Assessing Support for Cat Bylaws in Aotearoa New Zealand

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Abstract of a Dissertation submitted in partial fulfilment of the requirements for the Degree of Master of Planning.

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Companion, stray, and feral cats have a significant impact on Aotearoa New Zealand's (NZ) biodiversity. Legislation such as the Wildlife Act 1953, the Conservation Act 1987, and the Biosecurity Act 1993 help mitigate the effects of feral and stray cats. However, addressing the challenges posed by companion cats is a complex issue for decision-makers due to the bonds between these cats and their owners. The current strategy to address the impacts of companion cats is the creation of bylaws by local councils. Bylaw clauses such as microchipping, registration, desexing and containment have animal welfare benefits for cats and cat owners, as desexing reduces the risk of reproductive diseases and unwanted behaviours, and microchipping and registration help return lost cats to their owners. However, as cat management is a highly emotive issue, it has been considered difficult to gain public acceptance for cat-related bylaws.

Using a mixed methods approach, this study analysed public submissions from five NZ councils to gain deeper insight into community attitudes and interactions towards cats and cat bylaws. Ten themes were identified through qualitative analysis: nuisance, human and livestock health concerns, toxoplasmosis risk to wildlife, conservation/environmental concerns, benefits of cats, cost concerns, stray and feral cat management, containment/curfews, bylaw support, and anti-regulation sentiments. These themes demonstrate the issues surrounding cat management, and how the public feels about bylaw requirements. Quantitative statistical analysis was used to determine the significant statistical similarities and differences among the councils.

Overall, all regions studied showed majority support for cat bylaws, indicating that nationwide cat management legislation may be supported by the NZ public. However, the distinct regional concerns identified in the submissions suggest that the implementation of national legislation would require local authorities to collaborate closely with communities to address these issues. Furthermore, this study supports the need to redefine the legal definitions of stray cats to better address the complexity of human-cat interactions and enable better management of these cats. Additionally, the findings

demonstrate that cat containment remains a contentious issue for the NZ public, although there was a small, vocal group in all regions that advocated for mandatory containment measures. Further research into public attitudes towards cat containment is needed to assess the level of support for such measures, both regionally and nationally. Ultimately, successful cat management in NZ requires a careful balance between national standards and local adaptation, focused on encouraging and supporting responsible cat ownership to address the environmental and social impacts of cats.

Keywords: bylaws, cat legislation, companion cat, stray cat, feral cat, cat management, cat predation, responsible cat ownership, public opinion, cat welfare, cat containment, Aotearoa New Zealand

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List of Abbreviations

ACT	Australian Capital Territory
CANZ	Companion Animals New Zealand
GLM	Generalised Linear Model
HSD	Honestly Significant Difference
MPI	Ministry for Primary Industries
NCMSG	National Cat Management Strategy Group
NESP	National Environmental Science Program (Australia)
SA	South Australia
SPCA	Society for the Prevention of Cruelty to Animals
TDC	Tasman District Council
TNR	Trap-Neuter-Return (Humane management technique for free-roaming cats)
TAR	Trap-Assess-Resolves (Humane management technique for free-roaming cats)

Chapter 1

Introduction

Domestic cats (*Felis catus* Linnaeus, 1758) are the most common and widespread pets worldwide and are afforded more free license than any other pet (Read, 2019). Cats also divide public opinion more than any other pet, as their free license to roam and their nature as predators means they cause considerable impacts on wildlife, public nuisance effects, and public health effects (Bassett et al., 2020; Read, 2019; Sumner et al., 2022). Cats are the most popular companion animal in Aotearoa New Zealand (NZ), with 41% of households owning at least one cat, and over 1.2 million companion cats nationally (Companion Animals New Zealand (CANZ), 2020). There are also approximately 200,000 stray cats and an estimated 2.4 million feral cats in NZ (Donnell, 2021). Cats are both beloved companion animals and invasive predators (Read, 2019; Sumner et al., 2022). All cat relationship types (companion, stray and feral) threaten native biodiversity, cause public nuisance by damaging private gardens such as through defecating and spraying, and can transmit diseases and parasites such as *Toxoplasma gondii* (Taxonomic authority: Nicolle & Manceaux, 1908) to humans and wildlife (Bassett et al., 2020; Farnworth et al., 2011; Glen et al., 2023; Kays et al., 2020; Loyd & Hernandez, 2012; National Cat Management Strategy Group (NCMSG), 2020; Read, 2019; Sumner et al., 2022; Wald & Peterson, 2020).

Cat relationship types (companion, stray and feral) are defined by the Ministry for Primary Industries (MPI) in the 'Code of Welfare: Companion Cats' which establishes the standard of care for cats under the Animal Welfare Act 1999 (MPI, 2018). Companion cats are those living with humans and dependent on them for their welfare. In contrast, stray cats are considered lost or abandoned companion cats living as individuals or in colonies. Stray cats have many of their needs indirectly supplied by humans, live in areas of human habitation and interbreed with unneutered companion cats (MPI, 2018). Feral cats are defined as having none of their needs provided by humans, generally not living in areas of human habitation, and having a self-sustaining population, which is not dependent on input from the companion cat population (MPI, 2018).

Until recently, there has been little legislation in NZ to manage the effects of cats on the environment. The earliest inclusion of feral cat management in legislation is the Wildlife Act 1953, which places feral cats under the definition of wildlife and allows them to be hunted or killed if they are causing damage. This was followed by the National Parks Act 1980, which does not specifically reference cats, however, the National Parks Act 1980 states that introduced animals shall as far as possible be exterminated. Feral cats fall under this definition as they are an introduced species. The National Parks Act 1980 was

followed by the Conservation Act 1987 and the Biosecurity Act 1993. These Acts also do not explicitly mention cats but indirectly require their management. The Conservation Act 1987 introduced the requirement of a permit for all trapping, killing, and taking of animals from a conservation area, and states that no animal can be released into a conservation area. As animals, cats are included in these requirements. The Biosecurity Act 1993 allows feral cats to be managed as pests on public conservation land and feral and stray cats to be included in pest management plans, as they fall under the definition of harmful organisms. The Wild Animal Control Act 1977 also allows for the control and eradication of feral cats, as they fall under the definition of wild animals due to their lack of dependence on humans.

The Animal Welfare Act 1999 introduced welfare requirements for the management of all animal species. This Act sets out requirements for companion cat owners to provide for their pets' welfare, and introduced protections for feral and stray cats, making it an offence to commit wilful or reckless ill-treatment towards them, and requiring live capture traps be checked without delay (Sumner et al., 2022). The Animal Welfare Act 1999 also defines feral cats as a pest species (s2). However, the above Acts do not address the impacts of companion cats on humans and the environment. Local council[1] bylaws are often the legislation of choice for addressing cat impacts (NCMSG, 2020; SPCA New Zealand (SPCA), n.d.c; Sumner et al., 2022), as these impacts come under the purpose of protecting the public from nuisance or protecting, promoting and maintaining public health and safety (Local Government Act 2002, s. 145).

Recently, bylaws with cat-specific clauses have been introduced in some local and regional councils around NZ, with the first being the Animals Bylaw by Wellington City Council in August 2016 (Kikillus, Chambers, et al., 2017). Local council bylaws introduce clauses that require limits on the number of cats per household, mandatory desexing, microchipping or registration of cats, or a combination of these (NCMSG, 2020; SPCA, n.d.c). These clauses encourage responsible pet ownership and improve animal welfare, as unwanted animal problems are reduced through desexing. Microchipping and registration allow for better identification of companion and stray cats from feral cats. This helps reunite lost cats with their owners and enables more effective management of feral cat populations. Additionally, these measures contribute to wildlife conservation by reducing the contribution that companion cats make to wild cat populations and bolstering the effectiveness of feral cat control efforts (NCMSG, 2020; SPCA, n.d.c).

[1] Local government in NZ is comprised of regional councils, territorial authorities (district and city councils), and unitary authorities (territorial authorities that also have the powers of a regional council). Regional councils are responsible for environmental management in their region, while territorial authorities are responsible for delivering various services such as infrastructure, community facilities, and creating bylaws to address specific matters (Local Government Commission, n.d.).

When drafting bylaws councils must determine whether a public consultation process is required. Grounds for consultation are if the bylaw is of significant interest to the public or will have a significant impact on the public (Local Government Act 2002, s. 156). Public consultation on animal bylaws is usually deemed necessary as legislation around companion animals generates highly emotive responses. Public opinions around cats range from strongly in support to strongly against and the reasoning behind these responses also varies widely. Submissions on cat bylaws are received from cat owners and non-cat-owners, conservation and animal welfare organisations, and members of the public who have concerns about predation of wildlife, disease transmission to humans, wildlife and livestock, animal welfare and nuisance issues such as cats defecating in gardens, spraying, yowling and fighting. The significant and often emotive public response to cat bylaws complicates the planning process. If members of the public feel that their voices are not being heard, public acceptance of the bylaw is reduced, as is its effectiveness (Sumner et al., 2022).

This research aimed to analyse public submissions from five NZ councils to gain deeper insight into community attitudes and interactions towards cats and cat bylaws during varying stages of the bylaw creation process. By comparing these submissions, this research aimed to identify the key issues, similarities, and differences between regions, consider whether a nationwide or localised strategy better suits cat management in NZ and understand public perceptions on stricter legislative measures such as cat containment and curfews.

1.1 Research Aims and Questions

This dissertation examined public submissions from five councils (four territorial authorities and one unitary authority) on cat management bylaw clauses, focusing on how the public responded to these clauses. To achieve the research aims, the following questions were addressed:

1. What regional similarities and differences are there in community interactions with cats and attitudes towards cat bylaws?

2. What do these similarities and differences signal about the appropriateness of localised or nationwide approaches towards cat management?

3. What is the diversity of public opinions about stricter cat legislation approaches such as cat containment and curfews?

By answering these research questions, the regional similarities and differences in community interactions towards cat bylaws are discussed, and the implications for cat management legislation in NZ are explored.

Chapter 2

Literature Review

2.1 Cat Impacts on Wildlife

2.1.1 Impacts of Feral, Stray and Companion Cats

Globally, cats have contributed to at least 14% of bird, reptile, and mammal extinctions in the last 500 years, through predation, facilitation of disease transmission, behavioural changes and hybridisation (Bassett et al., 2020; Doherty et al., 2016). On islands, cats have played a direct role in the extinction of multiple species (Table 1) (Medina et al., 2011). In NZ, cats are classified into three categories: companion cats that live with and depend on humans for their welfare (also called pet cats or owned cats), stray cats that partly rely on humans for food and shelter, directly or indirectly, and live around human habitations, and feral cats, that have minimal or no reliance on humans, and survive independently (Farnworth et al., 2011; Glen et al., 2023). Estimates are that NZ has 1.2 million companion cats (CANZ, 2020), 200,000 stray cats, and 2.4 million feral cats (Donnell, 2021). With almost four million cats in NZ, we must have effective cat management to reduce the effects of cats on wildlife.

Domestic cats (*Felis catus* Linnaeus, 1758) are opportunistic, generalist predators that exploit a wide range of prey (Bassett et al., 2020; Glen et al., 2023; Loyd et al., 2013; Read, 2019). Cat predation on wildlife has been well documented in NZ and overseas, with cats posing a significant threat to birds, reptiles, amphibians, and small mammals (Baker et al., 2008; Bassett et al., 2020; Bischof et al., 2022; Dickman, 2009; Glen et al., 2023; Grayson & Calver, 2004; Kays & DeWan, 2004; Kays et al., 2020; Krauze-Gryz et al., 2017; Legge et al., 2020; Loss et al., 2018; Loss & Marra, 2017; Loyd et al., 2013; McGregor et al., 2015; Mori et al., 2019; Morgan et al., 2009; Read, 2019; Trouwborst et al., 2020; van Heezik et al., 2010; Wierzbowska et al., 2012; Woinarski et al., 2017).

Cats have some positive impact on wildlife, as they can sometimes contribute to the control of other invasive predators such as rats (Badenes-Pérez, 2023; Morgan et al., 2009; Wood et al., 2016), however, this does not negate their negative impacts (Glen et al., 2023; Morgan et al., 2009). Additionally, a USA-based study of the impact of cats on rat populations found that rats changed their space use in response to the presence of cats. As such, rats were less likely to be seen by observers (Parsons et al., 2018). Parsons et al. (2018) believe this change in space use may explain the common perception of cats as controllers of rodents, as they observed few direct predation attempts on rats throughout the study despite high cat and rat densities.

Cat hunting behaviour varies by individual and by season, with cats more active in mild weather months than in cold or extreme heat (Kikillus, Chambers, et al., 2017; Krauze-Gryz et al., 2017; Loyd et al., 2013; van Heezik et al., 2010). Cats also exhibit atypical hunting behaviour, as they often do not kill prey for sustenance (Krauze-Gryz et al., 2017; Loyd et al., 2013; McGregor et al., 2015), and the amount of food a cat is fed does not affect its propensity to hunt, as hunting behaviour is also associated with individual characteristics and opportunity to roam (Metsers et al., 2010). A behavioural study by Loyd et al. (2013) found that of successful hunts by companion cats, 49% of prey were left at the capture site, 23% were brought home, and 28% were eaten.

Feral, stray and companion cats have varying impacts on wildlife. Feral cats pose a significant threat to wildlife (Longcore et al., 2009). They receive little or no food from humans, so they hunt up to four times more than stray and companion cats (Kays & DeWan, 2004). Feral cats in Australia are estimated to be between 2.1 and 6.3 million depending on climate conditions (Read, 2019). These cats kill approximately 650 million reptiles and 377 million birds annually (Read, 2019). However, according to an Australian study by McGregor et al. (2015), even feral cats kill prey for reasons other than sustenance. McGregor et al. (2015) recorded 101 hunting events from 89 hours of footage and found 32 successful events. Of these, 28% of kills were not eaten. In NZ, one feral cat was found to have killed 102 native bats in seven days (Department of Conservation, 2010). Local news and the NZ public tend to focus on the impacts of feral cats (Walker et al., 2017). However, the role of domestic cats in wildlife predation and how to manage these impacts is gaining increasing public awareness, with articles from Radio New Zealand, BBC, Stuff and 1News (Brettkelly, 2022; Dowling, 2023; Nine to Noon, 2024; Page, 2023).

The management and impact of stray cats is a particularly contentious topic. They are semi-owned and fed by carers, and these carers do not want them destroyed, but due to the atypical hunting behaviour of cats, feeding stray cats results in only a minor reduction of wildlife predation compared to truly feral cats (Kays & DeWan, 2004; Metsers et al., 2010; Palmer & Thomas, 2023; Trouwborst et al., 2020). Stray cats, like all cats, also cause indirect wildlife impacts, such as fear effects and disease spread (Loss & Marra, 2017). Studies on companion cat impacts found that around 50–80% of owned cats are allowed outdoors to hunt, and only a fraction of prey is returned to residences (Trouwborst et al., 2020). Loyd et al. (2013) and Jones (2008) note that many studies of companion cat predation rely on surveys with owners reporting cat kills. As such, the full impact of companion cat predation may be vastly underestimated, given that 77% of prey caught in the Loyd et al. (2013) study would not have been presented to their owners. This view is supported by Morgan et al. (2009), who note that not all prey brought home will be found and reported by owners. The impact of stray and companion cats is highest in urban and suburban suburbs, where there are high densities of cats.

Table 1: Island species extinctions linked to cats (Adapted from Medina, F. M., et al. (2011) with permission from John Wiley and Sons)

Country	Region	Species	Impact
NZ	Mangere Island	Chatham Island bellbird (*Anthornis melanocephala* G.R. Gray, 1843)	Extinct
		Chatham Island fernbird (*Bowdleria rufescens* Buller 1869)	
		Chatham Island rail (*Cabalus modestus* Hutton, 1872)	
	Little Barrier, Stewart and Herekopare Islands	North Island snipe (*Coenocorypha barrierensis* Oliver, 1955)	
	Stewart Island	Laughing owl (*Sceloglaux albifacies* G.R. Gray, 1844)	
	Stephens Island	Lyall's wren (*Traversia lyalli* Rothschild, 1894)	
		Stephens Island piopio (*Turnagra capensis minor* J.H. Fleming, 1915)	
	Stephens and Kapiti Islands	Bush wren (*Xenicus longipes* Gmelin, 1789)	
	Raoul Island	White-necked petrel (*Pterodroma cervicalis cervicalis* Salvin, 1891)	Extirpated
Mexico	Granito Island	Granitos deer mouse (*Peromyscus guardia harbinsoni* Banks, 1967)	Extinct
	Guadalupe Island	Guadalupe caracara (*Caracara lutosa* Ridgway, 1876)	
		Guadalupe flicker (*Colaptes auratus rufipileus* Ridgway, 1876)	
		Guadalupe towhee (*Pipilio maculatus consobrinus* Ridgway, 1876)	
		Guadalupe ruby-crowned kinglet (*Regulus calendula obscurus* Rigdway, 1876)	
	María Madre Island	Nelson’s Rice Rat (*Oryzomys nelsoni* Merriam, 1898)	
	Montserrat Island	Bailey's pocket mouse (*Chaetodipus rudinoris fornicatus* Burt, 1932)	
	San Roque Island	San Roque white-footed mouse (*Peromyscus maniculatus cineritius* Allen, 1898)	
	Socorro Island	Socorro dove (*Zenaida graysoni* Grayson, 1872)	Extinct in the wild
	Mejía Island	Mejía deer mouse (*Peromyscus guardia mejiae* Burt, 1932)	Critically endangered, possibly extinct
Ecuador, Galápagos Islands	Santa Cruz Island	Darwin’s Galápagos mouse (*Nesoryzomys darwini* Osgood, 1929)	Extinct
	Santa Cruz and Baltra Islands	Indefatigable Galápagos mouse (*Nesoryzomys indefessus* Thomas, 1899)	
	San Cristóbal Island	San Cristóbal Island rice rat (*Aegialomys galapagoensis galapagoensis* Waterhouse, 1839)	

USA	Navassa Island	Navassa curlytail lizard (*Leiocephalus eremitus* Cope, 1868)	
	Hawai'i	Hawaiian crake (*Zapornia sandwichensis* Gmelin, 1789)	
		Hawaiian crow (*Corvus hawaiiensis* Peale, 1849)	Extinct in the wild
Japan	Chichi-jima, Ogasawara Islands	Bonin grosbeak (*Chaunoproctus ferreorostris* Vigors, 1829)	Extinct
		Bonin thrush (*Zoothera terrestris* Kittlitz, 1830)	
Australia	Lord Howe Island	Lord Howe Island parakeet (*Cyanoramphus novaezelandiae subflavescens* Salvadori, 1891)	
Chile	Alejandro Selkirk Island	Alejandro Selkirk firecrown (*Sephanoides fernandensis leyboldi* Gould, 1870)	
Honduras	Little Swan Island	Little Swan Island hutia (*Geocapromys thoracatus* True, 1888)	
Italy	Santo Stefano Island	Santo Stefano lizard (*Podarcis siculus sanctistephani* Mertens, 1926)	
Solomon Islands	Choiseul Island	Choiseul crested pigeon (*Microgoura meeki* Rothschild, 1904)	

2.1.2 Urban and Suburban Wildlife Impacts of Cats

Stray and companion cats are highly concentrated in urban and suburban areas (Krauze-Gryz et al., 2017; Thomas et al., 2014). Kays et al. (2020) found that, worldwide, pet cats have an ecological impact greater than native predators but concentrated within ~100 m of their homes. Due to the density of companion cats in urban areas, they collectively kill 28–52 times more animals per square kilometre than feral cats living in urban environments (Legge et al., 2020). Urban and suburban areas provide habitat for a diverse range of flora and fauna (Angold et al., 2006; Kikillus, Chambers, et al., 2017; Tratalos et al., 2007; Pennington et al., 2008; Seewagen & Slayton, 2008; Woolley & Hartley, 2019). Cats are one of the most common avian predators in urban areas (Baker et al., 2008; Krauze-Gryz et al., 2017). The impact of cats on birds is not restricted to predation, as they also increase sub-lethal factors such as reduction in fecundity and food delivery to chicks (Krauze-Gryz et al., 2017; Loss & Marra, 2017; Woolley & Hartley, 2019). The high concentration and predation rates of cats in urban and suburban areas warrant strict cat management practices in these areas.

The distance a cat ranges varies based on numerous factors. The average home range of a companion cat is 3 ha (Kikillus, Woods, et al., 2017; Metsers et al., 2010), although cats can have a max range of 6.8 ha (Thomas et al., 2014). Cats range further at night than during than day, however, they are more likely to hunt in daylight hours (Metsers et al., 2010). Bigger cats have larger home range sizes, as do cats living near natural areas such as wetlands and reserves, or in rural areas (Kikillus, Chambers, et al., 2017; Metsers et al., 2010). Whether a cat is desexed or not also influences its range size, with entire

male cats ranging further (Morgan et al., 2009). Urban cats also range into natural and rural areas (Bischof et al., 2022; Kikillus, Chambers, et al., 2017). If urban and suburban areas are located near significant ecological areas, the effectiveness of these areas for wildlife conservation is reduced by cat predation (Krauze-Gryz et al., 2017; Wierzbowska et al., 2012).

Research recommends a buffer zone around significant ecological areas where cats are not permitted (Thomas et al., 2014). The size of this buffer zone is contested in research, with Lilith (2007) suggesting a buffer zone of 360 m around housing development, and Thomas et al. (2014) suggesting a zone of 300–400 m based on ranging characteristics observed in their study. Metsers et al. (2010) suggest that buffer zones in rural areas would need to be at least 2.4 km wide, while urban fringe buffers could be 1.2 km. Metsers et al. (2010) state that despite the relatively small home range sizes of companion cats, buffer zones need to be wider than 300 m to account for large inter-cat variations in ranging behaviour to effectively exclude cats from significant ecological areas.

Effective buffer zone size is also complicated by cat territorial behaviour and regional variations (Lilith, 2007; Metsers et al., 2010). Higher cat densities can contribute to smaller territory size and ranging distance. As such, cat-free zones could contribute to greater range distance of remaining cats due to a reduced density, which reduces the effectiveness of buffer zones (Thomas et al., 2014). While cat containment is not currently included in NZ cat management, it has become more common overseas, with Australian States ACT, Victoria and SA passing cat containment legislation (NESP Threatened Species Recovery Hub, 2021). The urban and suburban impacts of cats are of significant concern, and further research is needed to determine the full impact of urban and suburban cats on wildlife, and what size a buffer zone would need to be to keep cats from significant ecological areas. NZ also presents a unique situation, as there are additional cat impacts to consider due to the nature of our environment.

2.1.3 Cat Predation on Wildlife in Aotearoa New Zealand

NZ has many native threatened bird species (Department of Conservation, n.d.a), some of which are becoming more prominent in urban areas thanks to conservation efforts. Populations of red-crowned parakeet/kākāriki (*Cyanoramphus novaezelandiae* Sparrman, 1787), North Island kākā (*Nestor meridionalis septentrionalis* Lorenz, 1896) and South Island kākā (*Nestor meridionalis meridionalis* Gmelin, 1788) are increasing in Wellington and Dunedin, due to Zealandia and Orokonui Ecosanctuary providing predator-free spaces for these birds within the city boundaries (Ballance, 2018; Concannon, 2021). However, sanctuaries within urban areas place bird species at risk of predation by cats.

