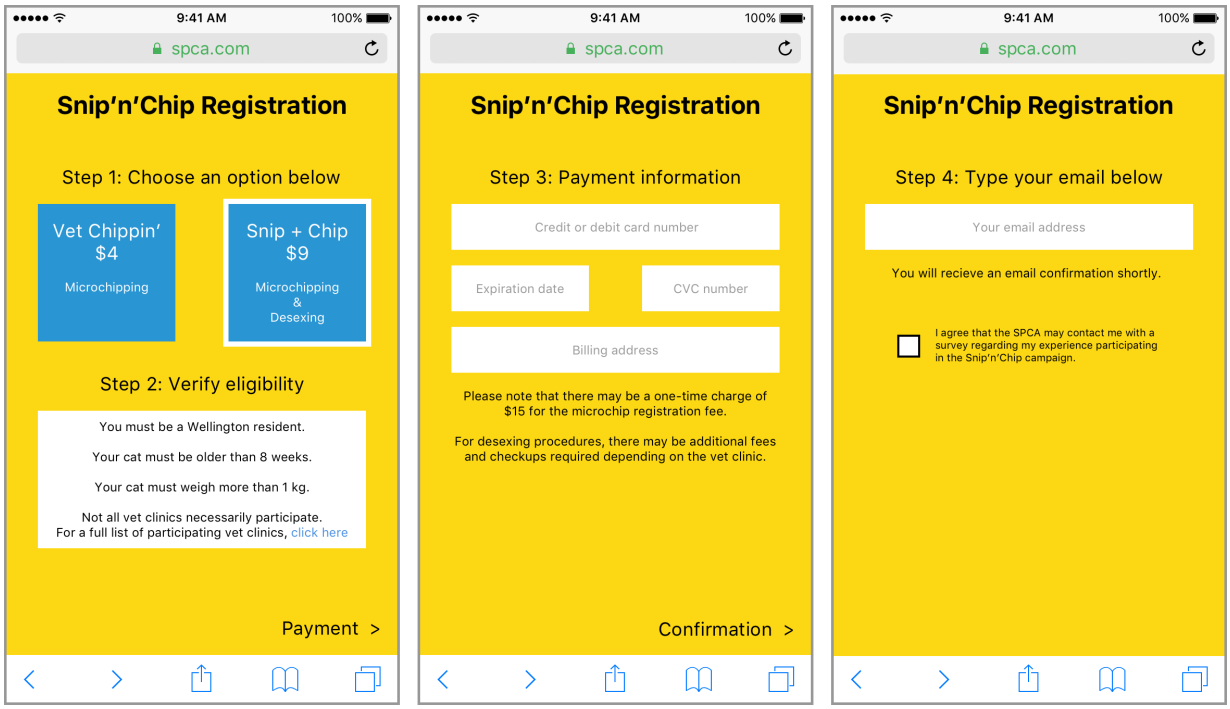

Figure 37: Snip’n’Chip voucher purchase with recommended improvements

Further, we recommend that **if the Snip’n’Chip campaign is run again, that it extend its hours beyond the typical 9–5 workday.** This is for convenience purposes such that people who are busy during the day can also make use of the campaign. Since the campaign’s

purpose is to help people microchip and neuter their cats who otherwise would not be able to, it is important that people who usually could not make it to a vet clinic can still participate in the campaign. One additional idea we have to enhance the Snip'n'Chip experience is to hand out cheap Birdsbesafe or Kiwi Cat Collars to those who participate or to those who make an additional donation. By doing this, the SPCA and WCC can encourage methods of responsible pet ownership in ways other than just microchipping and neutering.

Gathering data about the Snip'n'Chip campaign was somewhat difficult for the WCC and SPCA. Therefore, **we recommend that organizations involved in the campaign predefine their expectations for each other**. If this campaign is to run again, and an organization would like to be able to evaluate its effects, the organizations involved should explicitly agree upon the data that will be collected, saved, and passed on for evaluation beforehand. It would also be useful to double check that privacy agreements with other organizations will not stand in the way of obtaining this data. We also believe it would be beneficial for the WCC and SPCA to gather feedback from participants about future programs shortly afterwards. Feedback received in this timely manner would likely be more thorough and accurate since the experience would be fresh in the users' minds. The SPCA and WCC invested a tremendous amount of time and money into the Snip'n'Chip campaign, so the expectations for being able to receive data about the success of these campaigns should be communicated much more clearly.

5.3 Further Research

The SPCA estimates that it takes approximately 10 years to see the effects of campaigns like Snip'n'Chip on cat populations. Because the Snip'n'Chip campaign had only concluded thirteen months before this project, there was no way to analyze the impact of Snip'n'Chip and the Animal Bylaw on cat populations, so we have outlined the method we would have liked to employ to evaluate the effects of Snip'n'Chip and the bylaw on cats in shelters. To do this, we focused on the effects of the increased rate of microchipping due – at least in part – to the bylaw and Snip'n'Chip. We hypothesized that if the bylaw and Snip'n'Chip were truly effective, the percent of lost cats reunited with their owners should increase over time as microchipping becomes more widespread. We recommend that the SPCA or WCC perform this analysis in approximately 10 years when microchipping has hopefully become

even more popular and when the effects of Snip'n'Chip on cat populations may be statistically significant.

To support our objectives of analyzing the impact of Snip'n'Chip and the Animal Bylaw, the Wellington SPCA granted us access to their Shelter Buddy database, which contains details on animals brought into SPCA shelters. We attempted to use this data to determine whether there has been a change in the rate of wandering cats returned to their owners.

We performed this analysis ourselves to make sure it was feasible and to see if we were able to draw any conclusions from it, despite the short timeframe. To do this, we used the SPCA's ShelterBuddy database and we selected the report "Total Length of Stay" since it provides the incoming date, incoming status, outgoing date, and outgoing status of each animal. For the report's parameters, we selected the date range January 1, 2010 to February 13, 2018; limited the region of interest to Wellington (and selected only the shelter in Newtown); and ensured the report only included cats and kittens.

We defined a "returnable cat" as a cat or kitten whose incoming status was "Ambulance" or "Stray", as these are the only major statuses that can have owners. Other incoming statuses could indicate, for example, that a cat was born in the shelter or surrendered by its owner – in cases like these, the cat definitely has no owner, and it makes no sense to count these against the number of cats that were successfully returned. We considered a returnable cat "returned" if its outgoing status was "reclaimed."

For the analysis, we calculated the number of returnable cats and returned returnable cats each month from January 2010 through December 2017. Because the data appeared cyclic, we considered that its trends may be seasonal and separated it by months as shown in Figure 38, quarters in Figure 39, and entire years in Figure 40, as we did for the microchipping analysis.

The first analysis about percentage of cats reunited with their owners yielded little to no useful results. Regression lines fitted to monthly data had r^2 values between 0.0012 and 0.40, and breaking up by quarters yielded r^2 values between 0 and 0.1.