Cats have no natural predators in NZ (Kikillus, Chambers, et al., 2017). This poses an additional cat management problem, as cat impacts are most severe on islands without native predatory mammals

(Loss & Marra, 2017). NZ's native species have also evolved in the absence of predatory mammals and are often naïve to the risks posed by mammalian predators (Kikillus, Chambers, et al., 2017). Additionally, NZ cities have a high density of companion cats, with 220–250 cats per km^2 (van Heezik et al., 2010). NZ urban domestic cat densities are comparable to densities in the UK and the USA, with USA studies showing an average cat density of >200 cats/km^2 and one UK study reporting a median of 417.3 cats/km^2 (Aegerter et al., 2017; Bennett et al., 2021; Bischof et al., 2022). NZ has a much lower human population than the USA and the UK, and as such, urban cat densities are notably high relative to population size.

Historically, cats have contributed to the extinction of endemic species in NZ, such as the Stephens Island wren (*Traversia lyalli* Rothschild, 1894) and the decline of several reptile populations (Kikillus, Chambers, et al., 2017; Woolley & Hartley, 2019). Rodents, and in one study, invertebrates including tree wetas (*Hemideina thoracica* White, 1842) (Gillies & Clout, 2003), are the preferred prey of NZ cats, followed by birds (Kikillus, Chambers, et al., 2017). Although they prefer rodents, cats can still exert population-level effects on native species, such as pīwakawaka/fantail (*Rhipidura fuliginosa* Sparrman, 1787) and silvereyes (*Zosterops lateralis* Latham, 1801) (Bassett et al., 2020; van Heezik et al., 2010). Indeed, van Heezik et al. (2010) estimated the Dunedin-wide annual cat catch of silvereyes to be 20,962. The full impacts of cats in NZ are little understood and further research is required (Glen et al., 2023; Woolley & Hartley, 2019).

Belled collars and cat bibs are used in NZ to reduce cat predation to varying success. Gordon et al. (2010) found belled collars reduced cat predation of birds by 50% and mice by 61%. However, belled collars did not reduce the predation of rats, lizards, and insects (Gordon et al., 2010). Gordon et al. (2010) also note that a 50% reduction in predation may not be sufficient to ensure the viability of urban wildlife populations. International studies by Geiger et al., (2022), Calver & Thomas (2011) and Calver et al. (2007) found similar levels of reduction in predation using colourful cat collars and bells, and a motion-triggered alarm attached to a cat collar (the Liberator™). Calver et al. (2007) found that a combination of colourful cat bibs and bells reduced bird catch by 83%, herpetofauna by 33% and mammals by 44%. However, many cats learn hunting techniques that nullify belled collars, discard bells and collars, or refuse to wear them (Read, 2019). This reduces their effectiveness and prompts the need for alternative cat management methods.

2.1.4 Transmission of *Toxoplasma gondii* Parasite and Other Diseases

In addition to wildlife predation, cats transmit diseases and parasites to wildlife, livestock, companion animals, and humans (Glen et al., 2023; Horn et al., 2011; Zhu et al., 2023). Internationally, feral, stray and companion cats are associated with several zoonotic parasites. These parasites cause diseases such as toxoplasmosis, sparganosis and acute muscular sarcocystosis (Mendoza Roldan & Otranto,

2023). Toxoplasmosis, caused by the protozoa *Toxoplasma gondii,* is the main cat-associated parasite worldwide (Glen et al., 2023; Hill & Dubey, 2002; Read, 2019; Roberts et al., 2021). Cats are also the sole definitive hosts for *T. gondii*, as the parasite can only reproduce sexually in the intestinal tracts of cats (Read, 2019).

In humans, infection of *T. gondii* usually does not manifest in symptoms, however, for those who are pregnant or immunocompromised, there can be serious symptoms, such as neurological damage, miscarriages, and vision loss (Glen et al., 2023; Roberts et al., 2021). There is currently no human vaccine for toxoplasmosis, and transmission between cats and humans is high (Glen et al., 2023; Read, 2019). More than half of the human population and half of the population of free-roaming cats in many countries have been infected by toxoplasmosis (Hill & Dubey, 2002; Read, 2019). Indoor-only cats can avoid infection; however, this is only if they do not hunt or scavenge for prey, or are not fed infected meat (Read, 2019). Zhu et al. (2023) state that increasing human population density and temperature fluctuations can exacerbate environmental contamination with *T. gondii*, a cause for concern as global population and climate change effects increase.

Toxoplasmosis has been detected in native wildlife, including kiwi (*Apteryx* spp. Shaw & Nodder), kākā (*Nestor meridionalis* Gmelin, 1788), kererū (*Hemiphaga novaeseelandiae* Gmelin, 1789), red-crowned kākāriki (*Cyanoramphus novaezelandiae*), NZ sea lions (*Phocarctos hookeri* Gray, 1844) and Hector's (*Cephalorhynchus hectori hectori* van Beneden, 1881) and Māui dolphins (*C. hectori maui* Baker, Smith & Pichler, 2002) (Glen et al., 2023; Howe et al., 2014; Roberts et al., 2021; Roe et al., 2017; Taylor et al., 2023). Howe et al. (2014) reported four fatal cases of toxoplasmosis, in two kererū, one North Island brown kiwi (*Apteryx mantelli* Bartlett, 1850), and one North Island kākā (*Nestor meridionalis*). Taylor et al. (2023) tested little spotted kiwi (*Apteryx owenii* Gould, 1847) living inside the Zealandia ecosanctuary in Wellington, NZ, and found widespread exposure to *T. gondii*. Roe et al. (2017) reported systemic toxoplasmosis in a NZ sea lion, which has also been observed in California sea lions (*Zalophus californianus* Lesson, 1828) and southern sea otters (*Enhydra lutris nereis* Merriam, 1904) in North America (Carlson-Bremer et al., 2015; Miller et al., 2008).

The cause of toxoplasmosis in marine mammals has not been established, however, it is suggested that it is due to surface water run-off that has been contaminated by cat faeces (Miller et al., 2008; Roberts et al., 2021; Roe et al., 2017). *T. gondii* has also been detected in California mussels (*Mytilus californianus* Conrad, 1837) near freshwater run-off areas, further linking marine wildlife infections to contaminated surface water run-off (Miller et al., 2008; Shapiro et al., 2015). The presence of *T. gondii* in mussels poses an exposure risk to both marine wildlife and humans, as many marine mammals feed on shellfish, and humans face an increased risk of toxoplasmosis infection if they consume undercooked shellfish (Miller et al., 2008; Shapiro et al., 2015). The Department of Conservation (2020)

has developed an action plan to reduce the risk of toxoplasmosis in Hectors and Māui dolphins, which outlines the challenges in changing the behaviour of cat owners to reduce *T. gondii* environmental contamination, and the lack of information available regarding the parasite and its environmental effects. Overall, the impact of toxoplasmosis on wildlife is poorly understood, and the disease poses a significant conservation risk to native species NZ (Roberts et al., 2021).

Toxoplasmosis also infects livestock and can lead to abortions in sheep, deer, and goats (Glen et al., 2023; Roberts et al., 2021). A commercial vaccine for toxoplasmosis was developed in NZ in 1988 to reduce abortion and congenital infections in sheep and goats (Roberts et al., 2021). However, it is costly, has a short shelf life, and there are safety concerns around its use due to it being a live vaccine (Glen et al., 2023). Vaccination has not reduced the economic burden of toxoplasmosis on the sheep industry, due to the costs involved in monitoring and controlling the disease (Roberts et al., 2021; Stelzer et al., 2019). There is no vaccine for any other species, including cats (Glen et al., 2023). Toxoplasmosis is a significant health risk to humans, wildlife, livestock and companion animals, and its prevalence and spread by cats indicates a need for cat management legislation.

2.2 Current Cat Management Legislation

2.2.1 International Policies

Cat management and legislation vary widely between countries. In Australia, many local municipal councils have passed bylaws encouraging responsible cat ownership (Dickman, 2009; Franklin et al., 2021). These bylaws include clauses such as registration, desexing, dusk-to-dawn curfews, designated cat-free zones, requirements for cats to wear bells, limits on the number of cats allowed per household and in some places, 24-hour containment to owners' properties (Dickman, 2009; Franklin et al., 2021; NESP Threatened Species Recovery Hub, 2021). Some bylaws also allow unowned cats to be removed from parks and other sensitive habitat areas (Dickman, 2009). The Tasmania Government passed the Cat Management Act in 2009, requiring all cats to be microchipped and desexed, restrictions on breeding cats, limits on the number of cats per household, and guides on how to deal with feral and stray cats (Tasmanian Government, n.d.).

Feral cats are controlled and removed under the Australian Federal Government's Threat Abatement Plan for Predation by Feral Cats and the Threatened Species Strategy (Hillier, 2017; Trouwborst et al., 2020). In all jurisdictions in Australia, it is an offence to abandon cats, under animal welfare or animal management legislation depending on the territory (Sumner et al., 2022). In British Columbia, Canada, a municipal bylaw has been passed requiring cats to stay within their property boundaries, however, Booth & Otter (2022) note that this has not been strictly enforced. Conversely, in Italy, a No-Kill cat management policy was passed in 1991 (Natoli et al., 2019). This law gives cats the right to live free and safe and requires cats to be neutered by the Veterinary Services of the Local Health Unit, and the

institutionalisation of cat caretakers (Natoli et al., 2019). The Spanish government passed a similar law, prohibiting the culling of unowned cats in favour of a trap-neuter-return (TNR) program (Carrete et al., 2022).

Each approach has been determined suitable based on the country involved and the public perceptions of cat management, with Italy and Spain deciding on a more sensitive, cat welfare-based approach. However, Carrete et al. (2022) are critical of the Spanish law, stating that while animal welfare issues should be considered, cat management law should focus on minimising the number of free-roaming cats in the shortest time possible and limiting the outdoor access of companion cats. This view is supported by several studies, which state that TNR is ineffective at reducing cat populations, their suffering, or their impacts on wildlife and humans (Carrete et al., 2022; Castillo & Clarke, 2003; Coe et al., 2021; Crawford et al., 2019; Farnworth et al., 2010; Greenwell et al., 2019; Lepczyk et al., 2010; Lohr et al., 2013; Longcore et al., 2009; Loss & Marra, 2018; Read, 2019; Read et al., 2020; Sizemore & Wallace, 2014).

Trouwborst et al. (2020) consider that there are many international legally binding commitments, defined as invasive alien species law, protected area law, and species protection law, that technically require control of feral and domestic cats. Examples of these are the Conference of the Parties 1992 Convention on Biological Diversity, the 1971 Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) (Trouwborst et al., 2020), both of which NZ has signed (Convention on Biological Diversity, n.d.; Department of Conservation, n.d.b).

2.2.2 Aotearoa New Zealand Policies

Feral, stray and companion cats are managed in different ways in NZ policy. The impacts of feral cats in NZ are managed under the Wildlife Act 1953, the Conservation Act 1987, and the Biosecurity Act 1993. The Animal Welfare Act 1999 states that it is an offence to commit wilful or reckless ill-treatment towards feral and stray cats, makes it an offence to abandon an animal, and sets out the responsibilities of cat owners (Sumner et al., 2022). Specific clauses relating to stray cats are included in some Regional Pest Management Plans, such as Auckland, Northland, and Wellington (Sumner et al., 2022). These include restrictions such as prohibiting the feeding and moving of stray cats or, in Northland, defining them as a pest (SPCA, n.d.c; SPCA, n.d.d). Cats are managed under bylaws or regional pest management plans by regional or district councils, and the management required varies in each region (Sumner et al., 2022; SPCA, n.d.c; SPCA, n.d.d).

Twenty-two of the seventy-eight regional, territorial, and unitary councils in NZ have bylaws with cat-specific clauses (Buller District Council, 2023; Hutt City Council, 2024; Sumner et al., 2022; SPCA, n.d.c; SPCA, n.d.d; Selwyn District Council, n.d.). Of these, ten councils only include limits on the number of cats per household (Kikillus, Chambers, et al., 2017; Sumner et al., 2022; SPCA, n.d.c; SPCA, n.d.d). Four

councils have bylaws that include the full suite of currently accepted cat management legislation: limiting the number of cats per household and requiring mandatory microchipping, desexing and registration. Six councils have requirements for mandatory microchipping, desexing and registration but no limits on the number of cats. One council's bylaw only includes limits on the number of cats per household and mandatory desexing, and one, Selwyn District Council, includes only mandatory microchipping and registration (Sumner et al., 2022; SPCA, n.d.c; SPCA, n.d.d; Selwyn District Council, n.d.).

Whether each clause is included depends on public acceptance. For example, Selwyn District Council dropped desexing from their bylaw based on public feedback (Sandys, 2021). The Tasman District Council and Nelson City Council are currently creating cat management bylaws (Nelson City Council, 2024; Tasman District Council, n.d.). The Gore District Council and Far North District Council are considering creating cat management bylaws (Ling, 2023; Gore District Council, 2023). The Tasman District Council bylaw will include mandatory microchipping, registration and desexing as public feedback indicated support for all three measures (Tasman District Council, n.d.).

Groups such as the SPCA and the National Cat Management Strategy Group (NCMSG) consider national cat legislation to be the best solution for NZ, and to resolve discrepancies between each council's cat bylaw requirements (SPCA, n.d.c; SPCA, n.d.d; NCMSG, 2020). Sumner et al. (2022) also believe a national cat act would improve cat welfare, protect biodiversity, and reduce nuisance. Walker et al. (2017) state that a national cat management strategy may achieve a balance between the benefits of cat ownership and the negative societal and environmental impacts of cats. Somerfield (2019) suggest a national management strategy, national policy statement, or action plan could be used to address the cat management issue.

In July 2023, the Environment Select Committee, in response to a petition asking Parliament to mandate the registration and desexing of pet cats and kittens, recommended that the government develop and implement a nationwide cat management framework (Environment Select Committee, 2023). The Environment Select Committee also recommended that this framework be based on the principle that cats should be registered, desexed and microchipped with appropriate exemptions (Environment Select Committee, 2023). However, in November 2024 the Government shelved the proposed National Cat Act (Environment Select Committee, 2023; Sharpe, 2024). The effectiveness of a national or localised approach would be determined by public acceptance, and this can vary from region to region.

2.3 Public Perception of Cats

2.3.1 Global Studies

Studies have considered the public perception of cats in various countries. There is considerable debate, in the scientific community and among the public, around the degree to which cats cause wildlife mortality and whether that mortality results in significant population loss (Badenes-Pérez, 2023; Kays & DeWan, 2004; Longcore et al., 2009; Loss & Marra, 2017; Loyd & Hernandez, 2012; Read, 2019; Wald & Peterson, 2020). Dickman (2009) notes that the strong public affection for cats and the limited empirical evidence of their actual impacts has hampered attempts to manage them effectively. Dickman (2009) also notes that community surveys generally indicate strong support for legislation that promotes informed cat ownership, but less support for proposals that restrict cat ownership or cat-free zones, a sentiment also reflected in the NZ study analysis below.

Of international studies, one of the most cited is Hall et al. (2016), as researchers surveyed citizens from at least two cities in Australia, NZ, the UK, the USA, China, and Japan. Hall et al. (2016) found high support for desexing but low support for cat legislation and containment measures in NZ, the USA, and the UK. Japan, China, and Australia showed greater support for legislation and confinement. All countries agreed that it is important to have wildlife in cities, towns, and rural areas. There were varying opinions on the impacts of cats on wildlife, with nonowners in all countries more likely to agree that cats caused wildlife impacts than owners (Hall et al., 2016).

Differences of opinion between countries were attributed to several factors. For example, cat ownership has declined in Australia, and not owning a cat is associated with concern for native wildlife (Hall et al., 2016). However, opinion is divided between cat owners and nonowners, with owners much less likely to support legislative control of cats, although there is still a high level of concern compared to other countries (Carter et al., 2020; Elliott et al., 2019; Franklin et al., 2021; Hall et al., 2016; Travaglia & Miller, 2018). NZ shares Australia's concern for native wildlife and the divide between the perception of wildlife impacts by cat owners and nonowners. USA respondents were less concerned about wildlife impacts and the need for legislation; however, the USA has a high rate of indoor-only cats due to fear of predation by large mammals (Gramza et al., 2016; Hall et al., 2016).

UK respondents were the least supportive of cat legislation and were less likely to believe cats impacted native wildlife. Crowley et al. (2019) attribute this to greater concern for cat welfare than the impact of cat predation on wildlife. Japan was the only country where owners were more supportive of restrictions than nonowners, with China also showing significant support for restrictions by both owners and nonowners (Hall et al., 2016). The differences between countries can be due to cultural practices, the presence and importance of native wildlife, large predators that could harm cats, the size and complexity of urban environments, cat welfare concerns and conservation concerns (Hall

et al., 2016; Leong et al., 2020; Loss & Marra, 2017; Woolley & Hartley, 2019). As such, each country must deal with cat management legislation differently due to the varying opinions on legislative practices, cat welfare, and the impact of cats on wildlife.

2.3.2 Aotearoa New Zealand Studies

There are many studies on the public perception of cats in NZ. Firstly, it is important to understand the demographics of cat owners in NZ. A survey by CANZ (2020) found that cat ownership is highest among females (43% versus 39% male), NZ European ethnicity households (46% versus 36% Māori, 20% Pacific Peoples, 24% Asian and 32% Other), families with children at home (49% of households with children aged 9–17 years, 44% with children aged 0–8 versus 38% with no children at home) and higher-income households (46% over $90k versus 41% $40-90k and 36% under $40k). The survey also found that 49% of cats in NZ are microchipped and 88% are desexed. 83% of cats were reported as indoor/outdoor, with 11% indoor only and 5% outdoor only. Compared to the 2015 survey, indoor/outdoor cats have slightly decreased from 88% to 83%, and indoor-only cats have increased from 8% to 11% (CANZ, 2020).

Decisions regarding cat management must consider a wide range of perspectives (Aguilar et al., 2015). For example, Wellington City Council's Animals Bylaw generated much public controversy, as while many people agreed with the proposal due to wildlife concerns, others felt that the bylaw encroached upon their rights and threatened the safety of their cats (Woolley & Hartley, 2019). The contribution of cats to rodent population suppression has also led to disparate views among the public (Farnworth et al., 2014; Kikillus, Chambers, et al., 2017; van Heezik et al., 2010). Kikillus, Chambers, et al. (2017) found widespread agreement that pet cats harm wildlife in nature reserves, however, nonowners were more likely to support cat legislation than cat owners.

Sumner et al. (2022) highlighted cat owners' tendency to underestimate their cats' impact on native wildlife and prioritise cat welfare. Walker et al. (2017) revealed varying support for cat legislation, with older individuals more likely to comply with legislation, while younger individuals would benefit from more education about the benefits of legislation for wildlife and cat populations. Currently practised bylaw measures such as limits on the number of cats and mandatory microchipping, registration and desexing were more supported by survey respondents (between 60 to 70%) than stricter measures such as confinement to property or inside the home (30–40%). However, cat-restricted areas also had high support (~65%), demonstrating that some stricter measures are favoured by the public (Walker et al., 2017).

Bassett et al. (2020) noted higher acceptance of desexing and microchipping but lower awareness of cat impacts among owners. Chamberlain et al. (2024), Gates et al. (2019), Ovenden et al. (2024) and Woolley & Hartley (2019) found that owners had concerns about the impact of cat containment on cat welfare and mixed support for stricter regulations like cat containment and cat exclusion zones, as well

as varied perceptions of the impact of cats on native wildlife (Figure 1). Forrest et al. (2019) found widespread support for desexing and microchipping among cat owners across all sixteen NZ regions. These studies show that cat owners in NZ often underestimate or are ignorant of the impact of cats on wildlife and can favour their cat's welfare over the impacts they cause. As such, bylaw clauses that benefit cat welfare, like desexing and microchipping (Kent et al., 2022; Sumner et al., 2022), are more acceptable than those focused on wildlife and nuisance impacts, like containment and curfews.

NZ economist and former politician Gareth Morgan sparked national discussions around cat management with his controversial 'Cats to Go' campaign in 2013 (The Morgan Foundation, n.d.a). The campaign focused on the wildlife impacts of cats, encouraging owners to microchip, register, desex and contain their cats to their property 24/7, and to not replace their cat when it died (The Morgan Foundation, n.d.b). The 'Cats to Go' campaign generated a strong emotional response in NZ and overseas (Adam, 2013). The Morgan Foundation received hate mail and death threats (The Morgan Foundation, n.d.a).

Local news articles stated that Morgan wanted to "wipe out cats" (Wade, 2013) and called his campaign an "attack on cats" (Cowlishaw, 2013). The campaign even made international news, with articles in National Geographic, the New York Times, and the Guardian, with the latter labelling the controversy "the Kiwi cat wars" (Adam, 2013; Andreassi, 2013; Mullany, 2013). Read (2019) stated that the "feverish and emotive debate" resembled the gun control debate raging in the USA at the time and that cat owners were "not prepared to give ground or listen to reasoned debate" (Read, 2019, p. 247-248). Despite the controversy, public perceptions of cats have shifted more towards Morgan's ideals, with NZ residents showing strong support for a National Cat Management Strategy and exclusion zones to protect wildlife from cats (Read, 2019; Walker et al., 2017).

In studies on the public perception of cats in NZ, there has been little regional variation, with most studies conducted on Auckland residents (Bassett et al., 2020; Farnworth et al., 2011; Ovenden et al., 2024; Walker et al., 2017). Hall et al. (2016) included Auckland and Dunedin in their international analysis and Woolley & Hartley (2019) surveyed a small portion of Wellington residents, with surveys delivered to residents within 100 m of the Polhill Reserve. While online surveys gather responses from across NZ, women can be overrepresented, as women are more likely to respond to online surveys than men (Becker, 2022; Smith, 2008). This was found in Chamberlain et al. (2024) and Forrest et al. (2019) with 64% and 92.3% of respondents identifying as female, respectively. Respondents were also predominantly NZ European, with a 76% representation in Chamberlain et al. (2024) and a 93.5% representation in Forrest et al. (2019). This may be correlated with the higher rates of cat ownership among women and NZ Europeans (CANZ, 2020). Overall, in NZ studies, there is a need for further research from different regions to gain a broader view of the public perceptions of cats and cat management practices.