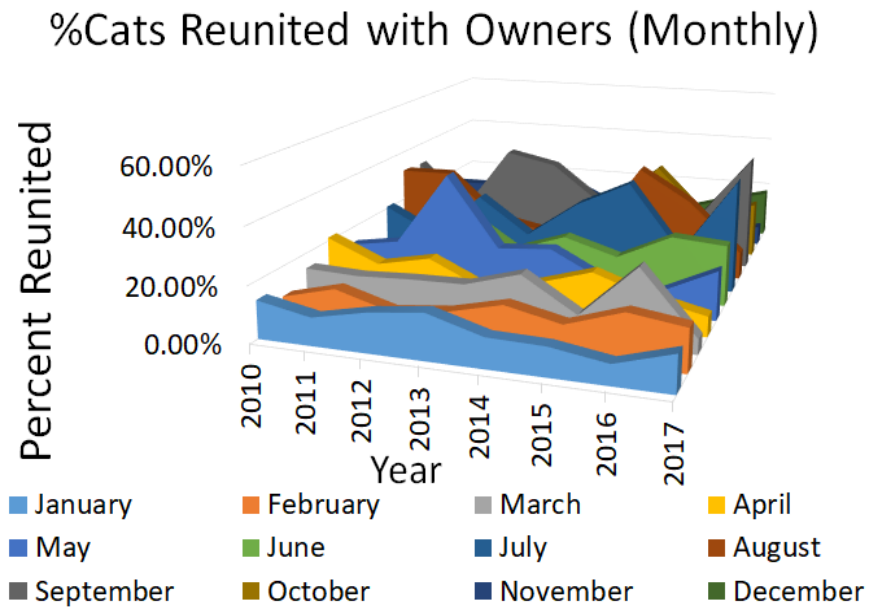

Figure 38: Percent lost cats returned to their owners by month from January 2010 to December 2017.

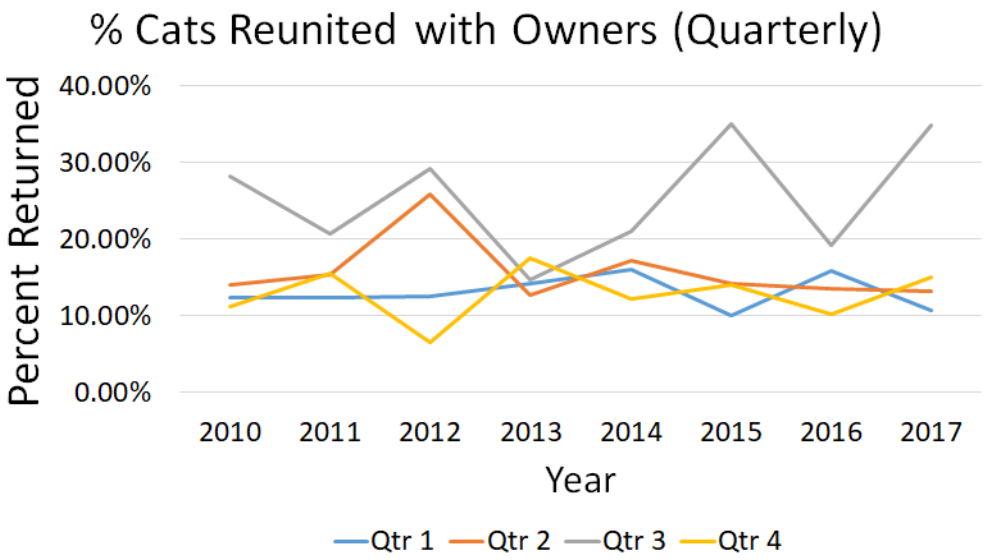

Figure 39: Percent lost cats returned to their owners by quarter from January 2010 to December 2017.

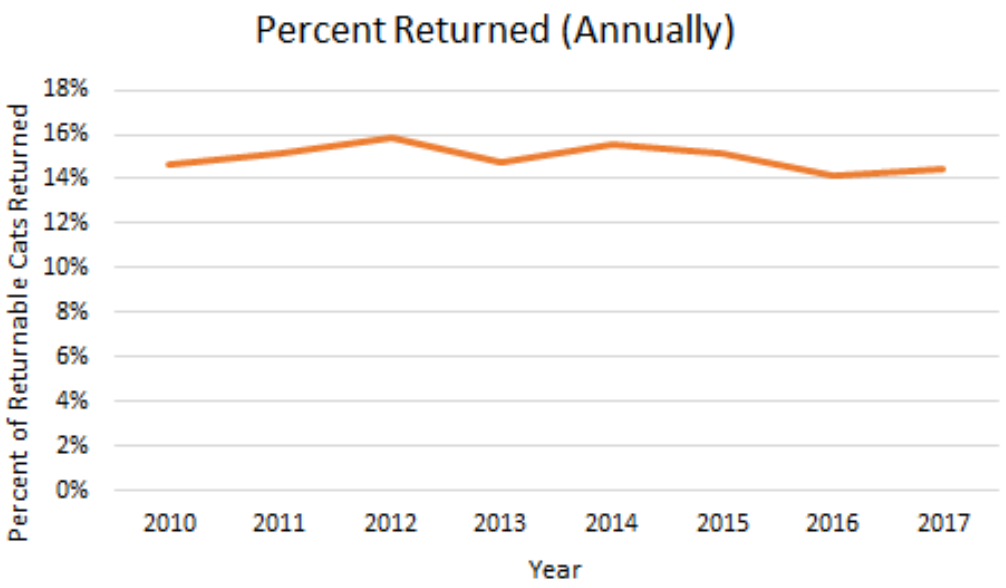

Figure 40: Percent lost cats returned to their owners by year from 2010 to 2017.

As shown in the graphs above, there was no distinguishable change in the rate lost cats are returned to their owners even though the Animal Bylaw went into effect in February of 2018 and Snip'n'Chip ran from October 2016 to December 2016. This lack of change could be because microchipping has seemingly been a common practice for several years now, or just because it will take more time to see the effects as the SPCA predicted.

In addition to recommending the SPCA or WCC perform this analysis in the future, we have identified key questions that our data was unable to answer that are essential to understanding the public's perceptions and behavior regarding cat ownership and cat management.

Are low income cat owners more likely to be noncompliant?

In our in-person survey, we encountered nine cat owners who were not already compliant with the Animal Bylaw. Because of this small sample size, we were unable to draw any concrete conclusions about the effect of income on compliance. If the WCC were to investigate this further and find that income and compliance were heavily correlated, it may suggest that another campaign like Snip'n'Chip would be important to help cat owners to microchip their cats and comply with the bylaw.

Is neutering cats as commonplace as our data suggests?

From our in-person surveys, we found that 100% of cat owners had their cats neutered or their cats had already been neutered when they got them. While this seems to suggest there is no

need for additional support or outreach surrounding neutering, the online Snip'n'Chip survey revealed that 39% of Snip'n'Chip users would not have been able to get their cats neutered without the help of the campaign. The fact that these results are contradictory could simply be because of our small cat owner sample size, but regardless, further research on how many people have their cats neutered in Wellington is needed to determine how much time and energy the WCC and SPCA should invest in helping people neuter their cats.