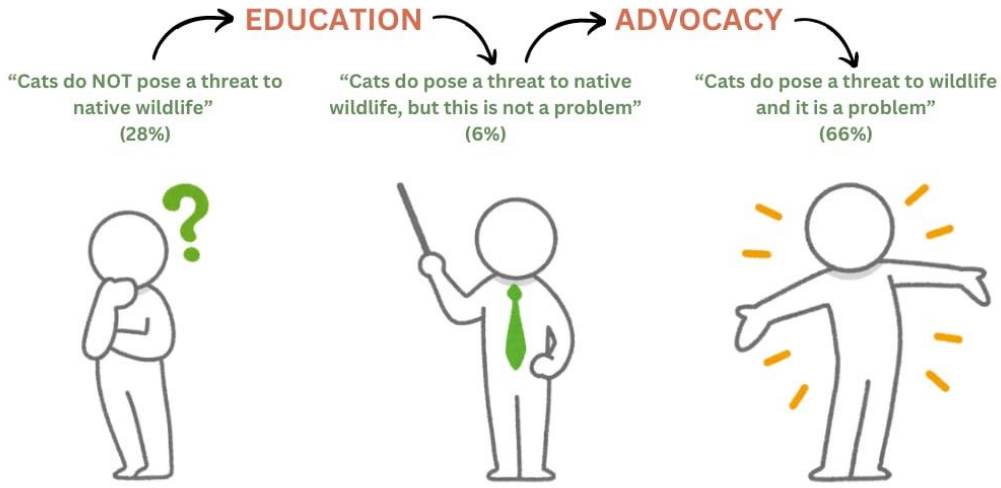

Figure 1: Public perceptions about wildlife predation by cats (quotes) and strategies for affecting changes in public perceptions (arrows). Adapted from Woolley & Hartley (2019), with permission from the authors and Springer Nature

2.4 Benefits of and for Cat Ownership

2.4.1 Benefits of Owning a Cat

There has been much research on the potential benefits of pet ownership to human mental and physical health (Atherton et al., 2023; Castelli et al., 2001; Du et al., 2021; El-Qushayri et al., 2020; Hardie et al., 2023; Kretzler et al., 2022; Nagasawa et al., 2020; Qureshi et al., 2009; Rieger & Turner, 1999; Riggio et al., 2022; Stammbach & Turner, 1999; Taniguchi et al., 2018; Walsh, 2009; Zimolag & Krupa, 2009), the psychosocial development of children (Carlisle et al., 2021; Christian et al., 2020; Melson, 2003; Walsh, 2009), providing support and companionship to elderly individuals (Branson et al., 2019; Cryer et al., 2021; Giansanti et al., 2022; Stanley et al., 2013), and reducing feelings of isolation during the COVID-19 pandemic (Kogan et al., 2021; Ogata et al., 2023; Phillipou et al., 2021; Sudbury-Riley, 2024). However, several researchers state that more evidence is required to determine whether pets have beneficial effects on human health, as benefits attributed to pets are often largely explained by confounding factors, such as the pet owner's pre-existing mental health or social support networks (Barroso et al., 2021; Miles et al., 2017; Ravenscroft et al., 2021; Westgarth et al., 2010; Wood et al., 2005).

Several studies found that pet ownership did not improve mental and physical health (Enmarker et al., 2014; Ogata et al., 2023; Phillipou et al., 2021), or that the benefit was not significant (Schreiner, 2016). Additionally, some studies found that pet ownership had benefits for dog owners but not cat owners, which can be attributed to the associated physical and social activity involved in caring for dogs (Albright et al., 2022; McCune et al., 2014; Minatoya et al., 2020; Taniguchi et al., 2018; Veronese et al., 2019). Ravenscroft et al. (2021) state that the primary benefits of cat ownership are different than

dog ownership, due to the difference in activities associated with each pet. As such, there is further research needed on the relationship between humans and cats. Ravenscroft et al. (2021) conducted a study on cat-human related activities and their impacts on owner well-being. Owners reported that tactile interactions and providing for their cats benefited their well-being, while cat behavioural problems and failure to meet the cats' needs had a negative effect (Ravenscroft et al., 2021). The well-being benefits of caring for a pet and through tactile interactions with pets have been mentioned in several studies, with touching animals reported to reduce stress, anxiety and blood pressure (Barker et al., 2005; Brkljačić et al., 2020; Freedman et al., 2020; Glaw et al., 2017; Kaminski et al., 2002; Lal et al., 2013).

While research suggests various benefits associated with pet ownership, the evidence is mixed and often influenced by confounding factors such as a pet owner's existing mental health and social support networks. Several studies highlight that pets may aid in children's psychosocial development, provide companionship for the elderly, and provide mental and physical health benefits to owners. However, the findings are not universally positive, with some research showing limited or no significant health improvements. Ravenscroft et al. (2021) state that cat ownership can offer wellbeing benefits through tactile interactions and caregiving, however, behavioural issues and unmet care needs may detract from these benefits.

Overall, these findings indicate a need for further research to better understand the unique dynamics of cat-human relationships and to clarify the specific ways in which different types of pet ownership may impact human health and well-being. Despite the mixed evidence on the benefits of owning a pet, pet owners in these studies usually believed that their pets had positive impacts on their well-being and considered their pets as companions and family members (Brkljačić et al., 2020; Charles & Davies, 2008; Cryer et al., 2021; Freedman et al., 2021; Hardie et al., 2023; Kaminski et al., 2002; Ravenscroft et al., 2021; Stammbach & Turner, 1999; Sudbury-Riley, 2024; Ryan & Ziebland, 2015; Wood et al., 2005). As such, the complex relationship between people and their pets is an important aspect for decision-makers to consider when creating cat management legislation.

2.4.2 Benefits for Owners and Cats of Microchipping, Registration, Desexing and Containment

Bylaw clauses such as microchipping, registration, desexing and containment have animal welfare benefits for cats and cat owners, as well as benefits for cat management nationally (Sumner et al., 2022). Nationally, desexing reduces cat abandonment and relinquishment to shelters (SPCA, n.d.c; Sumner et al., 2022). For cats and cat owners, desexing reduces the risk of reproductive diseases, increases cat lifespan (Kent et al., 2022), reduces unwanted behaviours such as hyperactivity, aggression and urine marking, reduces risks associated with roaming, and increases affectionate

behaviour (Sumner et al., 2022). If done between three and five months of age, the surgical procedure is also faster, and recovery time, stress and complications associated with surgery are reduced (Sumner et al., 2022).

Microchipping and registration enable lost cats to be returned home faster. During the 2011 Christchurch earthquake, 85% of cat owners with lost cats were contacted by the NZ Companion Animal Register within three hours, while only 25% of non-microchipped cats were reunited with their owners within seven days (SPCA, n.d.c). An Australian study by Lancaster et al. (2015) supported these findings, with 51% of microchipped cats returned to their owners compared to only 5% of non-microchipped cats. However, Lancaster et al. (2015) note that owners must keep their microchips and registration details updated for microchips to be effective. Roaming presents a high risk to cats, with a UK study by Elliott et al. (2019) finding that two-thirds of cat-owning respondents reported having lost at least one cat to an incident related to roaming. Roaming increases the risk of cats contracting diseases or parasites, injuries, or death due to traffic, predation from larger mammals (in some countries), ingestion of toxins, and becoming lost (Tan et al., 2020). Roaming also causes nuisances to human neighbours due to cats digging and defecating on neighbours' properties, predating at birdfeeders, and vocalisations such as yowling associated with fighting and mating (Tan et al., 2020).

Containing cats on an owner's property through cat-specific fence barrier products or secure outdoor spaces such as catios can result in cats spending more time outside and enable them to engage in naturalistic behaviours (de Assis & Mills 2021; Hall et al., 2016; Tan et al., 2020). It also reduces the risk of other cats entering the owner's property and reduces owner concern about their cat's welfare while outside (de Assis & Mills, 2021; Toukhsati et al., 2012). Concerns about a cat's welfare and lack of ability to engage in naturalistic behaviours due to being confined (Elliott et al., 2019; McLeod et al., 2015; Woolley & Hartley, 2019) can be reduced through adequate enrichment such as scratching posts and other toys, and secure outdoor access (Tan et al., 2020; Toukhsati et al., 2012). However, there are external barriers to containment measures, such as financial costs and the inability to modify rental properties (McLeod et al., 2015). Roaming restrictions also reduce the transmission of *Toxoplasma gondii* and other zoonotic parasites to humans, wildlife, and livestock (Stelzer et al., 2019; Stull et al., 2015).

Overall, there are many benefits to bylaw clauses such as microchipping, desexing, registration and containment. However, owners are not always receptive to these cat management practices, due to a lack of education, misinformation, or concern that these practices will inhibit a cat's welfare and free will (Hall et al., 2016; Sumner et al., 2022). Targeted education and advocacy campaigns may increase the effectiveness of and compliance with cat legislation (Sumner et al., 2022; Woolley & Hartley, 2019).

2.5 Summary

Cats have a significant impact on wildlife, especially in urban and suburban areas where they are at high densities (Bassett et al., 2020; Kayes et al., 2020; Legge et al., 2020). NZ has additional wildlife impact issues, such as native species that are naïve to predation by mammals, and no cat predators (Kikillus, Chambers, et al., 2017). Free-roaming cats also spread diseases and parasites, such as *Toxoplasma gondii,* to humans, wildlife, livestock, and other companion animals (Glen et al., 2023; Horn et al., 2011; Zhu et al., 2023). Cat legislation internationally and in NZ is predominantly done through bylaws. These bylaws include various management clauses such as desexing, microchipping, registration, limits on the number of cats allowed per household, and in some countries, curfews, and containment (Booth & Otter, 2022; Dickman, 2009; Franklin et al., 2020; Kikillus, Chambers, et al., 2017; Sumner et al., 2022; SPCA, n.d.c; SPCA, n.d.d). Public perception of the impact of cats on wildlife, the risk of disease and parasite transmission by cats, and the need for cat management legislation vary by country (Dickman, 2009; Hall et al., 2016; Leong et al., 2020; Loss & Marra, 2017; Woolley & Hartley, 2019).

While most cat owners and nonowners in NZ consider cats to have negative impacts on native wildlife, many cat owners believe feral and stray cats cause more impacts than companion cats and concerns for cat welfare are usually rated higher than concerns for wildlife by cat owners (Bassett et al., 2020; Gates et al., 2019; Kikillus, Chambers, et al., 2017; Sumner et al., 2022; Walker et al., 2017). Whether cat ownership provides mental and physical health benefits to owners is yet to be determined, and more research is needed to understand the human-cat relationship (Barroso et al., 2021; Miles et al., 2017; Ravenscroft et al., 2021; Westgarth et al., 2010; Wood et al., 2005). However, owners have strong, often familial relationships with their pets (Cryer et al., 2021; Charles & Davies, 2008; Ryan & Ziebland, 2015), which must be considered in any cat management plan.

Cat legislation provides benefits to cats, cat owners, wildlife, and the public, yet cat owners are not always receptive to cat management measures (Kent et al., 2022; Lancaster et al., 2015; Sumner et al., 2022; Tan et al., 2020; Toukhsati et al., 2012). The significant difference in opinion between cat owners and nonowners of the impacts of cats on wildlife, their nuisance effects on humans, and desire or lack thereof for cat legislation, as well as the regional and gender overrepresentation present in NZ studies, indicate a need for further research of public perceptions on cat bylaws. By developing a better understanding of public perceptions of cats and cat bylaws, decision-makers will be better equipped to create effective cat management legislation.

Chapter 3

Methodology

3.1 Introduction

This research was conducted using a mixed methods comparative analysis approach, integrating and combining qualitative and quantitative methods and then drawing inferences from the integration to address the research questions (Creswell, 2022; Creswell & Plano Clark, 2011; Kahwati & Kane, 2020; Kara, 2022). The five councils gathered submissions from the public on their perceptions of cat bylaws in their region. Qualitative analysis was used to determine which themes are consistently identified across the council submissions, and quantitative statistical analysis was used to find the significant statistical similarities and differences among the councils and communicate these through percentages. The following section provides justification for this research approach, followed by a description of the data collection process. Next, the methods for data analysis are described, concluding with the limitations of this research.

3.2 Research Approach

Each council collected their submission data differently. Data to be analysed included online (email) and handwritten submissions, online surveys (free text and multiple choice), long-form text submissions from organisations, and a petition. While most councils used online surveys as part of their engagement process, they used different formats and asked different questions. For example, one council asked a combination of a 'yes/no' question (e.g., do you think the Council should require people to microchip their cats?) followed by a 'why/why not' question. Other councils asked submitters to select which bylaw options they supported and then gave the submitters a free-text feedback space to express their opinions on cat management. Due to the inconsistency of the data, a mixed method approach was determined as the best method to organise this data into a consistent format for analysis. Using qualitative thematic analysis, the common themes among the data were identified and displayed as a word cloud. Then, using quantitative statistical analysis, the significant regional similarities and differences in these themes were analysed and displayed in bar plots and correlation matrixes. The use of mixed methods analysis enabled a comprehensive analysis of the data, with conclusions supported by statistical significance.

The rationale for choosing the five councils was that they have similar cat management clauses in their bylaws, have varying demographics and lifestyles and represent different regions such as urban, rural or an urban/rural mix, as shown in Table 2. I chose Tasman and Selwyn District councils as these regions have similar-sized populations, demographics, and bylaw clauses (Selwyn District Council, n.d.; Stats

NZ, n.d.b; Stats NZ, n.d.c; Tasman District Council, n.d.). Their key difference is lifestyle, with Selwyn's history and current lifestyle associated with agriculture, particularly sheep and cattle farming (Stats NZ, 2023), and academia due to it housing Lincoln University and multiple Crown Research Institutes (Wilson, 2006). Tasman's history and current lifestyle are associated with alternative lifestylers and artisans, and some pastoral farming and horticulture (Stats NZ, 2023; Walrond, 2010). Wellington City Council was chosen as Wellington is a major urban area, with a high level of cultural diversity, and has similar bylaw clauses to Palmerston North (Stats NZ, n.d.d; Wellington City Council, n.d.). Wellington was also the first region in NZ to adopt cat-specific bylaw clauses and is publicly proactive in conservation efforts aimed at increasing native bird populations (Kikillus, Chambers, et al., 2017). The Wellington City Council has reported a substantial rise in the populations of many native bird species since 2011, thanks to community efforts to reduce predator numbers and plant native species (Wellington City Council, 2024).

Palmerston North City Council was chosen as Palmerston North has an urban centre surrounded by rural land, and therefore provides a mix of urban and rural sentiment. Palmerston North also has similar bylaw clauses to Wellington (Palmerston North City Council, n.d.; Stats NZ, n.d.a). It has similar demographics to Selwyn and Tasman, with one in five people born overseas, however, it has a higher Māori population than the other regions, with 18.7% of the population identifying as Māori, compared to roughly 8% in Wellington, Selwyn and Tasman (Stats NZ, n.d.a; Stats NZ, n.d.b; Stats NZ, n.d.c; Stats NZ, n.d.d). Whangarei District Council was chosen as it also has an urban centre surrounded by rural land, and a similar population size to Palmerston North (Stats NZ, n.d.e). Demographically, it has the highest Māori population of the regions chosen, at 30.1%, and similarly, approximately one in five people born overseas (Stats NZ, n.d.e). The chosen regions will give a broad view of public attitudes and interactions with cats and cat bylaws in NZ.

A review of the literature reveals that research on public perceptions of cat legislation in NZ is largely focused on the Auckland region (Bassett et al., 2020; Farnworth et al., 2011; Hall et al., 2016; Ovenden et al., 2024; Walker et al., 2017). While online surveys such as those done by Chamberlain et al. (2019), Gates et al. (2019), and Forrest et al. (2019) give an NZ-wide perspective, there was an overrepresentation of women and NZ Europeans in the studies. This may be correlated with the higher rates of cat ownership associated with women and NZ Europeans in NZ (CANZ, 2020). This research will add to previous studies, giving a more contextualised approach by comparing submissions from four councils that vary in demographics, size, and setting (urban, rural, or urban-rural). These regions have also been under-represented in cat management research.

Table 2: The five councils studied, along with the similarities and differences between their bylaw approaches, populations, and regions.

Councils and their bylaws	Cat management clauses	Population (2018 census)	Regional differences
Wellington City Council Animals Bylaw Adopted 2024 (Replacing Part 2: Animals of the Wellington Consolidated Bylaw 2008. Cat management clauses were added in the 2016 review of the bylaw)	Microchipping, registration and desexing (Wellington City Council, n.d.)	202,737 (Stats NZ, n.d.d)	A major urban region. While 74.1% of the population identifies as European, it is multicultural, with 33.7% of residents born overseas (Stats NZ, n.d.d)
Palmerston North City Council Animals and Bees Bylaw 2018	Microchipping, registration, desexing, and a limit of three cats per dwelling (Palmerston North City Council, n.d.)	84,639 (Stats NZ, n.d.a)	A smaller urban area surrounded by rural land. It has the second highest representation of Māori in the regions studied at 18.7%. 79.5% of residents were born in NZ, and 75.5% of residents identify as European (Stats NZ, n.d.a).
Whangarei District Council Animals Bylaw 2017 (Amended July 2022 to include cat management)	Microchipping, registration and desexing (Whangarei District Council, n.d.)	90,960 (Stats NZ, n.d.e)	Whangarei district has a small urban area (Whangārei city) and is bordered by the coast and predominantly rural land. It has the highest representation of Māori in the regions studied at 30.1%. 77% of residents identify as European, and 82.8% were born in NZ (Stats NZ, n.d.e).
Tasman District Council Proposed Cat Management Bylaw 2024	Microchipping, registration and desexing (Tasman District Council, n.d.)	52,389 (Stats NZ, n.d.c)	Similar in size to Selwyn, the Tasman District is predominantly rural, with 92.6% of the population identifying as European, and one in five people born overseas (Stats NZ, n.d.c). Known for alternative lifestylers and artisans (Walrond, 2010).
Selwyn District Council Keeping of Animals, Poultry and Bees Bylaw 2021	Microchipping and registration (Selwyn District Council, n.d.)	60,561 (Stats NZ, n.d.b)	Similar in size to Tasman, the Selwyn District is predominantly rural, with 89.3% of the population identifying as European, and one in five people born overseas (Stats NZ, n.d.b). Known for agriculture and academia (Wilson, 2006).

3.3 Data Collection

Data was collected by emailing each council and requesting the public submissions from their respective animal bylaws. Most councils had contact information for a policy analyst listed on their public consultation page for the relevant bylaw. If this person was unavailable, or a person was not listed, the main contact email for the council was used, which would then forward the request to an appropriate staff member. Two Lincoln University Master of Planning students—one current and one former—employed by the councils in this study were also contacted to help identify the correct staff members to contact. One council required an official information request under the Local Government Official Information and Meetings Act 1987 to release their submission data due to the administrative time needed to fulfil the request.

Data collection occurred over two months, due to the time needed to identify the appropriate contact person, the official information request wait period, and varying response times from council staff, who were managing multiple responsibilities. Submissions were received in PDF or Excel formats, depending on how each council collected them. Most submissions were from the councils' original bylaws, except for Wellington City Council's, which were from the 2024 bylaw amendment on mandatory desexing. In total, 2,275 submissions relating to cats were received. Council staff were cooperative and interested in the insights that would result from this research. The completed dissertation and a summary document will be shared with the staff who provided the data.

3.4 Data Analysis

The first step of data analysis was to organise the data into a consistent format. The submissions from each council were copied into an Excel file, with an individual sheet created for each council and an identifier assigned to each submission. Submissions were identified using the abbreviated name of the Council and a number, for example, PN_1 for the first submission from Palmerston North. Each sheet was spell-checked to reduce coding errors.

The free-text feedback and survey data of each council were analysed. Of note, the Whangarei District Council data included 1,092 submissions of a petition, which had six variations, signed and submitted by members of the public. The Council treated each petition entry as an individual submission. As such, they were treated the same in my data analysis, although consideration of this is made in my interpretation of the results.

3.4.1 Thematic Analysis

The data was analysed for common themes and ‘tag words’ (repeated terms relevant to each theme). Thematic analysis was completed by analysing and coding the data. Ten themes emerged from the

submissions: nuisance, human and livestock health concerns, toxoplasmosis risk to wildlife, conservation/environmental concerns, the benefits of cats, cost concerns, stray and feral cat management, cat containment or curfews, bylaw support, and anti-regulation sentiments.

To further explore these themes and identify frequently repeated words across the data, NVivo 14 (Lumivero, 2023), a qualitative analysis program, was used to conduct a word frequency query with stemmed words (e.g., talk, talked, talking, etc.). A word cloud of all the submissions was created, with some adjustments made to ensure a balanced representation across the five council data sets. The Whangarei District Council petition submissions were over-represented in the word cloud, due to the repeated text used throughout. The adjusted word cloud (Figure 2) contains all free-text submissions and one of each petition variation as this was determined to be the best representation of frequently repeated words across the five council data sets. The fifty most frequent stemmed words are displayed.

Figure 2: Word cloud displaying fifty most frequently repeated words among submissions

Commonly repeated words from the word frequency query and manual analysis were recorded in a 'tag words' document under the relevant theme (Appendix A). Using R, a statistical computing program (v4.4.1; R Core Team, 2024), the individual council spreadsheets were merged into one spreadsheet, and organised via columns 'username', 'region' and 'comment', as this information was collected consistently by each council. A Boolean for-loop was run to identify if one of the 'tag words' occurred in the relevant theme. A spreadsheet was created with a 'yes' or 'no' recorded in the relevant theme if a 'tag word' was identified in a submission. To determine the accuracy of this method, twenty submissions were randomly checked to determine if the text in the submission matched the themes

identified. The ‘tag words’ were refined during this process to account for errors in the identified themes. Many single-word ‘tags’ like ‘roam’ and ‘wander’ were found to have complex interactions within the themes, for example, ‘roam’ could refer to the nuisance of roaming cats or a desire for cat containment to stop cats roaming. As such, these single word ‘tags’ were replaced by specific phrases mentioned in submissions, like “not allowing cats to roam.” Some manual adjustments of the spreadsheet were made to account for errors that could not be rectified through code, for example, the use of ‘foul’ predominantly referring to cats defecating in gardens, except in one instance where it was used in the phrase “fall foul of the law”. The process of running the code and checking the spreadsheet was completed until the identified themes and comments were consistent.

3.4.2 Statistical Analysis

All statistical analyses were conducted using R Statistical Software (v4.4.1; R Core Team, 2024). To address research questions one and two, a binomial Generalised Linear Model (GLM) with the “multcomp” package (Hothorn et al., 2008) was used. A GLM was chosen as they are useful when the variance of the data is not normally distributed, as is the case here with binomial “yes”/”no” data (University of Wisconsin-Madison, 2021). Each of the ten themes was analysed separately to identify regional similarities and differences in responses. A Holm’s sequential Bonferroni procedure (Holm, 1979) was applied to adjust the GLM p-values to account for conducting multiple tests on the same dataset. The Bonferroni procedure adjusts the p-value (significance) of the data to account for multiple tests, ensuring that the significance of individual tests remains valid.

P-values expressed in scientific notation, like those presented in the findings, are an estimate of the probability of the results being due to random chance, and so the smaller the P-value, the stronger the evidence against the null hypothesis. Smaller values, such as e-15 or e-16 (in the raw and Holm’s adjusted p-values for all themes except the two listed below), suggest strongly significant results, with very low chances of observing the data under the null hypothesis. Values like e-06 (benefits of cats) or e-07 (toxoplasmosis risk to wildlife) still indicate strong statistical significance. The minimum P-value that is considered statistically significant is <0.05 (i.e., 5e-02), although that is a somewhat arbitrary threshold. After applying the Bonferroni procedure, a post hoc analysis using a Tukey HSD test from the “multcomp” package was performed to clarify whether and how themes differed between regions (Hothorn et al., 2008). A Tukey HSD test was chosen as it adjusts for unequal sample sizes and variances and controls the probability of making a type I error (the null hypothesis being rejected when it is true) (Bobbitt, 2020).

Each theme was visualised using bar plots that displayed the percentage of submissions mentioning the theme (y-axis), the region (x-axis), and significant regional differences (indicated by letters above the bars, as determined by the Tukey HSD test). As an example of how to read these letters, in Figure

3, Palmerston North and Selwyn share a letter, indicating statistically similar responses, while Tasman and Wellington have different letters, reflecting statistically significant differences. To further explore correlations between themes and address research questions one and two, a correlation matrix was generated for each region using the "corrplot" package in R (Wei & Simko, 2024). An explanation of how to interpret these matrices is provided with the matrices in Appendix B.

"Box Tick" data in Figure 3 was derived from "Yes/No" or "Options Supported" responses collected in council surveys. Neutral responses such as "Don't mind" or "No preference" were retained as excluding them would have required the removal of associated tagged comments, eliminating valuable insights from the thematic analysis. To avoid inflating support percentages, "Don't mind" or "No preference" answers were combined with "No" responses. These respondents did not explicitly state their support, making it reasonable to categorise their stance as "no support." In Whangarei, survey options 1 and 5 represented no changes to existing regulations or non-regulatory measures such as funding and education. Options 2, 3 and 4 supported proposed bylaw clauses (limits on cat numbers, mandatory microchipping, and desexing). Options 1 and 5 were categorised as "no support" whereas options 2, 3 and 4 were treated as support for the bylaw. Combinations of options 1 or 5 with 2, 3 or 4 were considered "no support" as this shows a misunderstanding of the different implications of the options. These combinations were retained not only for consistency and to preserve their associated tagged comments but also to highlight the complexity and user confusion caused by the survey design. These mixed responses suggested a lack of support for mandatory bylaw measures while indicating potential interest in non-regulatory approaches, such as public education around cat management.

In Tasman, survey options included microchipping, Companion Animal registration, desexing, and "none of the above." Support for Companion Animal registration was significantly lower than for microchipping and desexing, largely due to misconceptions among submitters that registration would involve an annual council fee similar to dog registration, rather than a one-time fee to a national registration body. This misconception was evident on the Tasman District Council Facebook page, where commenters complained about the fee, overlooking explanations from Council staff in both the post and comments clarifying that the fee was charged by the NZ Companion Animal Register, not the Council (Tasman District Council, 2023). Consequently, only the microchipping and desexing percentages were used to assess bylaw support.

To answer research question three, submissions from the cat containment theme were isolated in a separate spreadsheet and identified as "for education," "for regulation" and "against." This data was then analysed using the same GLM process to determine what, if any, regional differences, and similarities there were in submissions on cat containment and curfews, and whether submitters were "for" or "against" cat containment/curfews. This data was expressed as a bar plot.

3.5 Limitations

There are some limitations to this research. First, each council collected and analysed its data differently, and no council collected demographic data in its surveys or submissions. As such, it was necessary to select a research method that accounted for these differences. While these differences were addressed as much as possible, some grey areas remain due to variations in survey methods. Differences in survey design and submission mechanisms may have influenced how opinions were expressed, potentially introducing bias. Second, differences in cat management measures being considered by councils, such as desexing, could have affected the extent to which submitters expressed opinions on certain issues. In some cases, submitters may not have commented on these issues, not because of differing public perceptions, but because they were not explicitly asked about them. Third, the scope of a dissertation limits the time and resources available for a comprehensive analysis. Finally, due to the variations in survey data collection and presentation across councils, as well as the diverse language used by submitters, it was not possible to account for every submission in the data analysis. For example, some submitters simply responded "No" in their free-text comments. With the coding method used, comments like this could not be assigned to their relevant theme, as including "no" as a ‘tag word’ in the anti-regulation theme would have captured every instance of the word "no," rather than only anti-regulation specific submissions.

Chapter 4

Results

4.1 Introduction

This chapter presents the key findings from the thematic and statistical analysis of public submissions on cat bylaws, reflecting the diversity of community interactions and attitudes toward cats and cat management in NZ. Ten themes were identified from the analysis: nuisance, human and livestock health concerns, toxoplasmosis risk to wildlife, conservation/environmental concerns, benefits of cats, cost concerns, stray and feral cat management, containment/curfews, bylaw support, and anti-regulation sentiments. These themes demonstrate the issues surrounding cat management, and how the public feels about bylaw requirements. Firstly, the regional similarities and differences of each theme are described. Following this, the significant correlations among themes are explored, revealing regional priorities and interconnected concerns. The p-values associated with each theme are presented, reflecting the statistical significance of the results. The chapter concludes with a summary of the extent of support for cat management among the regions studied.

4.2 Thematic Analysis of Regional Responses to Cat Bylaws

The ten identified themes illustrate the complexity of community views on cat management, offering insight into the priority issues across regions and highlighting public perceptions that influence support for cat bylaws. Each theme was associated with several sub-themes indicated in the submissions (Table 3). Of the ten themes, eight relate to concerns associated with cats and cat management, such as the environmental impacts of cats and how they should be controlled. From those eight themes, five emerged as those of most concern to submitters based on the percentage of tagged comments (≥20% for most regions): nuisance, cost, conservation, containment/curfews, and stray and feral cat management. The remaining themes (toxoplasmosis risk, benefits of cats, and health concerns) were of less concern across regions (≤10% for most regions). Despite the varying levels of concern across themes, all themes give insight into regional variations. The remaining two themes, bylaw support and its inverse, anti-regulation sentiments, examine whether submitters would support the implementation of a bylaw and its clauses in their region.

Table 3: Themes and sub-themes indicated in the submissions

Theme	Sub-themes
Nuisance	Gardening (particularly vegetable) Cats digging, defecating, or urinating in gardens/on properties Anti-social cat behaviours (spraying, fighting, yowling)
Human and livestock health concerns	Toxoplasmosis Zoonotic diseases and parasites (fleas, worms, parvovirus) Pregnancy complications in humans and livestock arising from diseases/parasites (miscarriages, stillborn)
Toxoplasmosis risk to wildlife	Toxoplasmosis in dolphins and kiwi
Conservation/Environmental concerns	Cat predation on birdlife (native and introduced) and wildlife (invertebrates, reptiles, bats) Endangered or threatened native species Environmental or ecosystem impacts of cats
Benefits of cats	Companionship (cats as family members or "fur babies") Control of rat and mice populations
Cost concerns	Cost of cat management measures (desexing, microchipping, registration) Subsidies or incentives ("Snip & Chip" programmes, discounts)
Stray and feral cat management	Irresponsible owners Abandonment or neglect of cats Suffering of unwanted or unowned cats, Overpopulation of stray and/or feral cats Feral/stray cat control measures (Trap, Neuter, Release (TNR) programmes, rescuing, culling, rehoming)
Cat containment/curfews	Keeping cats restricted to their owner's property or shut-in at night Cat containment measures like catios or walking on a leash Cat-free zones around sensitive wildlife areas. Comparisons to and desire for control similar to dog restrictions (on a leash or contained to property)
Bylaw support	Support for bylaws and desire for mandatory cat management measures (desexing, microchipping, registration). Comments such as "strongly support," "please take action," "great initiative," "long overdue," "should be mandatory"
Anti-regulation sentiments	Opposition to the bylaw and its measures. Comments such as "should be a personal choice," "would you microchip your children," "money grabbing exercise," "shouldn't be forced," "waste of time/money"

All themes have two associated p-values noted in the text, showing the statistical significance of the results. These are the original p-value, and the Holm-Bonferroni adjusted p-value, indicated by an 'HB,' the latter demonstrating how the p-value changed after applying the Holm-Bonferroni method that corrects for making multiple tests in the same dataset. The Holm-Bonferroni adjusted p-value is a more conservative estimate of a results' statistical significance. Correlation matrices were also created for all regions (Appendix B). Positive associations (blue shades) indicate that two themes tend to be mentioned together, increasing simultaneously, while negative associations (red shades) suggest that when one theme is emphasised, the other is less likely to be mentioned. These correlations help highlight the relationship between themes in council submissions.

The statistical analysis of submissions revealed significant regional similarities and differences in each of the ten themes. This section provides an in-depth examination of each theme, exploring key regional trends, percentage of public interest/concern, and correlations with other themes. Beginning with the bylaw support and anti-regulation sentiment's themes, the analysis proceeds through the most commented on themes such as conservation/environmental concerns and stray and feral cat management, followed by less commented on themes such as the benefits of cats and toxoplasmosis risks to wildlife.

4.2.1 Theme 1: Support for Cat Bylaws

For the bylaw support theme, the free-text submissions were searched for tagged words (Appendix A) and combined with survey data. All councils except Palmerston North surveyed residents on whether they would support the bylaw or its clauses. While there was statistically significant regional variation in the bylaw support theme (P=2.2e-16, HB P=2.420e-15), interestingly, all regions showed majority support for cat bylaws (Figure 3). Wellington City Council had the highest percentage of submitter support, at 96%, while Palmerston North City Council had the lowest at 59%. The Palmerston North percentage would likely have been higher if submitters were directly asked if they supported the bylaw, as shown by the increase in support for regions where survey data was available. Palmerston North also had fewer submissions than other councils, with 46 cat-specific submissions, compared to Whangarei as the highest with 1,402 submissions. Statistically, Selwyn and Palmerston North have similar levels of support, as do Tasman and Whangarei (Figure 3). Support for cat bylaws is associated with and likely influenced by other themes. These associations are expressed in the correlation matrices in Appendix B.

In Wellington, support for cat bylaws is positively (although not significantly) associated with conservation and stray and feral cat management (Figure 9). Conversely, in Whangarei, bylaw support is significantly positively correlated with stray and feral cat management, nuisance, health and cost concerns, and significantly negatively correlated with containment and the benefits of cats (Figure 11).

The Whangarei correlation matrix reflects the petition, as stray and feral cat management, nuisance, health, and cost concerns are the key issues noted by petition submitters. These variations indicate that support for bylaws varies regionally, depending on the issues submitters associate with cats and their management. Despite the majority support for bylaws, there were anti-regulation sentiments expressed in all regions, which must be addressed when creating cat management legislation.

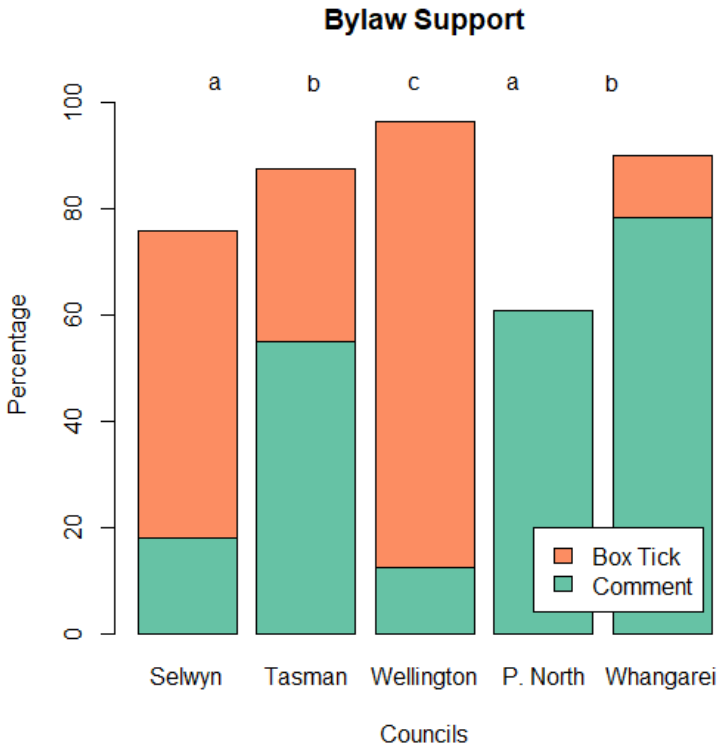

Figure 3: Percentage of submitters that support bylaws by council. "Box tick" refers to data gathered through surveys, while "Comment" refers to searching free-text submissions for tagged words. The letters along the top denote whether regional variations are statistically significant. Palmerston North and Selwyn are statistically similar (a). Tasman and Whangarei are also statistically similar (b) but different to Wellington, Palmerston North, and Selwyn. Wellington is not statistically similar to any of the other councils (c)

4.2.2 Theme 2: Anti-regulation Sentiments

For the anti-regulation theme, tagged comments were analysed to determine why some submitters were opposed to the bylaw. Sentiments frequently expressed by these submitters across regions were that the bylaw was a 'revenue' or 'money making' exercise, a 'waste of time and/or money,' 'anti-cat,' and 'unenforceable.' Some submitters also felt that it 'should not be forced' and 'should be an owners' choice' and compared microchipping cats to microchipping children (Appendix A). There was significant regional variation among anti-regulation submissions (P=2.2e-16, HB P=2.420e-15). Palmerston North, Tasman, and Selwyn submitters expressed the highest percentage of anti-regulation sentiments, between 11% and 20%, with the three region's percentages statistically

indistinguishable (Appendix C, Figure 12). Palmerston North had the highest percentage of these sentiments (20%), while Wellington and Whangarei had the lowest (1%). This is reflective of the bylaw support percentages, as Selwyn, Tasman and Palmerston North expressed lower support for bylaws than Whangarei and Wellington (Figure 3).

Not unexpectedly, anti-regulation sentiments were significantly negatively correlated with bylaw support in Palmerston North, Tasman, and Whangarei. These sentiments were also positively correlated, although not significantly, with conservation in Palmerston North and with cost in Palmerston North, Tasman, and Selwyn. Submitters in Palmerston North who were opposed to the bylaw were concerned that conservation organisations would be able to trap and destroy cats that were found without microchips. In all three regions, submitters expressed concern that desexing, registration and microchipping would be too expensive for some residents, and as such were against a bylaw that made these mandatory for cat owners.

The analysis of the bylaw support theme revealed statistically significant regional variation with notably high support across all regions surveyed. Support for cat bylaws has generally increased, reflecting the growing awareness and adoption of cat management regulations in NZ. The correlation matrices show that bylaw support is often linked with themes such as nuisance, conservation and stray and feral cat management, though these associations vary by region. Conversely, anti-regulation sentiments were associated with cost concerns, highlighting regional differences in how submitters perceive cat management policies. These differences underscore the complexities involved in gaining broad public support for cat bylaws. While anti-regulation sentiments highlight concerns over personal freedoms and opposition to stricter management, issues such as nuisance reveal the impacts of free-roaming cats on the public.

4.2.3 Theme 3: Nuisance

The nuisance theme represents comments tagged with nuisance-related issues, such as cats digging or fouling gardens, fighting, and demonstrating ‘anti-social cat behaviours’ (Appendix A). There was significant variation among regions in the comments tagged with the nuisance theme (P=2.2e-16, HB P=2.420e-15). Each region commented on cat nuisance, with some indicating a higher level of concern than others. Whangarei had the highest number of comments tagged with nuisance themes, at 79%, due to this being one of the main concerns of the petition submitted by Whangarei residents. Wellington had the lowest instance of comments tagged with this theme at 5% (Figure 6). Other regions had moderately high percentages of nuisance comments, with Selwyn at 38%, Palmerston North at 26% and Tasman at 18%. The regional correlation matrices (Appendix B) indicate that in each region, nuisance tends to be positively correlated with the conservation, containment, health, stray

and feral cat management and toxoplasmosis themes, although these correlations are not always statistically significant.

In Whangarei, comments tagged with nuisance were significantly positively associated with several themes: stray and feral cat management, bylaw support, health, and cost concerns. These were the main themes expressed by petition submitters, who wanted the bylaw to address the problems caused by “unowned and unwanted cats and kittens” entering resident’s properties and homes. Submitters were concerned about nuisance issues from stray and feral cats such as fighting, stealing their pet’s food, and spraying and defecating in their homes and gardens.

In Palmerston North, nuisance was significantly positively correlated with the conservation and containment themes. Palmerston North residents who mentioned cat nuisance also expressed concerns about cat predation and a desire for containment or curfews on cats. Conversely, nuisance was significantly negatively correlated with the containment theme in Whangarei. Nuisance issues in Palmerston North were more often attributed to owned cats than unowned cats, with many submitters stating that containing cats on their owner's property would resolve their nuisance concerns.

Since nuisance issues in Whangarei stem from stray and feral cats, submitters understandably do not see containment as a viable solution. These findings reveal that perceptions of cat nuisance vary significantly by region, reflecting different local issues and priorities. Nuisance issues highlight community concerns surrounding the immediate, tangible effects of roaming cats, while environmental and conservation impacts are both national and region-specific, drawing attention to the risk cats pose to native species.

4.2.4 Theme 4: Conservation/Environmental Concerns

All regions expressed concerns about the environmental and conservation impacts of cats, with submitters mentioning various native species and areas of conservation concern, such as wetlands (Appendix A). There was significant regional variation in submissions tagged with this theme (P=2.2e-16, HB P=2.420e-15). Whangarei and Tasman had the highest percentage of tagged submissions at 40% and 36%, respectively, followed by Selwyn (27%), Palmerston North (26%), and Wellington (23%) (Figure 6). These submitters across all regions were concerned about cats' impacts on native species, both in their backyards and more broadly. Submitters also highlighted region-specific areas of conservation concern, such as Zealandia in Wellington and St. Arnaud and Golden Bay in Tasman, which are home to endangered bird species.

Mentions of native species varied regionally. Submitters from Tasman and Wellington expressed concerns about kororā/little penguins (*Eudyptula minor* Forster, 1781). Mentions of lizards (with lizard,

reptile and gecko used as search terms) were much higher in Tasman, Wellington and Whangarei compared to other regions. There were twenty-two individual submissions mentioning lizards in Tasman, eleven in Wellington, and nine in Whangarei. One variation of the Whangarei petition mentioned lizards, and as such, the total number of lizard mentions in Whangarei submissions was four hundred and fifty-two. Some Whangarei residents highlighted concerns about long-tailed bats (*Chalinolobus tuberculatus* Forster, 1844), which were not mentioned elsewhere. Submitters from Whangarei and Tasman also mentioned insects and invertebrates in their conservation concerns more frequently than those from other regions. A search of the terms 'insect' and 'invertebrate' revealed eleven individual mentions of these in Tasman and nine in Whangarei. The same Whangarei petition also lists insects, so the total number of mentions is again four hundred and fifty-two.

The conservation theme was significantly positively correlated with the containment and nuisance themes in Palmerston North, the containment theme in Wellington, and the toxoplasmosis risk theme in Whangarei (Appendix B). In Palmerston North and Wellington, many submitters expressed a desire for cat containment or curfews to reduce the risk to native species. In Whangarei, three of the six variations of the petition cited predation of native species as a reason to support the bylaw, with one variation also noting the toxoplasmosis risk posed by cats to wildlife and immunocompromised individuals. These results illustrate the diverse conservation priorities across regions and highlight the complex interplay between cat management concerns and perceived risks to native wildlife. In addition to conservation impacts, cost concerns also represent national and region-specific concerns that play a key role in shaping public perceptions of cat management policies.

4.2.5 Theme 5: Cost Concerns

Concerns about the costs of cat management were present in all regions, while the level of concern varied significantly across them (P=2.2e-16, HB P=2.420e-15). Cost concerns generally related to the affordability of cat management measures such as desexing, and recommendations for councils to provide subsidies or discounts when implementing the bylaw (Appendix A). Whangarei had the highest percentage of cost concerns, at 81%, while Wellington had the lowest, at 7%. Selwyn and Tasman shared similar levels of concern, 19% and 24% respectively, while Palmerston North showed higher concern (50%) (Figure 6). Cost concerns were only significantly correlated with other themes in Whangarei, where they were positively associated with the health, nuisance, stray and feral cat management, and support themes, and negatively correlated with the containment theme (Appendix B). These correlations relate to the petition, as those were the main themes mentioned across all petition variations.

While no council collected demographic data, some financial demographics can be inferred from the 2018 Stats NZ census. Whangarei, Tasman, and Palmerston North have the lowest median incomes

and the lowest percentage of full-time employment among the regions studied (Stats NZ n.d.a; Stats NZ n.d.b; Stats NZ n.d.c). All three regions have a median income between $27,500 and $30,000, with a median full-time employment rate of 45–48%. In contrast, Wellington and Selwyn have the highest median incomes ($41,800 and $42,700, respectively) and the highest rates of full-time employment (56.8% and 58%). Additionally, Wellington and Selwyn have approximately twice as many higher-income earners (above $70k) compared to the other regions (Stats NZ n.d.d; Stats NZ n.d.e). The census data may correlate with the varying levels of concern found across regions, as Whangarei, Palmerston North, and Tasman expressed higher concern, potentially reflecting their lower median incomes. Conversely, Selwyn, despite having the highest median income, still shows relatively high levels of cost concerns. However, it is important to note that while these census data provide useful context, the submission data likely does not come from a representative sample of the population in each district. As Hodder (2024) notes, only a small percentage of a region's population typically engages in the submission process. Therefore, the views expressed in submissions may not fully reflect the wider population's demographic makeup or concerns.

Additionally, cost concerns do not explicitly relate to the submitter's income, with many submitters expressing concern for low-income households in their region, and a desire for subsidies to support these residents. For example, one variation of the Whangarei petition was signed by tenancy managers working for Kainga Ora/Housing NZ, who were concerned about the financial and health impacts of stray and feral cats on their clients (property damage, vet bills from stray and feral cats fighting with residents' pets and transmitting diseases). All variations of the Whangarei petition included a suggestion that the council "provide and financially contribute to subsidised de-sexing, microchipping and registering programmes throughout the year for people on low incomes." Overall, many submitters in all regions showed concern for low-income residents and a desire for subsidies to reduce the financial impact of cat management bylaws on these residents. Cost concerns are closely related to stray and feral cat management, due to the financial impacts of these cats on the public, and the need for desexing to reduce cat abandonment.

4.2.6 Theme 6: Stray and Feral Cat Management

Stray and feral cat management was of high concern to all regions, with submitters mentioning cat abandonment, overpopulation, and the eradication of feral cats (Appendix A). There was significant regional variation in submissions tagged with this theme (P=2.2e-16, HB P=2.420e-15). Whangarei had the highest percentage of concern at 84%, again related to the petition, while Wellington had the lowest at 12% (Figure 6). Selwyn and Palmerston North submitters showed similarly high levels of concern at 52% and 43% respectively, while Tasman had a slightly lower level of concern (35%). Stray and feral cat management was positively but not significantly correlated with conservation in all

regions. In Whangarei, this theme was significantly positively correlated with other petition themes (cost, health, nuisance and support) and significantly negatively correlated with the containment and anti-regulation themes (Appendix B). In Wellington, where submitters were surveyed about the council's focus on reducing stray cats, 96% were in favour.

Animal welfare was a key concern in the management of stray and feral cats. Submitters frequently used terms such as neglect, mistreatment, abandonment, and suffering (Appendix A) when referring to these cats, and many hoped that including desexing in cat bylaws would help reduce abandonment and control wild cat populations. Opinions on managing stray versus feral cats varied considerably. Humane measures like 'Trap, Neuter, Return' were generally favoured for strays, while measures such as 'culling' or 'eradicating' were suggested for feral cats. Many submitters shared personal stories of their encounters with stray cats, such as adopting or taking care of stray cats in their region, or of stray cats fighting with their pets.