Why is there such a significant disconnect between cat owners' beliefs and actions?

Many of those who agree cats are a threat to wildlife, or disagree because they believe owners can mitigate the threat, surprisingly fail to take preventative measures with their own cat. It seems that cat owners can see the issues with other cats but that there is a large disconnect between those issues and their own cat. Further surveying with a larger sample size may be able to explain why this disconnect exists and how to help owners connect issues they see with other cats to their own cat ownership behaviors.

5.4 Conclusion

Cat management is a controversial issue in New Zealand, as cats are valued companion animals but also proficient predators of endangered native wildlife. As part of an ongoing effort to reduce domestic cats' impact on unique endangered species in Wellington, the WCC has passed the Animal Bylaw, mandating microchipping of all domestic cats. To prepare the public for the Animal Bylaw, the WCC and SPCA ran the Snip'n'Chip campaign, which offered heavily subsidized microchipping and neutering of pet cats, from October to December 2016.

This project aimed to determine public awareness of, compliance with, and opinion on the Animal Bylaw; to determine effectiveness of the Snip'n'Chip campaign; and to produce recommendations for future outreach methods and Snip'n'Chip campaigns. We found that most Wellington cat owners are in compliance with and agree with the bylaw, that people who used Snip'n'Chip felt overwhelmingly positively about the program, and that there has been a significant increase in cat microchipping trends over the past few years, perhaps due in part to the WCC's effort. We recommend that the SPCA add eligibility verification steps to the process of purchasing a Snip'n'Chip voucher; that the WCC or SPCA employ emotion-driven cat

welfare focused advertising as well as a data oriented approach to influence behavior change; and that WCC and SPCA communicate their goals and objectives to each other and the public more effectively to ensure successful outcomes.

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Appendix A: General Public Survey

Interview Preamble

Excuse me, do you live in Wellington?
If they do → *Do you have a couple minutes to answer a few questions?*

Hi my name is [name] and I'm a student from Worcester Polytechnic Institute. I'm working with Wellington City Council to look at animal-related policy in Wellington. This interview will take about 5 to 10 minutes. Is that okay?

Participation is completely voluntary and responses may be made public but will remain anonymous. You don't have to answer anything you don't want to and you can stop the interview at any time.

Demographic
Now, please just fill out this demographic information and that will conclude the interview. Again, all this information will be kept confidential and anonymous.

Focus Group
We will conduct a focus group with people who are interested in this topic in about two weeks from now. Your participation would be very useful for this study. Would you be willing to participate in this focus group? It will take approximately ___ minutes and we'll correspond with you to find a time that works best amongst participants.

We'll be asking some questions about cats in Wellington. So first of all,

1. Do you own a cat?

NON Cat Owners – Form 2.5

2. Have you had one before?
3. Why don't you have one now?
4. Do you have any other animals?
5. What does responsible pet ownership mean to you?
6. Have you heard of the new Animal Bylaw in Wellington?
    a. If yes: Do you have an idea of what it requires from cat owners?
    b. If yes: How did you first hear about it?
    c. If no → The Animal Bylaw requires cat owners to microchip their cats and register that microchip with the Companion Animal Register.
7. What do you think of the Animal Bylaw in Wellington?
8. The Wellington City council recently ran a campaign with the Wellington SPCA to provide discounts for microchipping and neutering cats. Have you heard of the Snip'n'Chip campaign?
    a. If yes: How did you first hear about it?

Now, on a scale from 1 to 5, where 1 is "strongly disagree" and 5 is "strongly agree," how do you feel about the following statements:

9. Domestic cats are a threat to Wellington's native wildlife. (Why?)
10. Local government should play a role in managing cats. (Why?)

11. Do you believe there are any issues with cats in Wellington?
12. Is there anything else you'd like to add on this topic?

CAT Owners Questions – Form 2.5

2. How many cats do you have?
    a. If more than one, skip Q3
3. What is your cat's name?
4. How long have you owned your cat?
5. Is your cat an indoor or outdoor cat?
    a. Are there specific times when you keep your cat indoors?
    b. (Daily? Seasonally?)
    c. If indoor: skip 10
6. Does your cat wear a collar?
    a. Why?
7. Has your cat ever been lost or gone missing?
8. Has your cat ever come home hurt? (Why?)
9. (Skip if strictly indoor) Does your cat ever bring home rats or birds or anything like that?
    a. What do they bring? Do they have a favorite?
10. As a cat owner, what does responsible pet ownership mean to you?
11. Have you heard of the new Animal Bylaw in Wellington?
    a. If yes: Do you have an idea of what it requires from cat owners?
    b. If yes: How did you first hear about it?
    c. If no → The Animal Bylaw requires cat owners to microchip their cats and register that microchip with the Companion Animal Register.
12. What do you think of the Animal Bylaw in Wellington?
13. Have you heard of the Snip'n'Chip campaign?
    a. If yes: Do you have an idea of what it offered?
    b. If yes: How did you first hear about it?
    c. If no → skip 15
14. Did you take part in the Snip'n'Chip campaign in any way?
    a. Why or why not?
    b. If yes: What was your experience like with it?
    c. Would you still have microchipped and neutered your cat if Snip'n'Chip did not exist?

15. Is your cat microchipped?
    a. If yes: Is their microchip registered with the Companion Animal Register?
    b. If yes: When were they microchipped (and registered)?
    c. If no: Do you know how and where they could be microchipped if you wanted?
16. Is your cat neutered?
    a. If yes: When were they neutered?
    b. If no: Do you know how and where they could be neutered if you wanted?

Now, on a scale from 1 to 5, where 1 is "strongly disagree" and 5 is "strongly agree," how do you feel about the following statements:

17. Domestic cats are a threat to Wellington's native wildlife. (Why?)
18. Local government should play a role in managing cats. (Why?)

19. Do you believe there are any issues with cats in Wellington?
20. Is there anything else you'd like to add on this topic?

Appendix B: Public Survey Response Form

CAT Owner Interview Questions Form 2.6

Location:	Asker: B N T W	code:	number:
Time:	Recorder: B N T W		
Data Recorded?	Date:		

Question 2 — Loose response
How many cats do you have? One → Q3, Two or more → Q4

Question 3 — Open response
What is your cat's name?

Question 4 — Loose response
How long have you owned your cat?

Question 5 — Loose response
Is your cat an indoor or outdoor cat?

Outdoor / Indoor

Q 5A: Any *specific times indoors or outdoors?*

Night

When away

Whenever cat wants

Question 6 — Loose response
Does your cat wear a collar?

Yes / No

Q 6A: Why?

Identification

Wildlife safety

Tracking

Question 7 — Loose response
Has your cat ever been lost or gone missing?

Yes / No

Question 8 — Loose response
Has your cat ever come home hurt? Why?

Yes / No

Other cats

Dog

Hit by vehicle

Question 9 — Loose response (skip if strictly indoors)
Does your cat ever bring home rats or birds or anything like that?

Yes	No
Rats / Vermin	I don't know
Birds	Too old
Lizards / Skinks	Can't hunt
	Doesn't kill

Q 9A: *What do they bring? Do they have a favorite?*

Question 10 — Loose response
As a cat owner, what does responsible pet ownership mean to you?

Food	Welfare	Effect on wildlife
Water	Affection	Neutering
Shelter	Affording	Microchipping
Medical	Training	Exercise

Question 11 — Loose response
Have you heard of the new Animal Bylaw in Wellington?

Yes / No

Q 11A: *Do you have an idea of what it requires?*

Chip
Register
I don't know

Q 11B: *How did you first hear about it?*

Vet	Radio
Friend / relative	Television
Poster / sign	Internet
Newspaper	Social media

Question 12 — Open response
What do you think of the Animal Bylaw in Wellington?

Positive / Negative

Question 13 — Loose response
Have you heard of the Snip'n'Chip campaign?

Yes / No → skip Q14

Q 13A: Do you have an idea of what it offered?

Discount	*Free*
Chipping	*Don't know*
Registering	*Yes*
Neutering	*No*

Q 13B: *How did you first hear about it?*

Vet	Poster / Sign	Television
Friend / relative	Billboard	Internet
Radio	Newspaper	Social media

Question 14 — Loose response
Did you take part in the Snip'n'Chip campaign?

Yes / No

Q 14A: *Why did or didn't you take part?*

Discount	Didn't know about it
Bylaw	Already chipped
At vets already	Already registered
	Already snipped

Question 15 — Loose response
Is your cat microchipped?

Yes	No
Q 15A: *Is their microchip registered with NZCAR?*	**Q 15C:** *Would you know how and where they could be?*
Q 15B: *When were they microchipped?*	

Question 16 — Loose response
Is your cat neutered?

Yes	No
Q 16A: *When were they neutered?*	**Q 16B:** *Do you know how and where they could be?*

Question 17 — Scale response
Domestic cats are a threat to Wellington's native wildlife. Why?

1 2 3 4 5

Question 18 — Scale response
Local government should play a role in managing cats. Why?

1 2 3 4 5

Question 19 — Open response
Do believe there are any issues with cats in Wellington?

Yes / No

Wildlife	Too many
Property	Outdoors

Question 20 — Loose response
Is there anything else you'd like to add on this topic?

Appendix C: Public Survey Code Definitions

Responsible Pet Ownership

Nuisance: Making sure cat isn't a nuisance/disturbance/menace to other people or other pets
Property: Making sure cat stays on or near owner's property
Enrichment: Making sure cat is well exercised and/or has an enriching environment, entertainment, development, stimulation
Human/respect: Care for the cat like you would a child or human, respect its sentience
Clean: Keep cat clean and well groomed
Clean up after: Clean up after cat, waste and messes it may create
In at night: Keep cat indoors at night
Monitoring: Monitoring cat's whereabouts and being conscious of their behavior
Wildlife: Mitigate cat's potential to harm wildlife, typically by keeping it physically away from wildlife or impeding the cat's ability to hunt effectively
Indoors: Keep cat indoors at all times
Affordability: Be able to afford the expenses that come with owning a cat, and be financially stable enough to always be able to provide for cat
Adopt: Get your cats from shelters or rescues, such as the SPCA, instead of breeders or third parties
Outdoors: Cat should be allowed outside some or all of the time
Training: Cats should be trained to some degree to limit their interactions with wildlife, people, and other cats
Collar: Cats should wear belled collars to alert wildlife
Welfare: Cats should be kept happy and healthy
Food, water, shelter
Microchip: Cats should be microchipped and their microchips registered
Neuter: Cats should be neutered

Feelings on Bylaw

ID Cat: Identify whether cat is owned or not
Reuniting: Reuniting owners with lost, hurt, or killed cats
Wildlife: Protects wildlife
Tracking: Monitoring cats' whereabouts, where they roam
Slippery slope: Bylaw is slippery slope to more government microchipping and tracking of other animals, or even humans
Responsible: Something cat owners should be doing even without the bylaw
Unethical: Unethical to put artificial implant in living being
Unenforceable: Cannot enforce the bylaw or there is little way to do so
Collar: Microchipped collars should be used instead
Affordability: Might be difficult for people to afford to comply with bylaw
Overreach: Government is getting too involved and is overstepping its responsibilities

Equal dogs: Cats should be managed the same way dogs already are
Ineffective: Some or all parts of the bylaw will not achieve the intended result, or some involved processes are too difficult for it to work out correctly
Not enough: Law doesn't accomplish enough, should go further
Data: Bylaw would allow better data to be collected on cat population numbers
Thievery: Microchipping prevents theft of cats
Accountability: Hold owners responsible for their actions or their cats' behavior
Uninformed: The participant did not consider themselves informed well enough to give definitive reasoning
Privacy: The participant had privacy concerns about the information contained on the microchip and the registration process

Threat to Wildlife

Bigger threats: There are bigger threats than domesticated cats (e.g., stray/feral cats, pests (like rats, mice, stoats, weasels, or possums), and humans)
Natural killers: It is in a cat's nature to hunt things; it is associated with the very idea of a cat
Owner mitigation: There are actions that owners can or do take that mitigate or eliminate the threat cats pose to native wildlife
Kill pests: Cats' predation of dangerous pests is beneficial to native wildlife
Location: The cat's threat is dependent on its location, especially relative to wildlife reserves and rural areas vs. cities
Don't hunt: The cat's perceived laziness or inactivity is cited as a reason that the cat's impact is small – typically extended to all cats, not just a particular individual
Seen firsthand: The participant has personally witnessed cats kill birds
Not seen: The participant has not ever personally witnessed cats negatively or detrimentally interact with wildlife
Vulnerable wildlife: The participant cites some feature of the wildlife (naivety, flightlessness) as a reason that they are threatened by cats
Clever birds: The participant cites some behavior of the wildlife (staying off the ground, attacking cats) as a reason that cats don't have such a large impact
Can't control: Owners cannot control cats' behavior or owners should not keep cats from behaving according to their instincts
Equal importance: Native birds should not be valued more highly than cats; the lives of living creatures need to be equally weighted
Suggestion: participant makes a notable suggestion for how to mitigate cats being a threat to wildlife

Government Involvement

Owner's responsibility: It is the owner's responsibility to manage cats
Owners irresponsible: Owners are irresponsible and do not/will not manage cats themselves

Education: There should be more educational options made available through the government, (in addition to or instead of) direct management
Overreach: The government is overstepping their responsibility and jurisdiction, or is behaving intrusively
Ineffectiveness: The government's role is ineffective in managing cats, or the government's attempts at managing cats are ineffective or poorly executed
Suggestion: Participant makes a notable suggestion for how the local government should manage cats
Equal Dogs: Cats should be managed the same way dogs already are
Wildlife: Cats need to be managed in order to protect wildlife
Government governs: it's what the government does, it's what they do, not necessarily what they should do
Handle strays/ferals: The government has an obligation towards the stray and feral cat populations, but not necessarily towards managing domestic cats
Slippery slope: Government involvement in managing cats could be a slippery slope to them getting over-involved in managing other things
Not govt responsibility: This is not the government's problem to deal with, they have better things to worry about, and people's rates shouldn't go towards it
Affordability: People need help being able to manage their cats**,** the government should subsidize cat management, or cat management should be entirely paid for by the government
Location: There should be more government involvement in specific locations
Can't control: Cats cannot be managed effectively
Government responsibility: It is the government's responsibility to manage cats