Microchipping was recognised by submitters as essential for identifying whether a trapped cat is a companion, stray, or feral. However, submitters were divided on the fate of cats found without a microchip, with a wide range of opinions on whether they should be culled, rehomed, or desexed and returned to their original location. These findings highlight the differences in public opinion on managing stray and feral cats, as the personal connection between people and stray cats often leads to greater support for non-violent approaches, such as 'Trap, Neuter, Return.' This issue is further complicated by ethical considerations, regional differences, and the challenges of distinguishing between stray and feral cats. Stray and feral cat impacts highlight the need for better companion cat management, which could include cat containment or curfews.

4.2.7 Theme 7: Cat Containment/Curfews

No council asked the public about cat containment or curfews. However, 312 submitters (11% of total submissions) volunteered their opinion on this theme, with significant variations among regions about what this might like look (P=2.2e-16, HB P=2.420e-15). Tasman had the highest percentage of comments mentioning this theme, at 26%, followed closely by Palmerston North and Wellington (24% and 21% respectively). Selwyn and Whangarei had the least mentions of this theme (14% and 3%). Submitters commented on keeping cats inside at night (curfews) or keeping them inside at all times/restricted to their owner's property (containment).

Overall, variations of "inside at all times," "kept to owner's property," and "not allowed to roam" appeared more frequently in the tag words, indicating a stronger emphasis on total containment rather than an overnight curfew (Appendix A). Many submitters referred to how dogs are managed, with the term 'dogs' prominently featured in the word cloud (Figure 2). These submitters wanted cats

to have similar controls as dogs, such as being contained to their owner's property, on a leash if outside, impounded if found roaming and so on. Several submitters also mentioned "cat-free zones" or "exclusion covenants" near ecologically sensitive areas, such as Zealandia in Wellington and St. Arnaud in Tasman.

Of the submitters who commented on this theme, most expressed a desire for regulatory measures, with 95% strongly in favour of including a clause requiring mandatory containment or curfews in their region's bylaws (Figure 4). Others wanted an educational approach, where cat owners would be encouraged but not required to contain their cats, and some expressed no preference for either measure. Many submitters who chose regulation as their preferred option referred to similar legislative requirements in Australia, where bylaws including curfews and containment have been implemented (NESP Threatened Species Recovery Hub, 2021). Of the 312 submissions on cat containment and curfews, 5% of submitters were against these measures. Submitters argued that containing cats is "against their nature and cruel," would be "traumatic" for cats that are used to an indoor-outdoor lifestyle, and that it would be difficult for council staff to enforce.

Containment was significantly correlated with several themes among regions (Appendix B). In Palmerston North, the containment theme was significantly positively associated with the conservation and nuisance themes. Wellington also showed a significant positive correlation with conservation and containment. In these regions, submitters associated containment with reductions in nuisance effects and the environmental impacts of cats, especially on native wildlife. In Whangarei, containment was significantly negatively associated with the petition themes (cost, health, nuisance, strays and feral cat management, and support), as containment was not mentioned in any of the petition variations. In Selwyn and Tasman, containment was negatively but not significantly correlated with the anti-regulation theme. Submitters who commented on cat containment were usually in favour of cat bylaws in their region.

Overall, while a small minority opposed cat containment and curfews, the majority of submitters who commented on this theme supported stricter regulations to manage cats similarly to dogs, emphasising containment to their owner's property, overnight curfews, or designated exclusion zones near sensitive ecological areas. This support for regulation reflects a growing public concern for the environmental impacts of free-roaming cats and a desire for enforceable containment measures. When considering cat containment, it is important to recognise the relationship between people and their cats, and the perceived benefits of cat ownership.

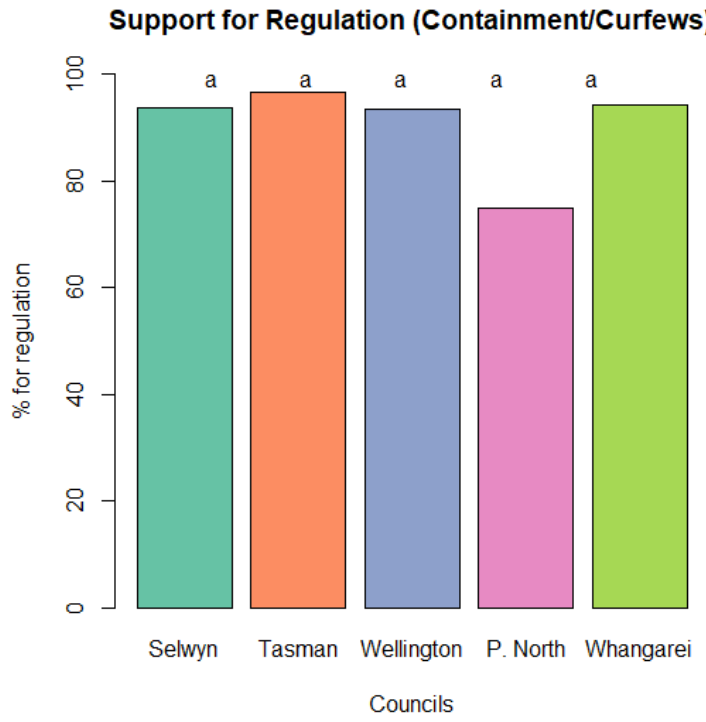

Figure 4: Percentage of submitters in favour of regulatory measures for containment/curfews over educational ones. The letters along the top denote that there was no significant difference between regions

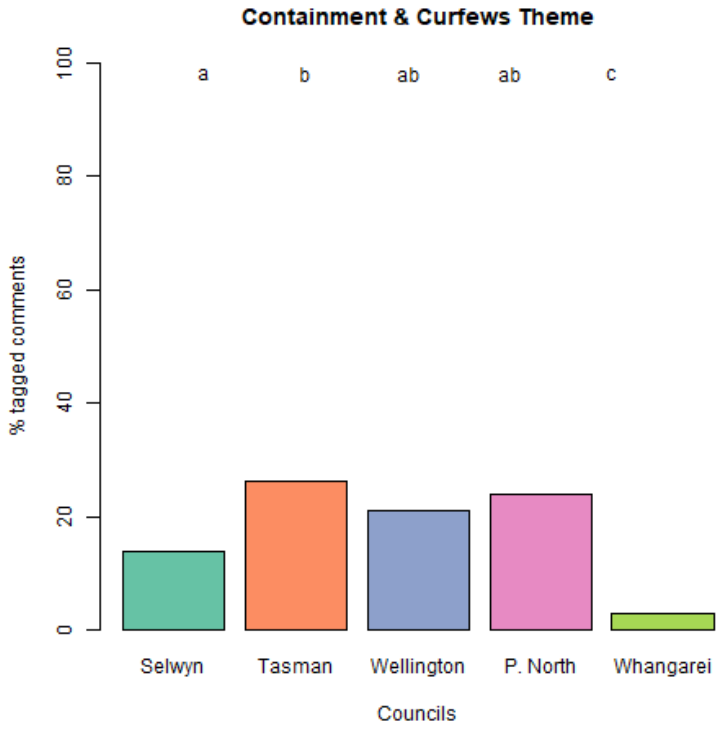

Figure 5: Percentage of tagged comments expressed by submitters for the containment theme, by region. The letters along the top denote which regions are statistically similar or different to each other. A shared letter indicates similarity

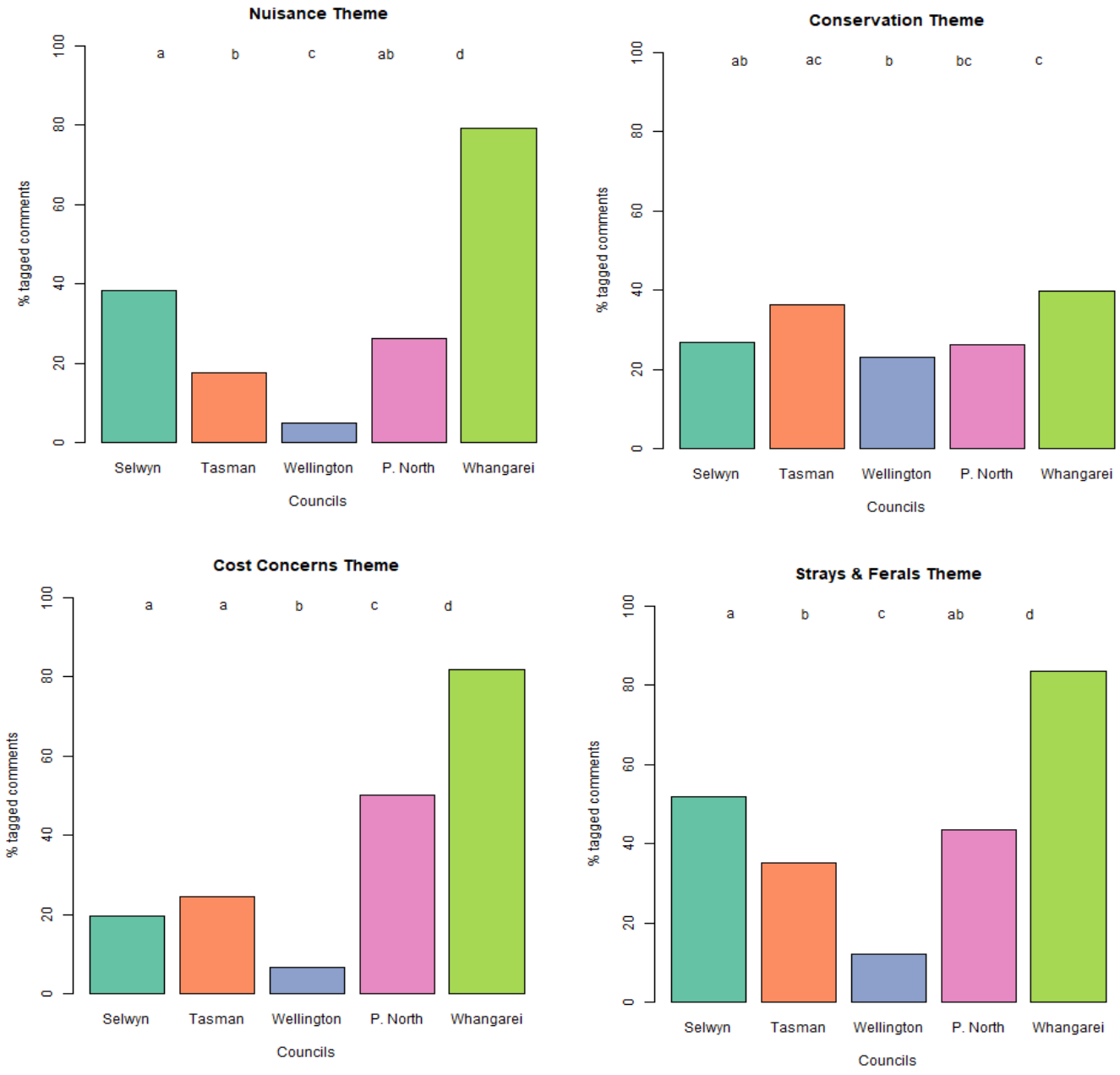

Figure 6: Percentage of tagged comments expressed by submitters for some of the main themes, by region. Themes from left to right: nuisance, conservation/environmental concerns, cost concerns, and stray and feral cat management. The letters along the top denote which regions are statistically similar or different to each other. A shared letter indicates similarity

4.2.8 Theme 8: Benefits of Cats

The benefits that cats provide to humans was not a noticeable theme in the submissions, but where such benefits were mentioned there was notable regional differences in how these benefits were characterised (P=1.591e-06, HB P=1.591e-06). Some submitters referred to cats as "fur babies," highlighting their roles in offering love, comfort, and companionship and "developing tolerance" in children (Appendix A). Others emphasised the role they believed that cats play in reducing rat and mice populations, expressing concerns that regulating cat numbers (companion, stray, and feral) could lead

to a surge in rodents, with comments like “watch the rat population explode” and “decrease cat numbers means more rodents” (Appendix A).

Tasman and Palmerston North had the highest percentages of submissions mentioning the benefits of cats (5% and 4%, respectively), while this theme was noted by only around 1% of submitters in Selwyn, Wellington, and Whangarei (Figure 13). In Whangarei, comments on the benefits of cats were significantly negatively correlated with health, nuisance, and support themes, reflecting the strength of the petition and its topics over other themes. In Palmerston North, the benefits of cats were strongly but not significantly positively associated with the conservation, containment and nuisance themes (Appendix B), suggesting that submitters who comment on cat benefits also comment on their impacts and containment measures. These findings indicate that while the benefits of cats were less emphasised, they reveal a contrasting perspective where many submitters value cats in their roles as companions and rodent hunters. However, the perceived benefits of cats must be balanced against health concerns, particularly in communities with high stray and feral populations.

4.2.9 Theme 9: Human and Livestock Health Concerns

Comments relating to cats and risks to human and livestock health were relatively low in all regions except Whangarei, with significant variation among regions (P=2.2e-16, HB P=2.420e-15). Whangarei had the highest percentage of submissions mentioning this theme (75%), followed by Tasman (9%), Palmerston North (7%), Selwyn (4%), and Wellington (1%) (Figure 14). Submitters expressed concerns about health risks posed by roaming cats to both humans and pets, including fleas (1043 mentions), worms (1035), cat flu (1039), “feline AIDS” (feline immunodeficiency virus) (1039), toxoplasmosis (480) and parvovirus (1). Most of these concerns were raised in the Whangarei petition. Toxoplasmosis had the most individual submission mentions, at thirty-seven non-petition-related mentions, followed by worms with six, fleas with four, and parvovirus with one mention. Petition submitters in Whangarei also reported skin infections from flea bites due to stray cats infesting their homes with fleas. Many submitters highlighted the issue of cat faeces in gardens, especially those growing vegetables, and the associated health risks from handling contaminated soil.

Health concerns were significantly positively correlated with the toxoplasmosis in wildlife theme in Tasman, Palmerston North, Selwyn, and Wellington. In Whangarei, health was significantly positively associated with the nuisance, strays, bylaw support and cost themes, while showing a significant negative association with containment, benefits of cats, and anti-regulation themes (Appendix B). Toxoplasmosis was a common concern in submissions on this theme, with submitters referring to the health risks for pregnant and immune-compromised individuals, and concern for their children and grandchildren who play in their gardens. Some submitters also highlighted the transmission risks of toxoplasmosis to other domestic animals, with mentions of impacts on sheep in Tasman and

Whangarei. In Tasman, several submitters referred to a 2023 Stuff article where a farmer reported losing 120 lambs due to toxoplasmosis (Hubbard, 2023). These findings illustrate that health-related concerns, particularly regarding toxoplasmosis, play a significant role in shaping public opinion on cat management. This is particularly evident in Whangarei where issues of stray cats and related health impacts are most pronounced. In addition to health concerns, the risk of toxoplasmosis transmission to wildlife presents another cat management challenge.

4.2.10 Theme 10: Toxoplasmosis Risk to Wildlife

This theme reflects submitters' opinions on the risk of toxoplasmosis transmission to native wildlife, and there was significant variation in this among regions (P=4.72e-07 HB P=9.440e-07). Whangarei had the highest percentage of submissions mentioning this theme (32%) largely due to its inclusion in one of the more commonly signed petition variations. Tasman followed with 5%, while Palmerston North, Selwyn, and Wellington had lower percentages (2%, 1%, and 1%, respectively) (Figure 15). Submitters in all regions referred to the general risks of toxoplasmosis to native wildlife, with species-specific concerns noted in Whangarei and Tasman. In Whangarei, submitters referred to the risks to kiwi, Māui (*Cephalorhynchus hectori maui)* and Hector's (*Cephalorhynchus hectori*) dolphins, while submitters in Tasman also expressed concern about Hector's dolphins.

The toxoplasmosis risk to wildlife theme was significantly positively correlated with the conservation theme in Whangarei, reflecting submitters' concerns for native species. As seen in the health theme, toxoplasmosis was significantly positively correlated with health concerns across all regions (Appendix B). Submitters who raised concerns about toxoplasmosis often highlighted the risks to human, livestock, and native wildlife health. Overall, the findings indicate that toxoplasmosis concerns were closely linked to health concerns, reflecting an awareness of its impact on humans, livestock, and native wildlife.

4.2.11 Extent of Support for Cat Management

The results indicate that public opinions on cats and cat management vary significantly among regions, with several themes being of greater importance in some regions than others. All ten themes had significant correlations with other themes in each region, demonstrating the complex connections between these issues and how cats are perceived regionally. These findings have important implications for cat management in NZ, as decision-makers must consider the concerns of local residents when implementing cat management legislation. Overall, the findings suggest strong public support for cat management that addresses the issues identified in the ten themes, reflecting widespread recognition of the significance of the cat problem.

Chapter 5

Discussion

5.1 Introduction

This research set out to gain deeper insight into community attitudes and interactions towards cats and cat bylaws. Using a mixed methods approach, submissions from five councils were assessed for regional similarities and differences and attitudes toward stricter cat legislation. The results indicate notable regional similarities and differences in community attitudes towards cats and their management across the regions studied, with public concerns focused on nuisance, conservation, stray and feral cat management, and cost. This chapter explores how cats are defined in legislation, advocating for updates to stray cat definitions to reflect their complex interactions with residents. It also examines the implications of these regional variations for local and regional authorities, assessing whether a nationwide framework for desexing, microchipping and registration could provide consistency while allowing for region-specific measures like exclusion zones or containment. This chapter also evaluates public opinions on stricter containment measures and suggests that a phased, education-driven approach would ensure these policies are both effective and responsive to community needs.

5.2 Defining Cats in Legislation

The Ministry for Primary Industries (MPI) defines cats under the 'Code of Welfare: Companion Cats' (MPI, 2018). Companion cats are defined as living with and dependent on humans, while stray cats are considered lost or abandoned companion cats, often living near human populations and partially reliant on human resources. The stray cat population is increased by interbreeding with unneutered companion cats as well as other stray cats. Feral cats, by contrast, are defined as having no human support, not living near human settlements, and maintaining a self-sustaining population that is not dependent on input from the companion cat population (MPI, 2018). However, cats can move between these classifications at different stages of their life, as can their offspring (Farnworth et al., 2010; MPI, 2018). For example, a companion cat could become a stray, and that cat could then birth to kittens who become feral due to limited or no interaction with humans (Farnworth et al., 2010; Somerfield, 2019).

The Code recommends that a trapped feral cat should be killed humanely, while a trapped stray cat should either be released back into its colony (if it is in good health and has ongoing access to food, water and shelter) or taken to an approved organisation (such as the SPCA), who must take reasonable steps to identify its owners. If the owner is not found after seven days, the organisation may sell,

rehome or euthanise the cat. The Code of Welfare notes that due to the large population of cats in NZ (1.2 million companion cats (CANZ, 2020), there will likely always be stray cat colonies, particularly in urban environments (MPI, 2018). Regardless of their status, companion, stray and feral cats cause significant wildlife impacts, as due to the atypical hunting behaviour of cats, even well-fed cats predate wildlife (Baker et al., 2008; Bassett et al., 2020; Bischof et al., 2022; Dickman, 2009; Glen et al., 2023; Grayson & Calver, 2004; Kays & DeWan, 2004; Kays et al., 2020; Krauze-Gryz et al., 2017; Legge et al., 2020; Loss et al., 2018; Loss & Marra, 2017; Loyd et al., 2013; McGregor et al., 2015; Metsers et al., 2010; Mori et al., 2019; Morgan et al., 2009; Palmer & Thomas, 2023; Read, 2019; Trouwborst et al., 2020; van Heezik et al., 2010; Wierzbowska et al., 2012; Woinarski et al., 2017).

Under the Biosecurity Act 1993, feral cats are controlled by site-led programmes in regional pest management plans. Some plans solely specify the management of feral cats (Gisborne District Council, 2017; Otago Regional Council, 2019; Tasman District Council & Nelson City Council, 2019; Waikato Regional Council, 2022), while others include terms such as “pest cat” (Greater Wellington Regional Council, 2019) or “unowned” cats (Auckland Council, 2020). In the Greater Wellington plan, “pest cats” are defined as cats that are not microchipped or registered, are free-living and unsocialised, with limited or no relationship with humans (Greater Wellington Regional Council, 2019). Conversely, in the Auckland plan, “unowned” cats are those that are not microchipped or registered and are within any site that contains a population or any regionally or nationally threatened bird, reptile, or amphibian, and is in a rural area (Auckland Council, 2020). These definitions more closely align with those of feral cats than stray cats, however, some stray cats could fall within these definitions.

The difference in definitions between stray and feral cats was reflected in the submission data, with submitters referring to the care or adoption of stray cats in their area, while comments on feral cats centred around ‘culling’ or ‘eradicating’ the population. Submitters also expressed a desire for desexing to reduce stray cat numbers and concerns about the nuisance and health impacts of stray and feral cats in their region. This was especially felt in Whangarei, where submitters reported that stray cats were causing financial and health issues to residents and their pets. Submitters were divided on how trapped cats should be managed, with culling, rehoming or ‘Trap, Neuter, Return’ suggested as methods for dealing with these cats. Several submitters also expressed concerns that mandatory microchipping would mean that cats found without a microchip would be culled and that microchipping could be too expensive for some residents. Despite this, microchipping was identified by submitters as essential for determining whether a trapped cat is a companion, stray, or feral cat. This supports the MPI Code of Welfare recommendation of microchipping as the best practice for cat identification, due to the risk of collars being lost (MPI, 2018). However, some submitters raised concerns about the reliability of microchips, citing issues such as microchips failing or shifting within the cat's body.

Submitters' concerns reflect the findings of the NCMSG Report, where stakeholders also reported concerns about microchip failure, the financial cost of microchips and the fate of trapped cats (NCMSG, 2020). The NCMSG notes that microchip failure is very low, with a recorded failure rate of 0.1% in NZ, which is likely overestimated due to microchip reader or implanter error (NCMSG, 2020). NCMSG (2020) also recommends non-lethal methods be prioritised when un-microchipped cats are found, and subsidised microchipping be part of cat management campaigns to address financial concerns. These strategies would alleviate the financial and animal welfare concerns of microchipping and registration measures in bylaws.

The NCMSG (2020) suggest a new method to categorise cats, dividing them into feral and domestic, with domestic sub-divided into companion, socialised stray cats, and unsocialised stray cats. The socialised and unsocialised (managed by carers or unmanaged) stray cat categories would include colony cats and semi-owned cats (individual cats who interact with humans and are not part of a colony). These definitions would change how stray and feral cats are managed. The report recommends that socialised managed and unmanaged stray cats be rehomed and microchipped if required. Unsocialised, managed cats are to be returned to their colony or carer if they are microchipped, while unmanaged, un-microchipped, anti-social cats should be humanely killed, along with feral cats (NCMSG, 2020). Stakeholders expressed concerns about the new categorisations, with many considering it too complicated. However, NCMSG (2020) states that the complexity of this categorisation reflects the diverse characteristics of the different cat groups.