Indoor Cats

Living situation: Something about the participant's living situation prevented them from owning a cat.
Dislike cats: The participant disliked cats in particular.
Allergy: Either the participant or someone the participant lives with is allergic to cats.
Travel: The participant travels too much to care for a cat or they might be traveling in the future.
Busy: The participant is too busy to care for a cat.
Have dog: The participant owns a dog and for some reason the participant could not own a cat too.
Wildlife: The participant is aware of the threat cats pose to wildlife and consciously chooses not to own a cat to mitigate harm to wildlife.
Dog person: The participant does not necessarily have a dog, but strongly prefers dogs over cats.
Trouble: The participant associates cats with trouble, whether it be the cat causing it or the cat being trouble to care for.
Expensive: The participant is concerned with the costs associated with owning a cat.
Dislike pets: The participant dislikes pets in general.

Appendix D: Snip'n'Chip Participant Online Survey Questions

Intro

Hi there!

We would like to invite you to take part in our survey about your experience with the Wellington Snip'n'Chip campaign. The survey should take about 5-10 minutes to complete. We hope you find it interesting!

Completing this survey will provide very valuable information to inform the Wellington City Council and SPCA on how to improve possible Snip'n'Chip campaigns in the future.

To start the survey click here.

If you would like your views to be included, please complete this survey by February 18, 2018. Your answers are completely confidential, and will be grouped with others so that individual people cannot be identified.

If you have any questions about this survey, please email [SPCA email].

Thank you for your time!

Question	Question Format
1. Was your cat microchipped or desexed prior to taking part in Snip'n'Chip? • Yes, microchipped • Yes, desexed • No	Multiple choice with bullets as choices
2. Would you have microchipped and/or desexed your cat(s) without the Snip'n'Chip campaign? Select all that apply: • Yes, but I liked the discount • Yes, but my schedule would have made it difficult • Yes, to comply with bylaw • Yes, for environmental reasons	Check boxes with bullets as choices

• No, I had privacy concerns • No, I couldn't have easily afforded it • No, I didn't have time • Yes, other: _____ • No, other: _____	
3. The Animal Bylaw sets forth certain requirements for cat owners. To the best of your knowledge, which of the following does it require? Select all that apply: • Registering cats with the City Council • Desexing cats • Microchipping cats • Keeping cats indoors at night • Registering cats' microchips • I don't know	Check boxes with bullets as choices
4. How did you hear about the Snip'n'Chip campaign? Select all that apply: • Social Media • Internet • Television • Radio • Newspaper • Poster/sign/billboard • Friend/relative • Veterinary Clinic • Other: _____	Check boxes with bullets as choices
5. Which of the following, if any, did you do PRIOR to Snip'n'Chip? Select all that apply: • Keep cat(s) indoors at night • Put collar with bell and/or bright colors on cat(s) • Make sure cat(s) is fed before leaving home • Provide toys for cat(s) to keep them entertained • None of the above	Check boxes with bullets as choices
6. Which of the following, if any, did you start doing AFTER Snip'n'Chip? Select all that apply: • Keep cat(s) indoors at night • Put collar with bell and/or bright colors on cat(s) • Make sure cat(s) is fed before leaving home • Provide toys for cat(s) to keep them entertained • None of the above	Check boxes with bullets as choices

7. Thinking about "responsible pet ownership" and what this term means to you, how important are the following factors: (very unimportant, unimportant, neutral, important, or very important) • Providing food and water • Providing shelter • Medical care • Keeping cats indoors • Letting cats roam free • Putting collars on cats • Affection • Financial stability • Desexing • Microchipping • Keeping cat away from other people's property / cats	Chart: "Providing food and water", "Providing shelter",..., "Keeping cats away…" are rows; "Very unimportant", "Unimportant",..., "Very important" are columns
8. Please state your level of agreement with the following statements: *Domestic cats are a threat to Wellington's native wildlife*. (Strongly disagree, disagree, neutral, agree, or strongly agree)	Multiple choice/scale where user can rate statement with "strongly disagree," disagree," "neutral," "agree," or "strongly agree."
9. *Local government should play a role in managing cats.* (Strongly disagree, disagree, neutral, agree, or strongly agree)	Multiple choice/scale where user can rate statement with "strongly disagree," disagree," "neutral," "agree," or "strongly agree."
10. How likely would you be to recommend Snip'n'Chip to a friend? • Not at all likely • Somewhat likely • Very likely • Extremely likely	Multiple choice with bullets as choices
11. What would you like to see repeated if Snip'n'Chip were to happen again? What would you like to see improved?	Open response
12. Any other comments you would like to add about your experience with the Snip'n'Chip campaign?	Open response
13. What suburb do you live in?	Open response
14. What is your gender? • Male • Female • Gender Diverse • I prefer not to answer	Multiple choice with bullets as choices

15. What is your age? • 18–25 • 26–35 • 36–45 • 46–55 • 56–65 • 66–75 • 76+ • I prefer not to answer	Multiple choice with bullets as choices
16. What is your annual household income? • $50,000 or less • $50,001–$70,000 • $70,001–$100,000 • $100,001–$150,000 • $150,001 or more • I prefer not to answer	Multiple choice with bullets as choices
17. **OPTIONAL:** We may be conducting a focus group with people who are interested in this topic on the 19th of February. Your participation would be very useful for this study. Would you be willing to participate in this focus group? It will take approximately 45 minutes of your time, and refreshments will be provided. Please provide your name & email address below if you are interested! Name: _____ Email:_____	Optional question with text boxes to collect name and email

Appendix E: Focus Group Email Invitations

Email 1

Hi all!

A week or two ago you were interviewed by a member of our team and expressed interest in participating in a focus group. My name is Toni Joy and I am a university student from the United States. Several other students and I are working with the Wellington City Council and SPCA to evaluate perceptions of animal-related policy in Wellington.

Thank you so much for expressing interest! Your participation would provide insight for our recommendations to the Wellington City Council and the SPCA. We plan to conduct the focus group for about 45 minutes at one of the following times listed below:

1.) Thursday, February 22nd from 4-5pm, 5-6pm, or 6-7pm
2.) Friday, February 23rd from 12-1pm, 1-2pm, or 2-3pm

If you are still interested, please reply to this email and let us know which hours you are available to participate! We will be meeting at the Wellington Central Library in Te Aro and refreshments and food will be provided. We will send a follow-up email with the selected time and additional information in the next few days! Even if you do not reply to this email indicating times you would like to participate, you will still receive one more email informing you of the exact day and time the focus group will be held if you still wish to attend.

Thank you again for your time and consideration. We hope to see you soon!