Based on the findings and the literature review, I agree with the NCMSG (2020) recommendations to redefine cat categories. However, as mentioned by MPI (2018) and Farnworth et al. (2010), cats can move between the companion, stray, and feral definitions within their or their offspring's lifetime. As such, a continuum-based definition is likely more suitable than the categories suggested by NCMSG (2020). Submissions on stray cats analysed in this research reflect the complex interactions between the public and these cats. The findings reveal a strong desire for better management of stray and feral cat populations, particularly in Whangarei, where stray cats are a significant concern for residents. While there is little appetite for extreme measures such as culling all stray cats, or no longer allowing breeding of companion cats, there is an appetite for greater control of stray and feral cats. By redefining these categories, local authorities would be better enabled to manage stray and feral cats, with clearly defined management expectations for the varied categories of stray cats.

Humane killing of unmanaged, un-microchipped and unsocialised stray and feral cats would help reduce the national stray and feral cat population, thereby reducing their impacts on human and wildlife populations. This view is reflected in the literature, as Gates et al. (2019) found that 50.1% of NZ survey respondents thought stray cats should be assessed and subjected to euthanasia. The

remaining stray cats are recommended to be rehomed or returned to a managed colony as part of a TNR program (NCMSG, 2020). While rehoming does little to reduce the nuisance, environmental and health impacts of these cats, as any rehomed cat will likely be kept indoors/outdoors rather than solely indoors, it does enable these cats to be responsibly managed by either their owner or a carer (CANZ, 2020). However, I disagree with NCMSG's (2020) TNR-based stray solution, as TNR programs are ineffective at reducing cat populations, are costly to implement, do little to improve the welfare of these cats, and do not reduce stray cat impacts on humans and wildlife (Carrete et al., 2022; Castillo & Clarke, 2003; Coe et al., 2021; Crawford et al., 2019; Farnworth et al., 2010; Greenwell et al., 2019; Lepczyk et al., 2010; Lohr et al., 2013; Longcore et al., 2009; Loss & Marra, 2018; Read, 2019; Read et al., 2020; Sizemore & Wallace, 2014).

Alternatives to TNR have been suggested, with the caveat that there is no "one-size-fits-all" solution to the stray and feral cat problem (Crawford et al., 2019, p. 22). Peterson et al. (2012) propose a balanced approach between conservationists and cat colony caretakers, where conservationists set management priorities in high conservation value areas, while cat caretakers could guide management priorities in low conservation value areas. Crawford et al. (2019) suggest a combination of mandatory desexing, registration, a limit to the number of cats allowed per property, and restrictions on cat's ability to roam, alongside increasing funding to shelters and councils to enable more rehoming of trapped stray cats, instead of euthanasia. Read et al. (2020) propose mandatory desexing, registration and vaccination of all companion cats, and containment to their owner's property. To address the unowned cat problem, Read et al. (2020) suggest laws prohibiting the feeding of unowning cats that are reinforced by prosecution, alongside encouraging the public to monitor and report stray cats in their area. Additionally, Read et al. (2020) propose keeping a register of both cats for adoption and potential owners looking to adopt cats in their region, to connect owners with pets, as well as allowing for lethal control of unowned cats in neighbourhoods where cats currently held for adoption outnumber realistic demand.

Another solution is the use of trap-assess-resolve (TAR), which predominantly involves intensive adoption of suitable stray cats and euthanasia of unsocialised or gravely ill cats (Calver et al., 2022). Calver et al. (2022) assessed a 25-year trap-assess-resolve program conducted by the Lonely Miaow charity in Auckland, concluding that the TAR approach is more suitable than TNR. Calver et al. (2022) found that the majority of cats in the study were rehomed (64.2%), while 22.2% were euthanised, reducing stray cat populations in the area. However, the effectiveness of any TAR or TNR approach relies on decision-makers and stakeholders educating the public about the importance of desexing their cats and reducing cat abandonment (Calver et al., 2022). Additionally, decision-makers must also consider the impact of lethal controls on stray cat carers. An Australian study on this subject found that the psychological health and quality of life of cat carers was negatively affected following the

lethal control of stray cats in their area, due to the strong relationships between carers and the cats they managed (Scotney et al., 2023). In areas with high conservation priority areas and a high number of cat carers, the solution suggested by Peterson et al. (2012) could be used in combination with TAR to better manage stray cat populations while reducing their impact on native wildlife. It is likely that, nationally and regionally, a combination of management solutions such as TAR and the suggestions by Crawford et al. (2019) and Read et al. (2020) would be most effective in reducing stray and feral cat numbers in NZ.

Overall, the varying interactions between humans and stray cats require their definition to sit within a continuum rather than defined boundaries, as cats can move between the different categories within their lifetime, or one generation (Farnworth et al., 2010; MPI, 2018). There is no perfect solution to the stray and feral cat problem, as due to continued abandonment, there will likely always be stray cats in NZ (MPI, 2018; NCMSG, 2020). However, by enabling greater control of stray and feral cats through better definitions of each type of stray cat, and encouraging, educating, and supporting owners to manage their pets responsibly, populations of stray and feral cats could be significantly reduced. Additionally, mandatory measures for companion cat management, such as desexing, registration, microchipping and roaming restrictions must be used alongside stray cat management programs to reduce the stray and feral cat population. With 1.2 million companion cats (CANZ, 2020) and an estimated 200,000 stray and 2.4 million feral cats (Donnell, 2021), NZ must implement better cat management strategies on a local, regional, and national level.

5.3 Implications for Local and Regional Planning

All regions showed a high level of support for cat management bylaws. The findings reveal a diversity of public opinions present in all the submission themes, with different themes of higher concern in each region. These may relate to demographic or regional differences, such as whether the region is predominantly urban or rural. Local and regional planners must consider region-specific issues and address these when implementing bylaws.

Wellington was the first council to implement a cat bylaw in NZ (Kikillus, Chambers, et al., 2017), with the Animals Bylaw 2016 requiring mandatory microchipping and registration. 89% of submitters were in support of these requirements (Simmons, 2016). Therefore, there has been a 7% increase in support between the 2016 bylaw and the 2024 bylaw, which added desexing to the cat management clauses (Wellington City Council, n.d.). The Palmerston North bylaw was implemented in 2018 (Palmerston North City Council, n.d.), and as such the lower support percentage may reflect the novelty of cat management bylaws in NZ at that time. The number of councils implementing cat bylaws rose substantially from 2020 onwards (Sumner et al., 2022). Selwyn's bylaw was implemented in 2021 (Selwyn District Council, n.d.), Whangarei's in 2022 (Whangarei District Council, n.d.), and Tasman's is

due to be adopted in November 2024 (Tasman District Council, n.d.). The national increase in cat bylaws may contribute to the higher percentage of bylaw support in Selwyn, Whangarei, and Tasman, as the public has become more aware of cat management issues following the NCMSG report in 2020.

Nuisance was one of the main themes mentioned by submitters, with many submitters commenting on cats' impacts on their gardens. Selwyn residents were more likely to comment on impacts to their gardens than Wellington residents, which may reflect their differing environments. Selwyn is a predominantly rural area known for agriculture (Stats NZ, n.d.b; Wilson, 2006), whereas Wellington is a major urban region (Stats NZ, n.d.d). As such, there may be fewer residents with access to garden space with which to grow vegetables. Additionally, rural Selwyn residents may be more aware of the risks of toxoplasmosis than Wellington residents, due to its agricultural impacts (Glen et al., 2023; Roberts et al., 2021). Nuisance impacts can also reflect how regions are controlling their stray and feral cat populations. In Whangarei, nuisance issues primarily stemmed from stray cats, reflecting a need for greater control of stray cat populations.

The cost theme reflects the demographics of each region. Based on the findings and the 2018 census, regions with a lower median income and full-time employment rate were more likely to comment on the cost of cat management measures and the need for subsidies. However, all submitters expressed concern for how the bylaw would affect low-income households in their region and a desire for the council to support these households. This may reflect the national cost of living crisis that NZ is experiencing (Gabel et al., 2023; Hewett, 2024), with much if not all the NZ population aware of the crisis and its impact on those with a lower socioeconomic status.

In the conservation/environmental concerns theme, submitters commented on localised conservation issues. These included impacts on species in their region, such as kororā/little penguins (*Eudyptula minor*) in Tasman and Wellington, and long-tailed bats (*Chalinolobus tuberculatus*) in Whangarei, as well as areas of conservation concern, such as Zealandia in Wellington and St. Arnaud in Tasman. Submitters were more likely to support stricter measures, such as cat exclusion zones, curfews or containment around these areas or the species' habitats. Submitters also referred to Australian cat containment and curfew regulations as an example of stricter cat management that better protects native species. Cat curfews, containment, and cat-free zones have been implemented by many local governments in Australia (NESP Threatened Species Recovery Hub, 2021), with the majority of Australians in favour of these measures (Biodiversity Council, 2024; Hall et al., 2016). The potential for the implementation of cat containment in NZ is explored later in this chapter.

Anti-regulation sentiments are another theme that planners need to address when making a bylaw, as several of the submissions on this theme could be addressed through engagement with and education of the public. Concerns around enforcement of bylaw measures, microchip failure, and bylaw

measures as a “money grabbing exercise” reflect a need for further information on how the bylaw would be implemented, the low failure rate of microchips, and whether the council would collect fees as part of the bylaw. However, this is easier said than done, as those expressing anti-regulation sentiments do not appear to seek this information. This is particularly evident in social media posts by councils when engaging on a bylaw. For example. Tasman District Council made several posts to encourage people to submit on their proposed cat bylaw. Many commenters were against microchipping and registration as they believed the council would enact a yearly fee for this, similar to the dog registration fee. In the post itself, and the many replies to these comments by a council staff member, it was stated that the fee is a one-off charge to the NZ Companion Animal Register. However, the number of people commenting on this issue shows that those with these concerns were not reading the post in full, or any other comments expressing this concern that council staff had previously responded to (Tasman District Council, 2023). As such, addressing these concerns may require a more nuanced approach, with ongoing engagement that attempts to address these concerns through education. Concerns around freedom of choice and bylaws being ‘anti-cat’ could be addressed by educating the public on how these measures benefit cats and owners themselves, which could lead to greater support, as owners are more likely to support regulations that address animal welfare than other issues (Hall et al., 2016; Kent et al., 2022; Sumner et al., 2022).

The Whangarei petition reveals several region-specific inter-related themes that planners should seek to address when implementing cat management legislation. Submitters expressed strong concerns regarding stray and feral cats causing nuisance, health, cost, and conservation impacts on themselves, their pets, and the wider community. While a cat management bylaw helps to address concerns, it should align with the area’s regional pest management plan and work in tandem to reduce these impacts.

Locally, planners can engage, educate, and legislate in response to region-specific matters to better address residents’ concerns, such as those expressed in the Whangarei petition, or the desire for containment/curfews and/or cat exclusion zones in Selwyn, Tasman, Palmerston North and Wellington. Transition periods have been implemented by councils to give cat owners time to comply with bylaw measures, addressing some cost and enforcement concerns (Selwyn District Council, n.d.; Wellington City Council, n.d.). Targeted advocacy and education campaigns can increase the effectiveness of and compliance with cat legislation (Sumner et al., 2022; Woolley & Hartley, 2019). Additionally, it is important to remember that submission data does not necessarily represent the views of all residents in a region, as usually a relatively low percentage of a region’s population engages in the submission process (Hodder, 2024). Therefore, planners must foster ongoing engagement and collaboration with their local communities to better determine what issues need to be addressed through cat management (Reid & Schulze, 2019).

Existing research in NZ and the findings of the present research demonstrate that there is high support for and compliance with common cat management measures such as desexing, microchipping and registration (Bassett et al., 2020; CANZ, 2020; Forrest et al., 2019; Hall et al., 2016; Gates et al., 2019; Ovenden et al., 2024; Sumner et al., 2022; Walker et al., 2017). As such, national cat legislation for these measures may be appropriate. National legislation could enable local and regional councils to implement cat management measures on other region-specific concerns, such as exclusion zones, curfews or containment, especially near ecologically significant areas.

5.4 Appropriateness of Localised or Nationwide Approaches Towards Cat Management

In NZ, 41% of households own a cat, and among these households, 74% consider their cat a member of the family (CANZ, 2020). As such, cat management is a deeply personal issue. Additionally, 49% of all NZ companion cats are microchipped, and 88% are desexed (CANZ, 2020), showing that many pet owners are already complying with management measures, regardless of whether there is a bylaw requiring them in their region. Multiple NZ studies have found high support for desexing, microchipping and registration (Bassett et al., 2020; CANZ, 2020; Forrest et al., 2019; Hall et al., 2016; Gates et al., 2019; Ovenden et al., 2024; Sumner et al., 2022; Walker et al., 2017). Given the strong bylaw support shown in the findings, and in line with recommendations from the NCMSG (2020), the SPCA (n.d.c; n.d.d), Sumner et al. (2022), and Walker et al. (2017), I suggest that national cat legislation requiring mandatory desexing, microchipping, and registration would be well-received by the NZ public.

The findings and literature review confirm that cats have significant national impacts on native wildlife and human and livestock health and wellbeing, through predation (Baker et al., 2008; Bassett et al., 2020; Bischof et al., 2022; Department of Conservation, n.d.a; Dickman, 2009; Glen et al., 2023; Grayson & Calver, 2004; Kays & DeWan, 2004; Kays et al., 2020; Krauze-Gryz et al., 2017; Legge et al., 2020; Loss et al., 2018; Loss & Marra, 2017; Loyd et al., 2013; McGregor et al., 2015; Metsers et al., 2010; Mori et al., 2019; Morgan et al., 2009; Palmer & Thomas, 2023; Read, 2019; Trouwborst et al., 2020; van Heezik et al., 2010; Wierzbowska et al., 2012; Woinarski et al., 2017), parasite and disease spread, especially of *Toxoplasma gondii* (Glen et al., 2023; Howe et al., 2014; Roberts et al., 2021; Roe et al., 2017; Taylor et al., 2023), and nuisance effects (Grayson & Calver, 2004; Metsers et al., 2010; McLeod et al., 2015; Scotney et al., 2023; Sumner et al., 2022; Tan et al., 2020; Toukhsati et al., 2012).

The percentage of NZ households with cats declined from 44% in 2015 to 41% in 2020 (CANZ, 2016; CANZ, 2020). However, the average number of cats per household has slightly increased since 2015, indicating an overall increase in the total cat population between 2015 and 2020, from 1,134 to 1,219 cats (CANZ, 2020). There has also been increasing public awareness of cats impacts on native wildlife

due to many recent news articles on this topic (Brettkelly, 2022; Dowling, 2023; Nine to Noon, 2024; Page, 2023), with some people stating that their currently owned cat will be their last (McClure, 2023). NZ has addressed the impact of pets on native wildlife previously, by banning the sale, distribution, and breeding of ferrets in 2002 (Lee, 2002). While an extreme solution, this was supported by the NZ public, with over three-quarters of submitters in support of the ban. Sandra Lee, the Conservation Minister at the time, stated that the ban was needed to prevent greater problems of ferrets escaping and increasing the size of the feral population, especially as ferret ownership was on the rise (Lee, 2002). However, ferrets were a "minor pet species" (Lee, 2002), without the numbers or popularity that pet cats boast. As such, it is unlikely that the NZ public would support a similar ban, furthering the need for effective cat management legislation.

The NCMSG recommended that the central government implement a National Cat Act to allow for "mandated, comprehensive and consistent implementation of nationwide humane management of all cat populations in New Zealand" (NCMSG, 2020, p. 76). Many national organisations have stated their support of this act, for wildlife conservation (Forest and Bird, 2023; Rutledge, 2022 (Department of Conservation representative); Predator Free NZ, n.d.) as well as animal welfare (Romayne, 2022 (MPI representative); SPCA, n.d.c; SPCA, n.d.d). Trouwborst et al. (2020) noted that there are several international legally binding commitments that NZ has signed that technically require the control of feral and domestic cats, such as the Conference of the Parties 1992 Convention on Biological Diversity and the 1971 Convention on Wetlands of International Importance, especially as Waterfowl Habitat (the Ramsar Convention). These commitments, along with the growing public recognition of cat impacts, and the high support for cat management measures in the findings and the literature, demonstrate that legally and socially, NZ should implement a national cat legislation to reduce the environmental, nuisance and health impacts of cats. However, there are many factors that decision-makers need to consider when developing and implementing this legislation.

As shown in the findings, there are barriers to residents' ability to comply with cat management measures. Cost is a significant barrier and would likely require local or central government support and subsidies to address. Decision-makers could partner with national groups like the SPCA, or with local groups like Cats Protection, who offer subsidised desexing (Cats Protection League Canterbury, n.d.; Cats Protection Wellington, n.d.) and microchipping (SPCA, 2024). The desire for owner freedom of choice expressed in the anti-regulation theme is a more difficult barrier to address, likely requiring continuous engagement on a local level. To ensure the success of national cat legislation, ongoing advocacy, engagement, and education would be required, along with a slow, phased-in approach, which allows cat owners to adjust to these changes (NCMSG, 2020). Cat owners are more receptive to education and engagement that focuses on animal welfare and responsible cat ownership than conservation (Dickman, 2009; Crowley et al., 2019; Hall et al., 2016; Ovenden et al., 2024; Sumner et

al., 2022; Woolley & Hartley, 2019). However, as conservation is a key concern to owners and non-owners, with NZ cat owners showing greater concern for the conservation impacts of cats than some other countries (Foreman-Worsley et al., 2021; Hall et al., 2016), a dual approach that covers both conservation impacts and animal welfare benefits may engage more people (Woolley and Hartley, 2019; Hall et al., 2016; Toukhsati et al., 2012; McLeod et al., 2015; McLeod et al., 2017). As such, these should be the focus of any information campaign.

Responsible cat ownership articles are featured on the SPCA and Predator Free NZ websites, encouraging desexing and microchipping, and ways to entertain an indoor cat (SPCA, n.d.a; SPCA, n.d.b; Welch, 2023). Forest and Bird have also distributed information brochures to encourage responsible pet ownership, in partnership with local entities such as SPCA Waiheke Island and the Hauraki Gulf Conservation Trust (Forest and Bird et al., 2018). Partnering with organisations like these to distribute information about the importance of responsible cat ownership and the need to comply with national cat legislation would help reduce the resource load on central and local governments.

The National Cat Act proposed by the NCMSG (2020) and supported by national organisations would be an important step in more effective cat management in NZ. The strong support for legislation that mandates desexing, microchipping and registration, shown in the findings and literature review, demonstrates that NZ is ready for national cat legislation. Additionally, it would enable local authorities to implement cat management measures on other region-specific concerns, such as exclusion zones, curfews or containment, especially near ecologically significant areas. This would enable greater control of companion, stray, and feral cats across NZ.

5.5 The Diversity of Public Opinions About Stricter Cat Legislation Approaches

Cat containment, curfews, and exclusion zones around ecologically sensitive areas have been proposed in the research and by submitters as stricter cat management approaches that address the nuisance, environmental and health impacts of all cat types (Chamberlain et al., 2024; Kikillus, Chambers, et al., 2017; Ovenden et al., 2024; Sumner et al., 2022; Walker et al., 2017; Woolley & Hartley, 2019). By containing all companion cats to their owner's property, decision-makers would be able to implement greater controls over stray and feral cats, and stray populations would lower, as fewer companion cats would enter the population. While cat abandonment means that there would likely never be zero companion cats entering the stray population (MPI, 2018; NCMSG, 2020), containing cats to their owner's property would reduce the number of lost cats entering the population. The literature and submitters compare NZ policies with those in Australia and suggest decision-makers could follow their example, due to their implementation of cat curfews and containment measures in several Australian states (NESP Threatened Species Recovery Hub, 2021).

Perceptions on cat containment vary in NZ. There has been a slight increase in indoor-only cats between 2015-2020, from 8% to 11% (CANZ, 2020), demonstrating that cat owners are beginning to implement cat containment of their own accord. This could be due to the benefits of containment to cat welfare, concerns around wildlife conservation, or both. Surveys of the NZ public have generated mixed support for cat containment. Non-owners are more likely to support containment than cat owners (Bassett et al., 2020; Hall et al., 2016; Harrod et al., 2016; Walker et al., 2017; Woolley & Hartley, 2019) and of all cat containment options (inside during the day, during the night, at all times, or at other times), cat owners are more likely to support overnight curfews than other measures (Bassett et al., 2020; Walker et al., 2017). Despite this, there is recognition in these studies by owners and non-owners that some form of containment is best practice for cat welfare and conservation purposes.

Cat owners and non-owners are more supportive of confinement around significant ecological areas (Bassett et al., 2020), however, confinement or exclusion zones around these areas is a complex issue. Cat home ranges vary from an average of 3 ha to 6.8 ha (Kikillus, Woods, et al., 2017; Metsers et al., 2010; Thomas et al., 2014) and bigger cats or cats living near natural areas such as wetlands and reserves or in rural areas have larger home range sizes (Kikillus, Chambers, et al., 2017; Metsers et al., 2010). Cat roaming is also influenced by whether the cat is desexed or not (Morgan et al., 2009), and the density of cats in the area, as higher densities lower territory size and ranging distance (Lilith, 2007; Metsers et al., 2010; Thomas et al., 2014). Given these factors, it would be difficult to determine an effective exclusion zone around ecologically significant areas, especially as reducing the cat density in these zones may cause the remaining cats to roam further, thereby diminishing their effectiveness (Thomas et al., 2014).

The findings indicate that 11% of submitters commented on cat containment, with the vast majority supporting mandatory regulation over educational approaches (Figure 4). A key recommendation for further research is to engage the public on this issue to determine if there is sufficient support for including it in legislation. Submissions from Tasman and Wellington show greater support for cat containment, with 26% of Tasman submitters and 21% of Wellington submitters commenting on the issue. These regions would likely be the most promising for engaging the public on the potential addition of a curfew or containment clause to the existing bylaw. There would undoubtedly be many passionate responses to this issue, both for and against, as evidenced in the submissions analysed here and from the literature on this topic. However, much like cat bylaws themselves, I think that once one region implements a containment clause, other regions would feel empowered to follow. Decision-makers could look to Australia for examples of how to implement this, as surveys of the Australian public and submissions to local councils on cat containment align with the themes found in this study: concerns about nuisance, conservation, pet welfare and responsible pet ownership, and managing the

stray and feral cat population (Biodiversity Council, 2024; City of Whittlesea, 2022; Indigo Shire Council, n.d.; Swan Hill Rural City Council, n.d.).

Cat containment has been implemented by councils in several Australian regions (NESP Threatened Species Recovery Hub, 2021). Overall, Australians have higher support for cat containment than people in NZ, although similarly, cat owners are less in support of these measures than owners (Biodiversity Council, 2024; Hall et al., 2016). Submissions on cat containment in Australia found that protection of native wildlife, prevention of trespass/nuisance (faeces, noise), and protection of cats from injury, disease and becoming lost were the main reasons to support cat containment (City of Whittlesea, 2022; Indigo Shire Council, n.d.; Swan Hill Rural City Council, n.d.). The City of Whittlesea published a report on their engagement process, analysing submissions and providing recommendations for implementing a cat curfew. Submitters in Whittlesea expressed a desire for alignment between rules for dogs and cats, with comments such as "if dogs have to be confined then cats should be too" (City of Whittlesea, 2022, p. 21), reflecting similar attitudes in the submissions analysed for this research. Submitters also thought that a curfew would have a positive impact on managing high stray and feral cat populations.

Submitters opposed to the curfew shared concerns similar to those expressed in this research, such as "too difficult to enforce," "too difficult to change cats behaviour," "domestic cats are blamed for things done by feral cats," "don't have the current setup to confine my cat(s)," "too many rules," "cats deal with pests," and "revenue raising" (City of Whittlesea, 2022, p. 33-38). The similarities in themes between Australian and NZ submissions suggest that decision-makers could learn from Australia's engagement and implementation process when developing containment or curfew regulations in NZ. However, it is important to recognise that public support for and attitudes towards stricter regulations differ between Australia and NZ, as well as regionally within NZ (Bassett et al., 2020; Hall et al., 2016; Harrod et al., 2016; Walker et al., 2017; Woolley & Hartley, 2019).

Cat owners express several key concerns and barriers to cat containment: cat welfare, the financial cost of cat containment structures like catios, the difficulty of transitioning indoor/outdoor cats to an indoor-only lifestyle, and the inability to modify rental dwellings (City of Whittlesea, 2022; Crowley et al., 2019; Elliott et al., 2019; McLeod et al., 2015; Woolley & Hartley, 2019). Containment also impacts the owner-cat relationship, with Ovenden et al. (2024) finding that owners were concerned about containment infringing on their cat's freedom of choice or ability to express itself, which could negatively affect their relationship with their cat. Many owners valued their cats "choosing to live with them," viewing this as fundamental to their relationship with their cats (Ovenden et al., 2024, p. 553). Concerns about cat welfare, freedom to engage in naturalistic behaviours and transitioning between indoor/outdoor to indoor-only can be reduced through cat-specific fence barrier products or secure

outdoor spaces like catios, as well as adequate enrichment items such as scratching posts and toys (de Assis & Mills 2021; Hall et al., 2016; Tan et al., 2020; Toukhsati et al., 2012). However, cost and restrictions on modifying rental properties remain barriers to these solutions. A slow, phased-in approach, with widespread information on why containment is beneficial for cats, native wildlife, and the wider community, and how owners can address their cat welfare concerns, would be vital to ensure compliance.

5.6 Recommendations for Implementing Cat Containment in NZ

Based on the research findings and the literature review, a cat containment argument should be framed around three aspects: cat welfare, conservation of native wildlife, and reducing nuisance. These themes resonate with cat owners and non-owners and would encourage support for containment regulation. Implementation should focus on a slow, phased-in approach, which gives cat owners time to gather the resources and information required to institute containment measures in their households.

While cat exclusion zones are perhaps a useful stepping stone into engaging with the public on stricter cat measures, and as a part of a slow, phased-in approach for containment, these zones are less effective than implementing containment or curfews. As night-time curfews are the most supported by the public, these could be implemented initially (Bassett et al., 2020; Walker et al., 2017), before being followed by 24-hour curfews after an appropriate length of time. The length of time required would likely vary regionally and should consider the financial demographics of the region's population.

Advocacy and educational strategies should focus on supporting behavioural change while recognising and addressing cat owner concerns. Chamberlain et al. (2024) recommend approaches to address the three key concerns of cat owners: the capability to contain cats, the physical opportunity to do so, and concerns about roaming. These strategies include training, such as workshops on building cat enclosures; environmental restructuring, such as increasing the availability of containment products; education about the risks of roaming-related accidents for cats; and modelling, such as using influencers who practice cat containment as role models in social media campaigns (Chamberlain et al., 2024). The main national hardware stores offer DIY workshops (Bunnings Warehouse, n.d.; Mitre 10, n.d.). These companies could be approached to provide advice on DIY cat enclosures and containment measures. Chamberlain et al. (2024) also suggest using credible messengers such as veterinarians to communicate the benefits of enrichment for contained cats and persuade owners that their cats can live healthy and happy lives while contained. Ovenden et al. (2024) suggest that any cat containment policy should emphasise the importance of enrichment as a normative cat-owner responsibility. It is also important to recognise that trust plays a key role in behaviour change. While

information from government sources is valuable, local cat advocacy groups and welfare organisations may offer a more trusted source of information for some audiences (McLeod et al., 2017).

The City of Whittlesea (2022) identified five key recommendations for implementing a cat curfew based on submissions. These included: a transition period, raising community awareness, providing ample notice to cat rescue and rehoming services, exploring financial support for low-income households, and conducting further research. To raise awareness, the recommendations emphasised repeated, targeted, mixed-methods communication, focusing on the 'why' of the legislation—understanding the value of cats, protecting local wildlife, minimising nuisance behaviour, and promoting responsible pet ownership. Campaigns should aim to “reduce fear, reiterate support,” and recognise the nuanced circumstances of individual cat owners (City of Whittlesea, 2022, p. 57). Submitters also suggested that only warnings, rather than fines, be issued during the transition period to allow owners time to adjust. These recommendations align with the literature and could guide councils considering cat containment regulations.

Literature on public opinions of cat containment indicates low support for these measures (Bassett et al., 2020; Hall et al., 2016; Harrod et al., 2016; Walker et al., 2017; Woolley & Hartley, 2019). However, the research findings reveal a vocal group of submitters who support regulatory measures. As such, there must be more research on this topic, focusing on whether the public would support mandatory containment measures, and why. While NZ is likely years away from implementing any form of mandatory containment, it is important to recognise that there is a desire for containment/curfews among the NZ public and that there are many sources with recommendations for the successful implementation of these measures.

5.7 Summary

Community attitudes towards cat management in NZ show notable regional differences, with public concerns largely focused on nuisance, conservation, stray and feral cat management, and cost issues. Nationally, there is a need to clarify the definitions for stray cats in legislation, to reflect the complex interactions between residents and cats. There is high support for desexing, microchipping, and registration, suggesting that national legislation could be appropriate to implement these cat management measures. National legislation could enable local authorities to explore other region-specific cat management measures such as exclusion zones or containment. However, regional variations in submissions suggest that implementing these measures requires a tailored approach that addresses local community concerns, especially in low-income areas. The connection between local decision-makers and residents must be maintained, to allow for the nuanced circumstances of individual cat owners to be considered when implementing bylaws. Public opinions on stricter cat legislation reflect some desire for regulation to address the nuisance and environmental impacts of

roaming cats. However, further research is needed to assess whether there is sufficient support for the implementation of cat containment and to determine an appropriate timeframe for such a transition. If cat containment is introduced, a gradual, phased-in approach is recommended, with education and engagement targeting the three main themes: cat welfare, environmental impacts, and nuisance effects. This approach, combined with strong public education and engagement, will help ensure that containment measures are both effective and considerate of the diverse perspectives and needs within NZ's communities.

Chapter 6

Conclusion

Domestic cats are the most popular companion animals in NZ; however, their free-roaming behaviour causes significant wildlife, public nuisance, and health impacts, including the spread of diseases like *Toxoplasma gondii*. NZ's native species have evolved in the absence of predatory mammals and are naïve to the risks posed by cats and other mammalian predators (Kikillus, Chambers, et al., 2017). High cat densities in urban areas exacerbate the issue, with cats exerting population-level effects on native species such as pīwakawaka/fantail (*Rhipidura fuliginosa*) and silvereyes (*Zosterops lateralis*) (Bassett et al., 2020; van Heezik et al., 2010). With 1.2 million companion cats (CANZ, 2020), 200,000 stray cats, and 2.4 million feral cats (Donnell, 2021), there is a strong need for better cat management to reduce the adverse impacts of cats.

This research examined public attitudes and interactions with cats and cat bylaws in NZ. Submissions from five councils were analysed using a mixed methods approach to determine the regional similarities and differences in attitudes and interactions towards cats and cat bylaws. The analysis also aimed to determine whether a nationwide or localised approach would be more effective in addressing these differences and to understand the diversity of opinions on stricter measures, such as cat containment and curfews. Ten themes emerged from the analysis of submissions. The main themes expressed were nuisance, conservation, cost, stray and feral cat management, and containment/curfews. Additional themes included the benefits of cats, human and livestock health concerns, and toxoplasmosis risk to wildlife. Submitters also commented on whether they supported the bylaw or opposed it, represented in the bylaw support and anti-regulation sentiment's themes.

This study supports the need for redefining the legal definitions of stray cats to better address the complexity of human-cat interactions. The NCMSG (2020) has suggested a broader definition of stray cats that separates them into four categories based on whether they are socialised or unsocialised. This approach gives councils clarity and guidance on how to deal with these cats depending on which category they fall into. However, as cats can move between these definitions throughout their lifetime, it would be beneficial to view cat definitions as a continuum rather than a category-based approach. Additionally, the TNR approach suggested by NCMSG (2020) for unsocialised, managed cats should be reconsidered in favour of a more effective strategy such as TAR. Stray and feral cat management requires an interconnected approach with companion cat regulation to effectively reduce the unowned cat population.

Support for measures like desexing, microchipping, and registration was high across all regions studied, suggesting that the implementation of national cat legislation on these measures would be well received. However, the distinct regional concerns—ranging from nuisance to conservation and health—underline the need for local authorities to address specific regional challenges. A nationwide legislative framework could also give local councils the flexibility to address other region-specific concerns like exclusion zones or containment around ecologically significant areas. Implementation of national legislation would require local authorities to work closely with communities to address region-specific issues. This is particularly important in areas with lower-income populations, as residents may require support from councils and local organisations to comply with cat management bylaws. Engaging with residents through targeted education and advocacy campaigns and maintaining open lines of communication between councils and citizens will be key to the successful implementation of these measures.

Furthermore, cat containment remains a contentious issue, with public support for stricter regulations varying across regions. Research shows that these measures could be gradually introduced through a phased approach, starting with nighttime curfews, as public opinion seems to support these measures more readily than others. Ongoing education campaigns focusing on the welfare benefits of containment and the nuisance impacts of cats, rather than just the impact on wildlife, would likely increase public receptivity to stricter cat management policies. These campaigns should also focus on reducing fears and misunderstandings about bylaw regulations, especially among cat owners concerned about the welfare implications of containment. Of the regions studied, Wellington and Tasman are the most well-positioned to engage with the public on cat containment, as they had a higher percentage of submissions on this issue than other regions. Overall, the findings emphasise the need for more research into public attitudes toward cat containment and stricter legislative measures to better assess the level of support for these measures, both regionally and nationally.

Ultimately, the success of any cat management framework will depend on a careful balance between national standards and local adaptation, ensuring that the preservation of wildlife, the welfare of cats and the concerns of the public are all addressed in a clear and effective manner. Engaging communities through education and advocacy, redefining stray cat classifications, and implementing flexible, region-specific measures alongside national legislation will be essential to encourage public support and achieve more responsible cat ownership in NZ.

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microchipping and registration of cats, a key step in promoting responsible domestic cat ownership. This is different to feral cat management which is dealt with through our Pest Managment Plan. Please note, we will not be charging for or making any money from microchipping or registration. If this bylaw is put in place, a cat owner would pay a vet to get their cat microchipped and pay a one-off $15 charge to the New Zealand Companion Animal Register to register their cat - that is all. Share your views with us online through our quick polls, the cat owners survey, or tell us what you think in your own words in the 'we're all ears' section – we're asking for early feedback until Monday 11 December. We're also paws-itively curious about your cat's microchip, registration and desexing status. This information will help us to know what proportion of cat owners would be affected by a new Cat Bylaw. Go to shape.tasman.govt.nz/cat-bylaw – it's the purr-fect place to share your feedback! Facebook. https://www.facebook.com/TasmanDistrictCouncil

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Appendix A

Tag Words Identified in Each Theme

A.1 Introduction

This appendix contains all the 'tag words' identified in the thematic analysis of submissions (3.4.1). Commonly repeated words and terms were identified from a word frequency query using NVivo 14 (Lumivero, 2023) and manual analysis. Following this, R statistical software (v4.4.1; R Core Team, 2024) was used to identify if one of the 'tag words' occurred in the relevant theme for each submission. Due to the complex interactions of some single-word tags within the themes, several themes contain phrases. The addition of specific phrases significantly reduced the instance of incorrect themes being applied to submissions during the statistical analysis. These tag words and phrases were copied verbatim from the submission data, and consequently contain spelling and grammar errors.

A.2 Nuisance

"garden", "gardens", "gardening", "lawn", "lawns", "nuisance", "nuisances", "toilet", "toileting", "toilets", "droppings", "dig", "digging", "dug", "defecate", "defecating", "defecation", "poo", "pooed", "poos", "pooing", "pooping", "urinating", "urine", "veggie", "vegie", "vegetable", "vegetables", "faeces", "pee", "peeing", "peed", "spray", "spraying", "excrement", "excrete", "fight", "fighting", "fights", "noisy", "sand", "pit", "pits", "sandpits", "mess", "marking", "crap", "foul", "fouling", "territorial", "territory", "pissing", "piss", "pissed", "shitting", "prowl", "prowling", "unregulated", "unneutered", "bed", "beds", "antisocial cat behaviours", "cats can be a pest", "cats are a pest when they wander", "cats are a total menace", "cats are ongoing pets", "cats are a increasing pest", "noise"

A.3 Human and Livestock Health Concerns

"toxo", "sickness", "miscarriage", "miscarriages", "stillborn", "zoonotic", "diseases", "disease", "toxoplasmosis", "parvo", "parvovirus", "foetuses", "public health", "flea", "fleas", "contagious", "worm", "bacteria"

A.4 Toxoplasmosis Risk to Wildlife

"toxo", "toxoplasmosis", "dolphins", "dolphin"

A.5 Conservation/Environmental Concerns

"native", "bird", "birds", "wildlife", "wild life", "birdlife", "bird life", "lizard", "lizards", "geckos", "skink", "skinks", "reptiles", "reptile", "insect", "insects", "invertebrate", "invertebrates", "killers",

"protect", "tui", "tuis", "kaka", "kākā", "fantails", "fantail", "piwakawaka", "warblers", "kereru", "waxeyes", "thrushes", "blackbirds", "sparrows", "finches", "penguin", "penguins", "kororā", "wekas", "kiwi", "mohua", "tomtits", "robins", "dotterel", "bell", "bells", "collar", "collared", "collars", "biodiversity", "biodiversity", "biodiverse", "nest", "nesting", "nests", "indigenous", "fauna", "bird population", "hunt", "hunting", "hunters", "threat", "threats", "threatened", "taonga", "predators", "predator", "predation", "predate", "predated", "bat", "bats", "apex predator", "apex-predator", "oystercatcher", "oystercatchers", "wrybill", "banded rail", "marsh crake", "Australasian bittern", "bar-tailed godwit", "species", "environment", "environmental", "wetland", "wetlands", "devastate", "devastation", "devastating", "ecosystems", "ecosystem", "ecological", "ecologically", "ecology", "endangered", "prey", "preying", "preys", "Zealandia", "habitat", "conserve", "conserving", "conservation", "flora"

A.6 Benefits of Cats

“companions”, “companionship”, "fur baby", "furry babies", "furry friends", "lover of cats", "lovely animals", "love and joy", "love my cat", "loved members", "pleasure cats bring", "make people feel good", "pets play an important role", "real benefits in developing tolerance", "children should have an animal in their lives", "pets are good for society", "our cats are our family", "dearly loved cats", "comfort that a pet can provide", "eat mice and rats", "kill mice and rats", "controlling rats and mice", " catch of mice, rats", "also eat rats, mice", "keeping down rats and mice", "keep down rats", "keep rats and mice population down", "decimate rats n mice", "mice, rat", "watch the rat population explode", "cat numbers means more rodents", "control rodents", "rodent", "rodents catchers", "well-being of many community members", "love to their owners"

A.7 Cost Concerns

"afford", "affordable", "affordability", "subsidise", "subsidising", "subsidised", "subsidize", "subsidy", "subsidized", "income", "incomes", "cost", "costs", "costly", "costing", "financial", "financially", "discount", "discounted", "fee", "fees", "expense", "expenses", "expensive", "pay", "paying", "pays", "fund", "funded", "funding", "funds", "spend", "spending", "incentive", "incentivise", "incentivised", "bills", "Chip and snip", "Snip & Chip", "snip n chip", "snip and chip", "Chip n Snip", "save folks a lot of money", "free register", "cheaper"

A.8 Stray and Feral Cat Management

"wild", "overpopulation", "over population", "overpopulate", "unwanted", "un wanted", "irresponsible", "abandon", "abandoned", "abandonment", "stray", "strays", "feral", "ferals", "dump", "dumped", "dumping", "given away", "trap", "traps", "trapped", "trapping", "TnR", "TNR", "release", "releasing", "rescue", "rescues", "rescuing", "rescued", "unwanted", "colony", "colonies",

"rehoming", "re home", "shelter", "shelters", "unloved", "wild cat", "wild cats", "euthanise", "euthanised", "euthanasia", "euthanize", "euthanizing", "dispose", "disposed", "disposal", "eradicate", "eradicated", "eradication", "mistreated", "mistreatment", "neglect", "neglected", "unchipped", "uncontrollable", "unmicrochipped", "unregistered", "unowned", "cull", "culling", "seize", "seized", “suffer”, “suffering”, “anxiety”, “captured”, "accidental litters", "unneeded litters", "don't want litters", "cat population", "wild lost animals", "not chipped", "control the population"

A.9 Cat Containment/Curfews

"containment", "contained", "curfew", "curfews", "indoor", "indoors", "confine", "confined", "confinement", "confining", "confines", "overnight", "cat runs", "catio", "catios", "shut-in", "dark", "darkness", "cat-free zones", "keep cats at home", “enclosure”, “enclosures”, “contain”, “contained”, “containment”, "inside pets at night", "kept inside", "inside at night", "locked inside", "inside overnight", "keep them inside", "inside before dusk", "keep cats inside", "inside cat", "keeping them inside", "cat inside", "cats inside", "inside at all times", "kept on the owners property", "inside pets", "inside pet", "wander off their property", "wander off their properties", "keeping cats off", "especially at night", "removal of the right for cats to roam", "cats restrained", "not be allowed to roam", "not allowed to roam", "not letting cats freely roam", "no longer be free roaming", "restrictions on cats being allowed to roam", "stop leaving their cats to roam", "dangerous to be allowed to Roam", "roam off the owners land", "none of it goes far enough", "where cats are allowed to roam", "allowed out at night", "restrictions on them being outdoors", "keep their cats in at night", "banning outside cats", "keep pet cats inside", "keep their cats inside", "control wandering cats", "not be allowed to wander", "don't allow cats out", "Cats should be on leads", "keep them on their own property", "in at night", "banned from going outdoors", "entertain them", "further restrictions", "phasing out of outdoor cats", "cats loose it means nothing", "stop them roaming", "not allowing cats to roam", "kept on the owners property", "not allow cats to wander", "not be allowed to go out", "keep their cats in their homes", "keep cats at home", "treated like dogs", "not be allowed to trespass", "banning new cats", "reduce roaming of cats", "not be allowed by their owners to roam", "do not want cats roaming my property", "penalized for allowing their animals to freely roam", "restricted to their owners", "shut in at night", "keeps cats in their own homes", "restrain their cats on their property", "cats on neighbouring properties", "neighbouring cats entering their property", "keeping cats off neighbouring properties", "stronger restrictions", "phase out cat ownership", "inside pets at night", "inside every night", "keep them in at night", "lock them up at night", "roaming at night unchecked", "in all night", "in house at night", "no cats out at night", "inside the garage each night", "movement needs to be controlled", "kept within bounds of their own property", "something residents can do about roaming" , "appropriate closures", "exclusion covenant", "exclusion covenants", "banned from St Arnaud", "cat free", "regulate cats further", "not left to roam", "their

dogs roam at night", "roaming animals also shouldn't be allowed", "not free to wander", "shouldn't be allowed to wander", "restrain my dog from wandering", "cats wandering onto other people's property", "wandering on to other peoples property", "restricted to their owners premises", "controlled as dogs are", "not be roaming", "kept to property", "keep on owner's property", "much stronger action", "need strict regulations"

A.10 Support for Bylaws

"supportive", "supports", "helps", "strong favour", "strong support", "strongly support", "feel very strongly", "strongly like to see", "strongly believe", "strongly prefer", "strongly agree", "strongly encouraged", "strongly encourage", "strongly recommend", "ensure responsible pet ownership", "ensures responsible pet ownership", "encouraging responsible pet ownership", "strongly urge", "strong support", "support desexing", "support a bylaw", "this needs to be a thing", "good idea", "great idea", "make it compulsory", "heartily support", "all for microchipping and desexing", "increase control of cats are welcome", "this is great", "brilliant idea", "excellent proposal", "very positive", "support all bylaws", "fully support", "please include mandatory", "please do all of the above", "welcome this discussion", "great initiative", "believe that all domestic cats should be", "extremely important", "in favour of", "cat control is essential", "believe all cats should be", "total agreement", "please have cats desexed". "absolutely agree", "cats need to be controlled", "completely agree", "are all essential for harmony", "all domestic cats should be microchipped", "please work towards managing cats", "do like the idea", "happy to comply", "yes to all of the proposed", "very keen", "about time we had cat regulations", "agree with microchipping", "agree with the compulsory", "we are pleased", "great start", "thank you for taking this first step", "agree domestic cats should be microchipped", "cats should be micro chipped", "yes! Cat owners should have", "100% for managing cats", "agree with this", "take action to control cats", "fully supportive", "happy to make this mandatory", "took responsibility for their pets", "definitely support this", "totally in support", "makes great sense", "all for microchipping and desexing", "great step forward", "cats should be microchipped", "de-sexing is a start", "support mandatory", "pleased to see your proposal", "totally agree", "definitely agree", "100% support", "well needed and a step forward", "yes please", "this is an essential", "I am all for this", "I'm all for this", "yes I agree", "amazing idea", "sounds good. I have two", "yes to microchipping", "really support", "makes it so much better", "agree with the bylaw", "agree with your suggestion", "absolutely support", "this is essential", "100% agree", "happy to support" "would be great", "it is necessary", "much needed move", "agree with compulsory", "please get this through", "overdue change", "all cats should be chipped", "support microchipping and registration", "long overdue", "fabulous idea", "yes microchipping", "keen as", "should be mandatory", "great move", "yes, I think it is time", "I am all for mandatory", "I am all for microchipping", "I am all for a bylaw", "fantastic", 100% desexing", "support having cats registered",