Best,

Toni Joy
WPI Class of 2019
Industrial Engineering

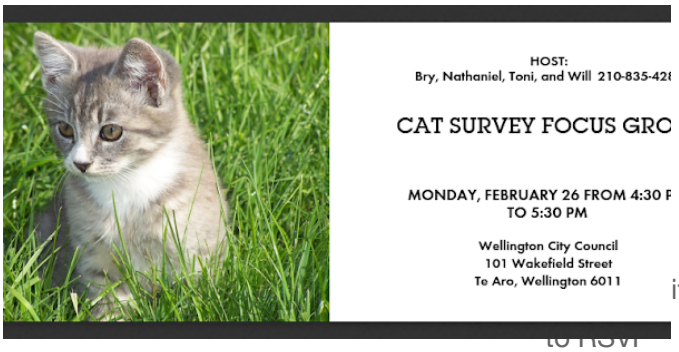
Email 2

Hello!

You expressed interest in participating in a focus group about cat ownership and cat policy in Wellington. Thank you! We would love it if you could participate and provide insight for our research with Wellington City Council and the SPCA, and we would value your input.

The focus group will take about 45 minutes and will take place at Wellington City Council - 101 Wakefield Street. The focus group will be held on **Monday, February 26th at 4:30pm. Participants will receive a $20 gift card for their support. Refreshments and food will be provided.**

If you are still interested, please RSVP using this link: http://evite.me/s4dwPXvcFy



RSVP to Cat Survey Focus

ited to Cat Survey Focus Group - Click here

Thank you again for your time and consideration. We hope to hear from you soon!

Best,
Toni Joy
WPI Class of 2019
Industrial Engineering

Appendix F: Focus Group Questions

Focus Group Questions

- Introduce
- University students from US
- Goal is discussion, not question and answer

Icebreakers

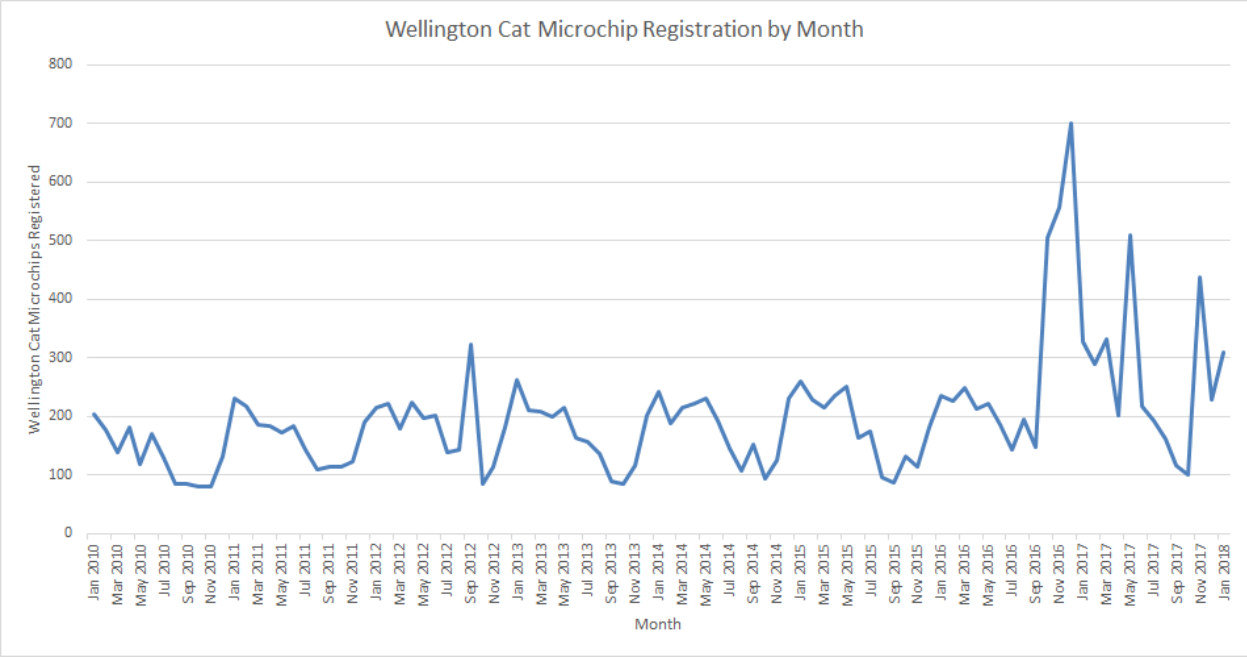
1. What are your cats' names?
2. Are they indoor or outdoor?
3. What do think is the best part about owning a cat?

Real questions:

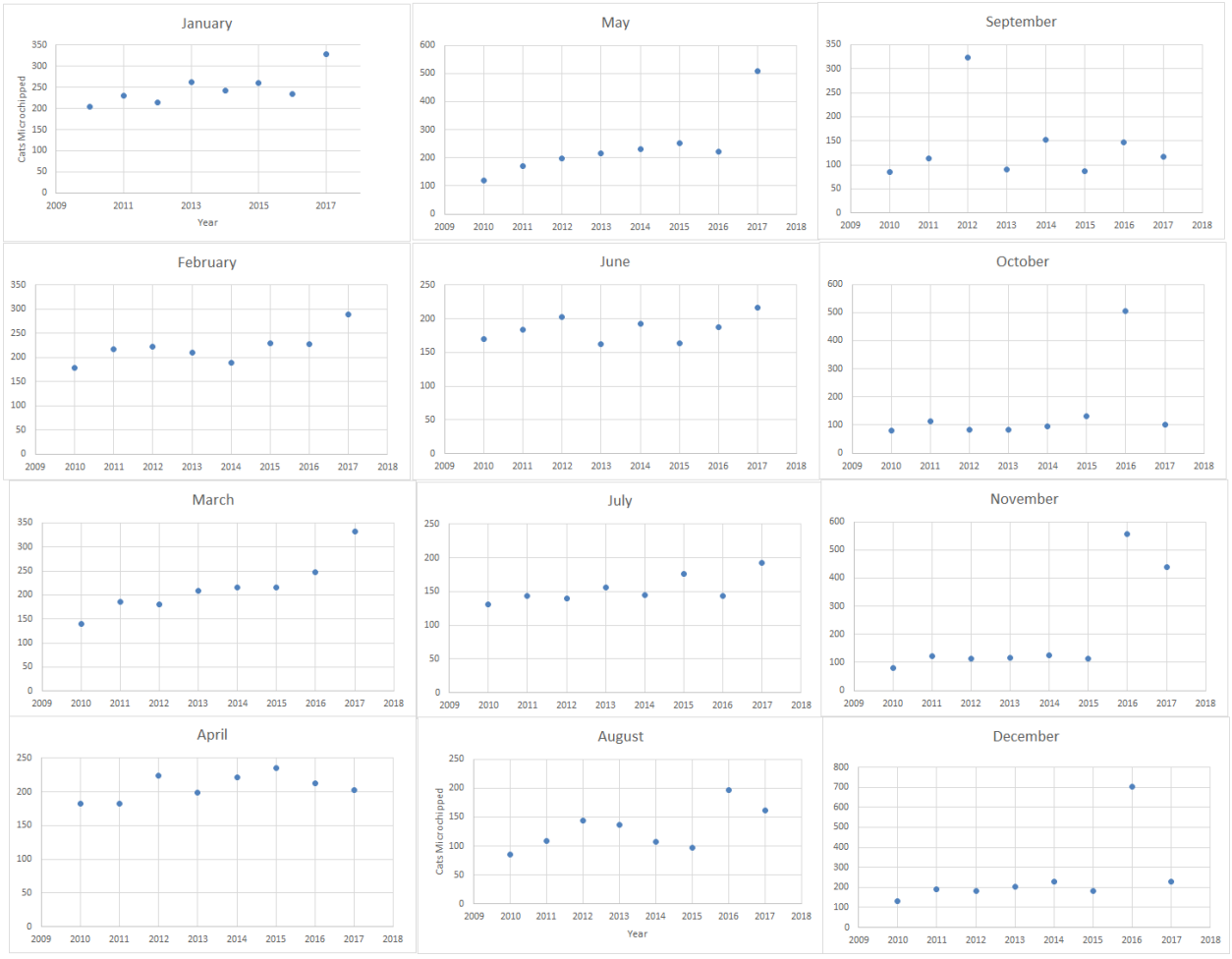
1. What gaps are there in the existing cat policy? Is there anything missing?
2. As a cat owner, have you experienced any negativity? What was your experience?
3. What can people do to reduce their cats' impact on wildlife?
    - What are your thoughts on putting a Birdbesafe collar on your cat?
    - What are your thoughts on keeping your cat indoors at night?
    - How could we best foster responsible cat ownership?
4. What prevents you from adopting some of the behaviors we mentioned before?
5. Out of what we previously mentioned, what do you think are the easiest changes to make as a cat owner and why?
    - Would you consider keeping a new kitten you got from the SPCA as a full time indoor cat, or building a cat enclosure or catio?
6. We know that cats roaming out at night are more likely to be injured from fighting with other cats, be harmed or even killed by a vehicle, and contract infectious diseases. In light of this why do you think many cat owners still believe that keeping your cat out overnight is what is best for your cat?
7. Under the Dog Control Act, dogs must be registered with the council every year, confined to the owners property, and leashed in public spaces. What do you think of the current differences in legal responsibilities between owning a dog and owning a cat? Logical? Legitimate?
8. How could responsible pet ownership be encouraged without creating laws?
9. Is there anything else you feel WCC could be doing to assist cat owners or address responsible cat ownership?

Appendix G: NZCAR Raw Microchip Registration Data

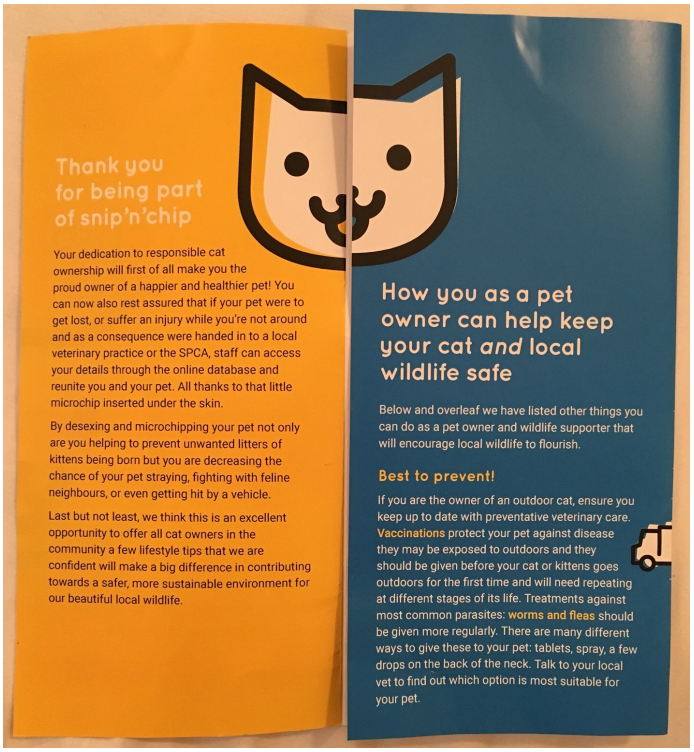
	January	February	March	April	May	June	July	August	September	October	November	December
2010	204	178	139	182	118	170	131	86	85	80	80	132
2011	231	218	186	183	172	184	143	109	114	114	123	191
2012	215	222	180	224	197	203	140	144	324	84	114	182
2013	262	210	208	199	216	163	156	137	90	84	116	203
2014	242	189	216	222	231	193	145	108	152	94	126	230
2015	261	229	216	235	251	164	176	97	87	132	114	182
2016	235	227	248	213	223	187	143	196	147	506	558	701
2017	328	289	332	202	509	217	192	162	117	101	439	229
2018	310											

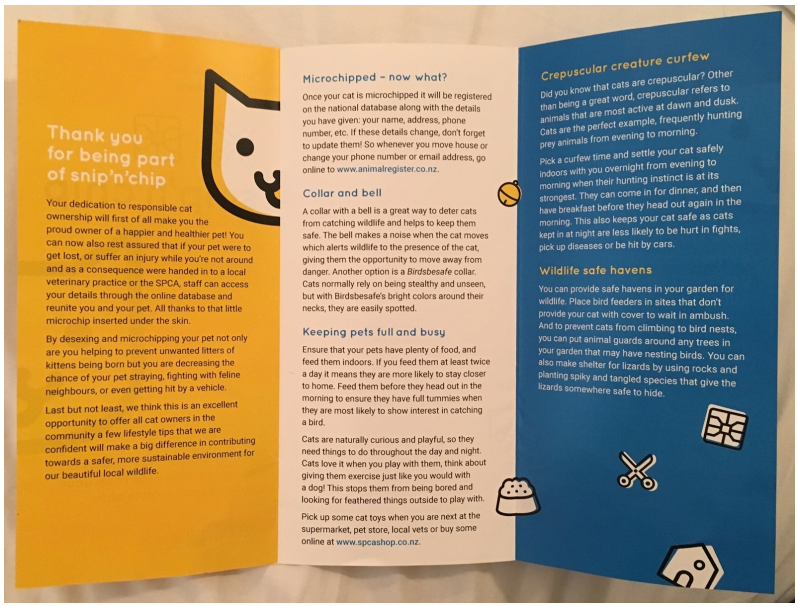


Appendix H: NZCAR Monthly Microchip Registration Data



Appendix I: Snip’n’Chip Pamphlets and Vouchers





SPCA WELLINGTON
NEW ZEALAND COMPANION ANIMAL REGISTER
We're helping you desex and microchip your cat.
3 month limited offer!
snipnchip.nz
snip'n'chip

Don't miss out on this dirtbox cheap deal.
Ends 28 June 2017.
For more info, your closest participating veterinary clinic and how to book in your cat head to snipnchip.nz
Terms and conditions apply
$4
vet chippin'
Take Fluffy, Borris and Pixie to your local vet for microchipping + registering.
OR
$9
snip + chip
Bring your fav feline to your local vet for desexing, microchipping + registering.