"well overdue", "there should be a bylaw", "please make it the law", definitely approve", "support more controls", "sounds great", "cats should be desexed", "support the measures", "agree desexing", "support the move", "this gets my vote", "compelling reasons for a cat bylaw", "we support", "highly support", "support this proposal", "support mandatory neutering", "should have mandatory microchipping", "strongly believe that all cats", "support this in the strongest", "step in the right direction", "we need radical change", "support promotion of desexing", "support the mandatory desexing", "restrictions need to start", "should also be microchipped", "important to take action", "support further restrictions", "seems very sensible", "should be registered", "I also support", "good progress", "appreciate any cat control activities", "would happy", "desexing is important", "please encourage people", "support adding restrictions", "thoroughly agree with", "important step", "support additional requirements", "responsible pet ownership is critical", "support the principles", "support responsible cat", "support mostly", "obey the rules. Support", "support everything", "support the changes", "wholeheartedly support", "cats makes sense", "yes, too many cats", "extremely helpful", "need to be controlled", "definitely. Too many cats", "good control", "assists with control", "cat population can be controlled", "cat owners should be required", "controls seem to work best", "this is necessary for animal", "cats should be too", "cats should be licensed", "particularly helpful", "so very pleased", "essential part of responsible", "all do something about it", "please help towards being predator free", "allow better control", "please have cats desexed", "please set a bylaw", "please include desexing", "please micro chip", "please take action", "more of this please", "please microchip", "strongly encourage the council", "make people responsible for their animals", "put some serious enforcement in place", "should all be brought in", "welcome a bylaw", "control of cats are welcome", "Introduce new bylaws mandating", "Introduce new bylaws, mandating"

A.11 Anti-regulation Sentiments

“pointless”, “disagree”, “cat hate”, “cat hating”, “oppose”, “opposed”, “money grabbing exercise”, revenue, “money making”, “power grab”, brainless, stupid, “money gaining”, “waste of time”, “waste of money”, “waste of time and money”, “money grab”, “wasting rate money”, “dead money”, “money grabbing”, “money wasted”, “propaganda”, "lost the plot", punish, "cat hater's", "play god", bureaucracy, "anti-cat", "no change", "leave it alone", "recovering costs", "don't make us", "unenforced", "waste money", "how could you possible regulate this", "we learned nothing", "do not support", "no thank you", "what on earth is a bylaw meant to achieve", "object to this proposal", "Would you microchip children?", "never be successful", "microchip your children", "absolutely ridiculous", "control tactic", "no thanks I do not agree", "do not agree or consent", "leave things as they are", "cat police", "should not be forced", "it should be forced", "encouraged rather than forced", "forced expense", "full deck of cards", "forced medical interventions", "definitely not more

council regulation, "what is the purpose of this", "impracticality", "this is dumb", "leave the cats be", "stay how it is", "it would traumatise her", "not interested, do something more useful", "council interference", "chips fail", "never be in support", "no need to create new rules", "nope", "stop controlling every aspect", "don't believe this is a good idea", "don't agree", "stay how it is", "should be up to the individual", "no thanks", "shouldn't be made to give up", "it's up to. The owner", "not force them to", "no one else should have any say", "stop making more rules", "leave the cat's alone", "not supporting", "personal choice", "persons choice", "choice to or not" "should be an owners choice", "peoples choice", "by their own choice anyway", "owner's choice whether they want", "should be a pet owners choice", "don't take people's choice away", "I do not think its necessary", "no longer freewill"

Appendix B

Correlation Matrices

B.1 Introduction

A correlation matrix was created for each council. In these matrices, blue shades indicate that themes are positively correlated. For instance, in the Selwyn District Council matrix (Figure 7), mentions of the health theme are often associated with mentions of the toxoplasmosis theme, meaning that comments referencing one theme typically reference the other as well. Conversely, red shades indicate negative correlations. For example, in the Tasman District Council matrix (Figure 8), mentions of bylaw support are negatively associated with mentions of anti-regulation sentiment, suggesting that submitters who emphasise support for bylaws are less likely to express anti-regulation sentiments. The p-values of these correlations are also indicated on the matrices, with significance marked by asterisks: three for p-values ≤ 0.001, two for p-values > 0.001 and ≤ 0.01, and one for p-values > 0.01 and ≤ 0.05. For instance, in the Tasman District Council matrix (Figure 8), the health theme is significantly positively correlated with the toxoplasmosis theme, denoted by three asterisks (***).

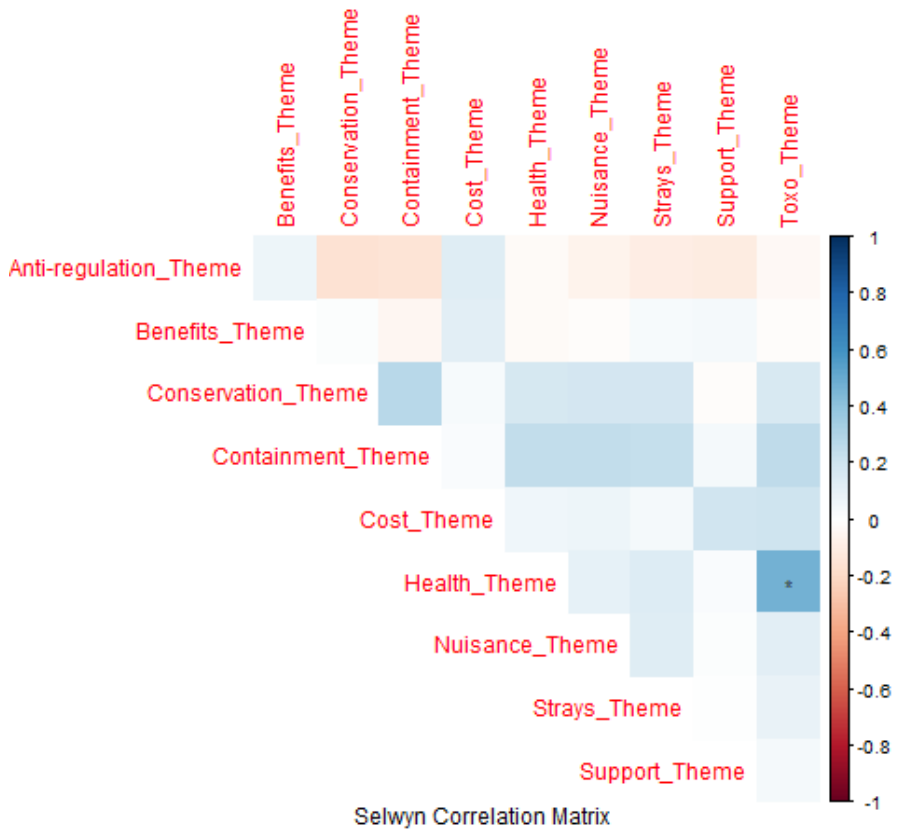

Figure 7: Selwyn District Council correlation matrix

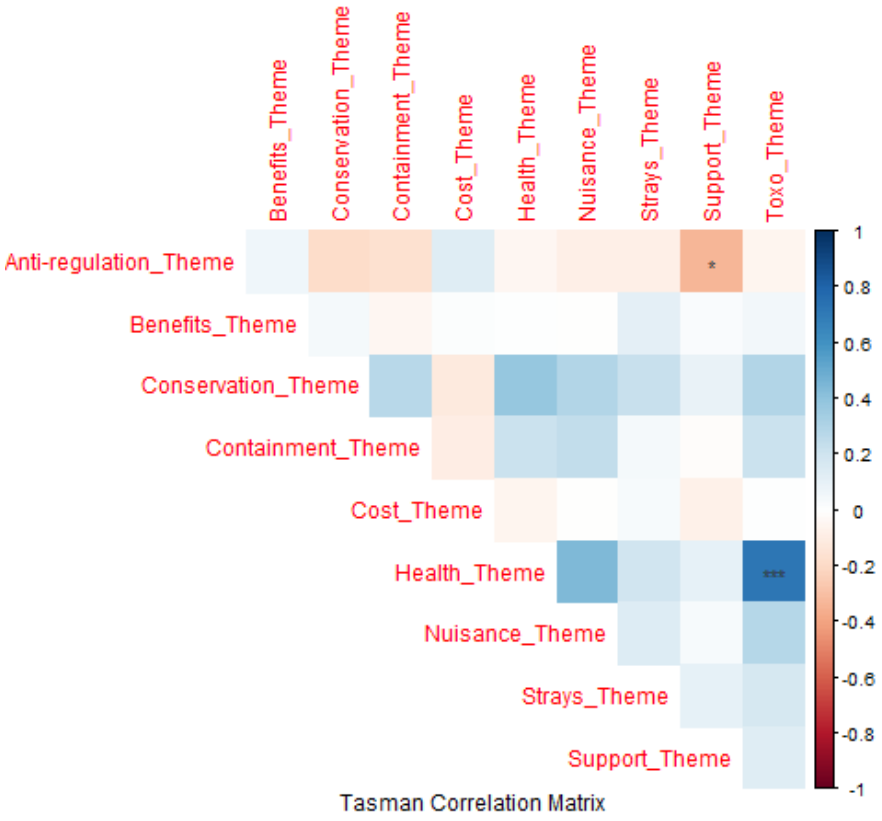

Figure 8: Tasman District Council correlation matrix

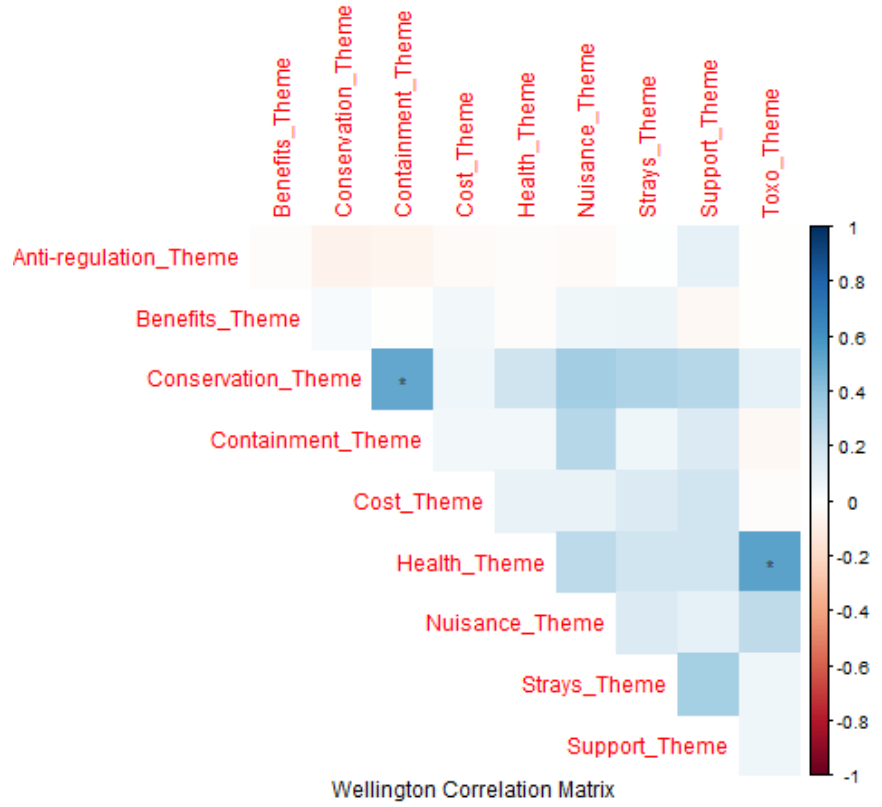

Figure 9: Wellington correlation matrix

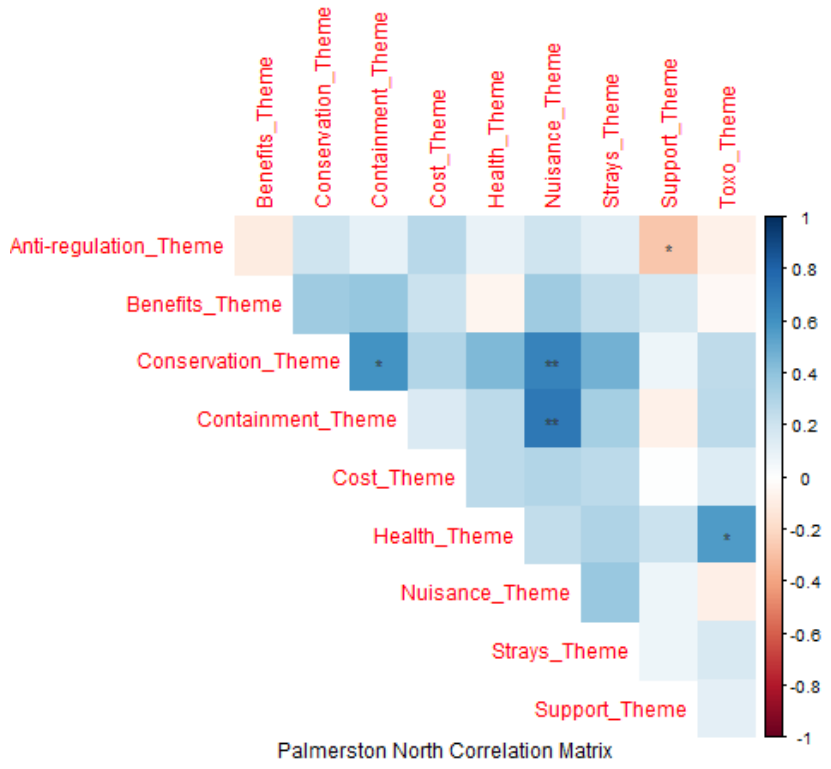

Figure 10: Palmerston North correlation matrix

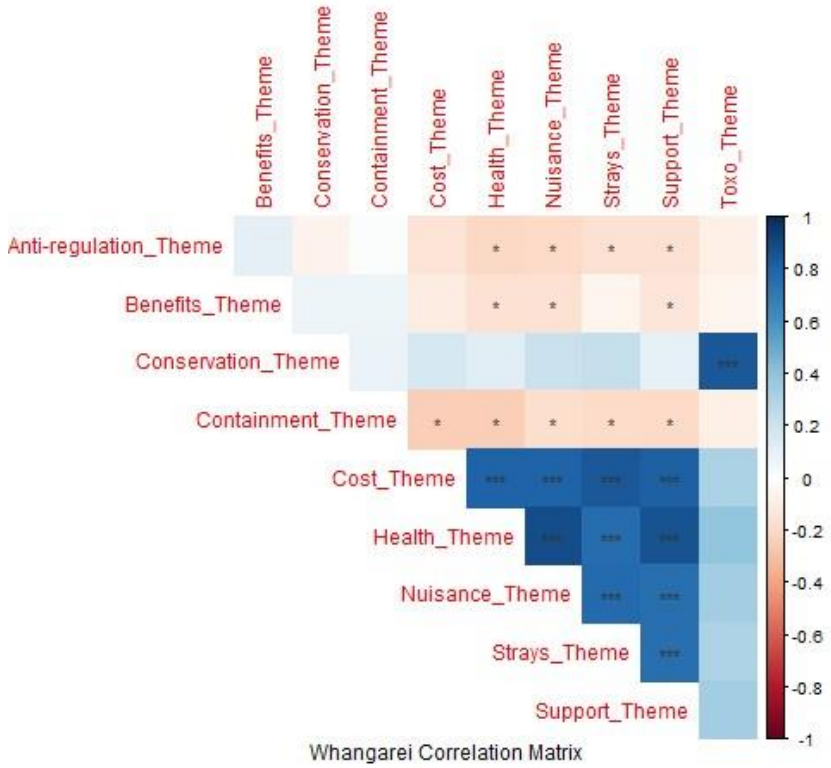

Figure 11: Whangarei correlation matrix

Appendix C

Supplementary Theme Graphs

C.1 Introduction

This appendix contains the figures for the anti-regulation, benefits of cats, human and livestock health concerns and toxoplasmosis risk to wildlife themes These figures were excluded from the main text to improve readability and maintain focus on the themes with higher submitter interest. While these themes received less attention, they are still essential for understanding the broader context of cat-related issues in NZ.

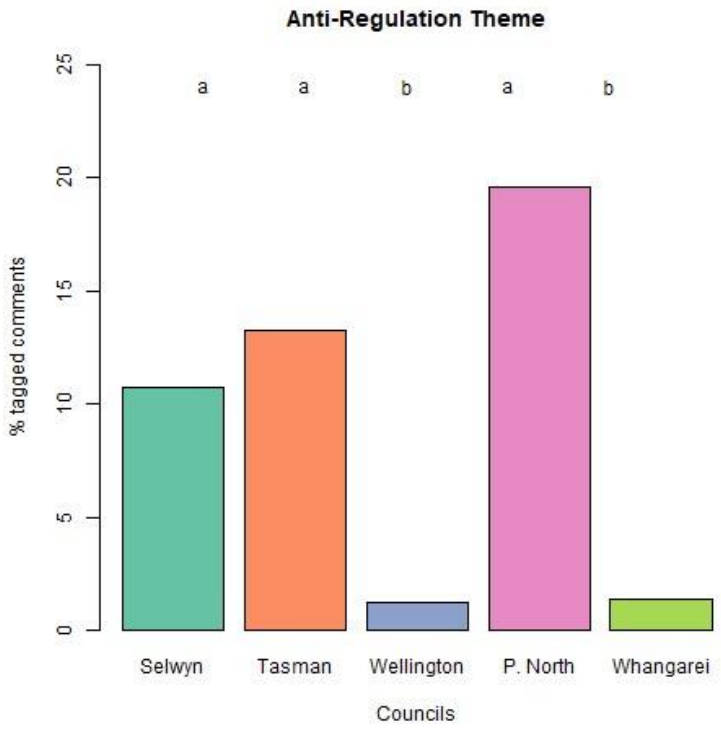

Figure 12: Percentage (up to 25%) of submitters expressing anti-regulation sentiments by council. The letters along the top denote whether regional variations are statistically significant. Palmerston North, Tasman, and Selwyn are statistically similar (a), as are Wellington and Whangarei (b)

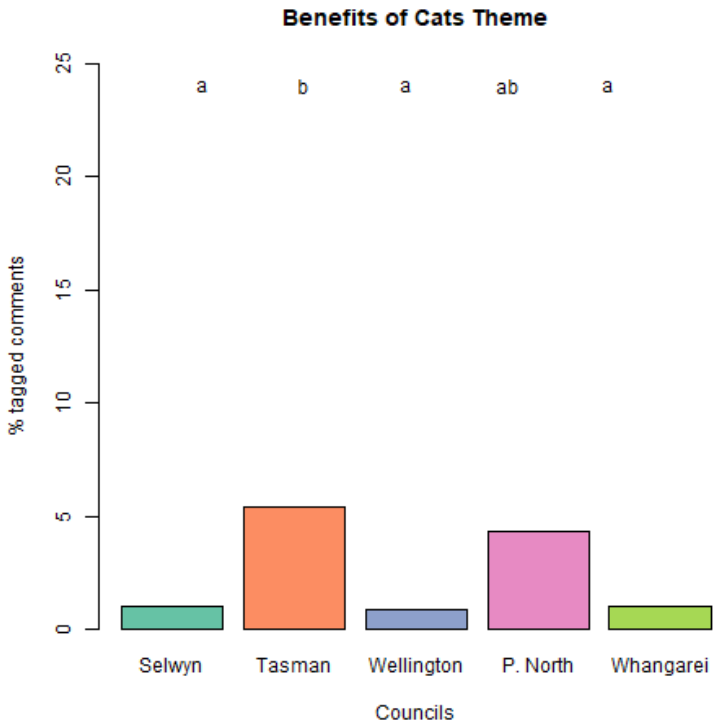

Figure 13: Percentage (up to 25%) of submitters who mentioned the benefits of cat ownership. Selwyn, Wellington, and Whangarei are statistically similar (a), while Tasman is different (b) and Palmerston North shares similarities with all regions (ab)

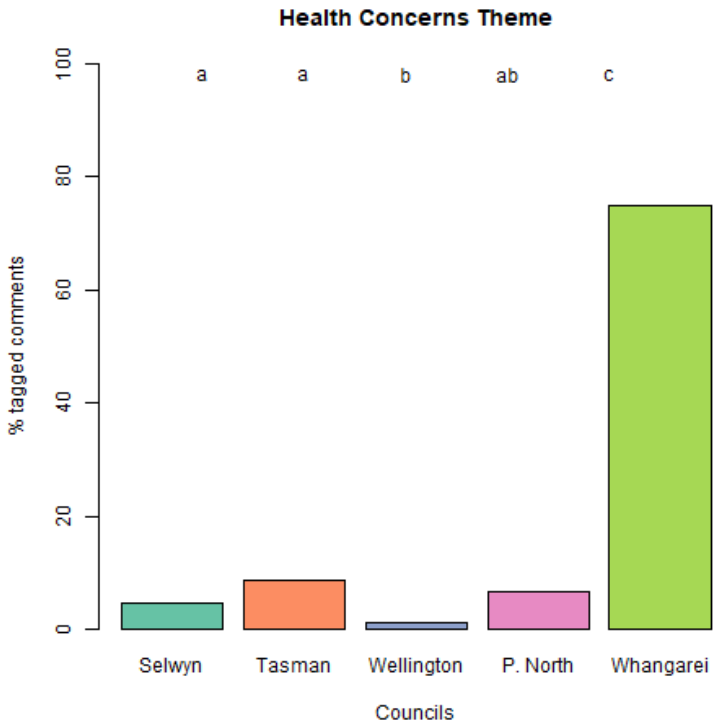

Figure 14: Percentage of submitters who mentioned health concerns in their submissions. Selwyn and Tasman are statistically similar (a), while Wellington (b) and Whangarei (c) are different. Palmerston North is similar to Selwyn, Tasman, and Wellington (ab)

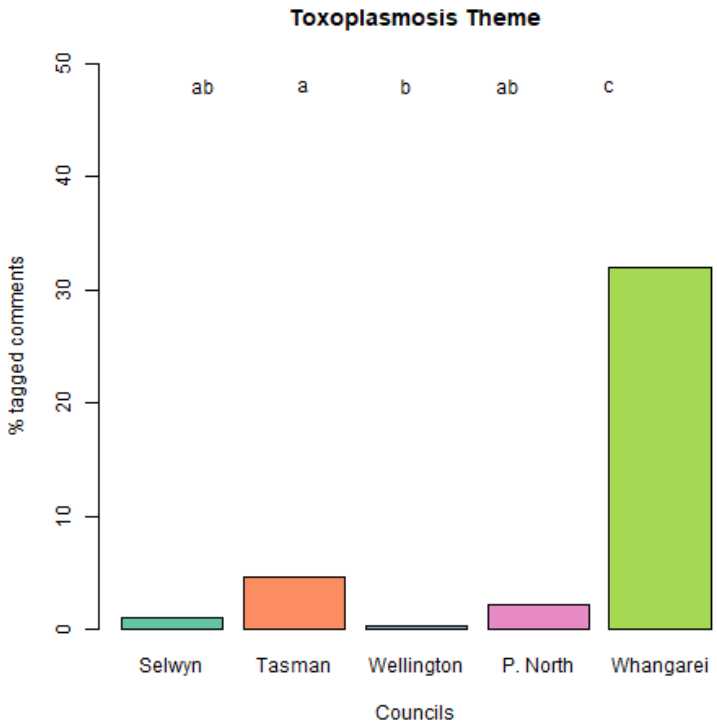

Figure 15: Percentage of submitters (up to 50%) who mentioned toxoplasmosis in their submission. Tasman (a), Wellington (b) and Whangarei (c) are significantly different from other regions. Selwyn and Palmerston North (ab) are similar to Tasman (a) and Wellington (b)