Appendix J: Focus Group Notable Quotes

NOTE

- Times are approximate
- When possible, the speaker was identified by their position at the table but this was not always possible
- Bold questions are questions we asked, whether it be from our predetermined questions or probing
- Not everything was written down due to time constraints, only the most relevant, articulate, and possibly useful quotes were transcribed

Actual Transcript

6:52 – "Even though I love cats, I love birds, so I probably would not get cats again after this."
– Person 3

7:40 – "I guess you could bring up cats from the beginning not to be outside cats, but it's not something [cats that have experienced the outdoors] can get used to."
– Person 3

8:00 – "To me, [bringing up a cat indoors] would be too cruel. I'd rather not have a cat if it had to be an inside cat."
– Person 3

8:35 – "I do what I call 'waterboarding now. When [my cat] has got a bird in his mouth, I grab him [...] and hose the hell out of his face. Sometimes he'll let the bird go and it will fly away but then I just completely get angry and keep watering him. I have to, just to deter him in some way. It hasn't been working, but I'm trying."
– Person 3

9:27 – "Rats he catches at night, birds he catches late morning or early evening."
– Person 3

10:30 – Q1: Are there any gaps you see in cat related policy?

10:35 – "As cat owners, we should be under the same obligations as dog owners."
– Person 2

"I think [cats'] habits is much different than dogs. When a dog gets out, if it's not registered, it gets put in the pound. Should a cat that's not microchipped be put down? [...] Do you set up cat traps for cats that aren't neutered or are feral and immediately exterminate them? I don't know."
– Person 3

21:00 — roller topped fences

24:20 — "Maybe there needs to be a limit on the number of cats you can have. Maybe two cats per household."

24:40 – “The saddleback would never survive anywhere outside of Zealandia. [...] My cat would kill them in a day.”

26:35 — Q3: What can people do to reduce their cat’s impact on the wildlife?”

- **Birdsbesafe**
- **Keeping cat indoors at night**
- **Catio**

27:10 — [Regarding Birdsbesafe collars], [my cats] were just too smart. One would hold the collar and the other would pull its head out.”

27:25 — “There are a lot of breeds that don’t like collars, isn’t there? [A lot of people won’t] put collars on show cats or [other cats] that are very paranoid about having a collar on. It takes a bit to train a cat to get used to a collar.”

27:40 — “Have we got proof that the collar works?”

28:50 — “I’d be interested to know how many birds actually [die] by whacking into windows [in comparison to how many die from domestic cats].”

29:30 — Give collars when picking cat up from SPCA, or advertise them every time people show up at the vet or SPCA.

29:50 — “I wouldn’t know where to buy [a Birdsbesafe collar]. I mean, I’ve never seen it [advertised].”

30:40 — “People need to see the benefits. People need to see the benefits of a new [behavior] and it has to be very well reasoned [for them to adopt the new behavior].”

31:30 — “[Should] you have the same requirements [to microchip and register] outside of the city [where the benefits are much less]?

32:20 — “[Try to get cat owners] to accept that if their cat isn’t microchipped and registered, they might lose them.”

32:40 — The potential for harsher outcomes would be persuasive to cat owners.

33:10 – Q4a (reworded): Are there any other strategies you do individually to try and mitigate your cat’s impact on wildlife?

33:40 – The message to future generations of cat owners seems to be: train your cat from a kitten to either come inside at night or to remain inside all the time.

35:20 – Q4b: Are there any other barriers you may have experienced that might get in the way of stopping cat interactions with wildlife? What would encourage you to adopt a new strategy to protect wildlife from your cat?

36:06 – “I think if I was presented with really hard evidence, I would really love to know the figures, [...] how much rats destroy birds, how much cats destroy birds, and [how much] dogs [destroy birds]. And then, I think if I was presented with those facts, I would be much more likely to act on them.”

36:26 – Unanimous agreement with the statement above.

36:45 – “Personally, I won’t own any more cats after this, because of my hunting cat. I wouldn’t rather keep cats inside. [...] I could be converted to not owning cats after this because of Zealandia [and the vibrant bird life it contains].

37:05 – Is it based off location? Would you not do that if there wasn’t a native bird population?

37:11 – “I think just full stop, [Zealandia] has converted me [to thinking] that the bird life in my backyard is definitely affected having cats around.”

38:02 – “From my experience with dogs, dogs can cause quite a bit of problems for birds that are nesting. [Harm to birds] also depends on if dogs roam.”
– Person 1

40:00 – People want more information on

- Domestic cats’ particular impact on wildlife
    - Compare to rats, mice, dogs, etc.

41:01 – “We’re focusing on cats, but actually mustelids and dogs do an awful lot of damage – and possums.”

42:50 – “For cat owners to change their habits too, I think you need evidence. And say look, this is what happened when we got rid of the feral cats, we had this many more [birds] in the garden.

43:56 – What else would encourage responsible pet ownership?

44:04 – “You have a little course [through the SPCA or veterinary clinics] or some sort of incentive to keep coming back and getting the treatments.”

44:40 – “Complete blanket ban on owning a cat that isn’t neutered or spayed.”

45:40 – “Educating the young often works.”

47:44 – Q6: We know that cats roaming out at night are more likely to be injured from fighting with other cats, be harmed, or even killed by a vehicle, and contract infectious diseases. In light of this, why do you think many cat owners still believe that keeping cats out overnight is best for them?

48:03 – “I think [cats getting hit by cars] is just the natural order of things. I could, I could consider [the information you gave] as a reason to keep my cat indoors at night.”

48:45 – “I think it’s about education. That’s a good way to get people to start keeping their cats inside – by reinforcing their actions aren’t that great for their cat.”

How could you get people on the same page about responsible pet ownership?

52:05 – “You’d have to do a multi-faceted communication [campaign]. [...] It’s that reiteration of the message.”

52:50 – “And over time. You have to have that repetition.”

54:12 – “Make people feel like they’re the exception to the norm [where the norm is responsible pet ownership.”

55:35 – Q9: Is there anything you feel the Council could provide cat owners or be doing to address responsible pet ownership?

58:05 – “Educate vets more to spread [responsible pet ownership and methods to mitigate their damage] information.”

59:28 – How do you feel about data from other countries?

59:40 – “I think you’d have to be careful with it. We have different flora and fauna.”

1:00:00 – “There’s no other country in the world that has just birds [like us]. [...] We have this unique situation [in New Zealand] that we really need to [approach] uniquely.”

1:03:30 – “We think that we’ve got birds in Wellington but there are more birds in the bush but there aren’t.”

Appendix K: Raw Data Repository

We have established an online repository with all of the data we gathered for this project. The repository can be accessed here:

https://drive.google.com/open?id=12Y1VT_Vnqr12DYcGaKwvnyYrr3hoRr-B