Study of attitudes towards native animals and ecological restoration vs companion animal ownership and control in a Waitakere Ranges community

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i. Abstract

Companion animals, notably domestic cats and dogs, are amongst a suite of predators known to significantly impact on native wildlife. Although there are some areas of ecological significance within New Zealand where companion animals are excluded, overall there is little legislation or enforcement to cover companion animal management and control in ecologically sensitive areas; particularly with regard to domestic cats.

Evidence suggests many pet owners value their animals higher than native wildlife, do not consider their pets constitute a threat and/or believe other predators pose a greater risk to native biodiversity. In areas where control of other predators is taking place, a lack of control of companion animals particularly cats could have an impact on predator / prey relationships.

A study was undertaken in the ecologically significant region of the northern Waitakere Ranges, West Auckland to assess the values the community placed on native wildlife and ecological restoration projects versus their attitudes toward companion animal management and control. Recommendations highlighted the need for increased community awareness of the threat companion animals pose to wildlife, greater advocacy for endangered native species existing within and proposed for reintroduction into the area and the facilitation of community based decision-making to achieve favourable ecological and social outcomes.

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1.0 INTRODUCTION

1.1 Introduced predators

The first mammalian predators in New Zealand, the Polynesian rat or kiore (*Rattus exulans)* and dog *(Canis familiaris)* arrived with early Polynesians (King, 1984). These were followed by Norway and Ship rats (*Rattus norvegicus* & *R. rattus.)* as stowaways on European trading vessels, and cats (*Felis catus)* to control the rats (ibid.). Brushtail possum (*Trichosurus vulpecula)* were introduced in 1837 as a potential fur crop, and mustelids, i.e. ferrets (*Mustela furo)*, stoats (*M. erminea)* and weasels (*M. nivalis)* were introduced in the late 1800's to control rabbits (ibid.)

The impact of these species on a biota that had evolved over millions of years in the absence of mammalian predators contributed to or was the sole cause of the extinction of 40 species of bird, at least 3 species of frog, one species of bat, and an unknown number of lizard species (Ji & Clout, 2006). Mammalian-free off-shore islands and isolated pockets on the mainland became refuges for many endangered and/or declining species (ibid.)

1.1.1 Companion animals as predators

For the purposes of this report, the term *companion* animal shall be used interchangeably with *domestic* animal to signify a cat or dog dependent on humans for food, water, shelter and social structure as well as to control disease and reproduction potential (SPCA, nd).

1.1.1.1 *Domestic dogs*

There is strong evidence to indicate that dogs can have a significant impact on wildlife populations. Any dog, whether stray or off the leash still possesses a highly developed sense of smell (Correa, 2005) and a natural instinct to chase and kill; often with little inclination to eat the prey (Forest & Bird, 2002). Dogs are a threat predominantly to flightless and ground nesting birds. As well as attacking and killing birds, dogs impact on bird populations by disturbing their nesting and feeding behaviour (Department of Conservation, n.d.-a).

Van't Woudt (1990) suggests that the smell of a bird around a nest is often enough to cause an unaccompanied dog to destroy a nest regardless of whether there are birds or eggs present.

In the forested, shrubland and wetland areas of New Zealand, ground nesting species at risk include kiwi (*Apteryx sp)*, rail *(Rallus sp)*, weka *(Gallirallus australis)*, and brown teal *(Anas chlorotis)*. Ground foraging species such as North Island robin (*Petroica australis)* are also at risk. Threatened coastal species include little blue penguin *(Eudyptula minor)*, New Zealand dotterel *(Charadrius obscurus)*, variable oystercatcher *(Haematopus unicolor)* and fairy tern (*Sterna nereis)* (Department of Conservation, n.d.-c).

Impact on kiwi

Dog attacks on kiwi (*Apteryx* sp) are well documented – the most notable being the stray dog that killed approximately 500 birds of a total estimated population of 900 in the Waitangi forest in Northland over a 6 week period (Taborsky, 1988). Miller & Pierce (1995), highlight predation by dogs as being a major contributing factor to the decline of the Brown kiwi population in Northland – particularly in north and eastern regions. Nine areas are cited where multiple (4+) kiwi deaths from dogs had occurred over the period 1987 – 1994, where in one case a house-based dog brought home kiwi over a 10-year period until a survey revealed that there were none left in the area (ibid.).

In other parts of the country, the reporting of kiwi deaths due to dog attacks is a common occurrence, but of particular concern is that many are occurring within sanctuaries and reserves ("Kiwi killed by dog at Boundary Stream Mainland Island", 2004).

Hunters using dogs to hunt deer and pigs are encouraged to and will sometimes report the loss of a dog ("National Parks no place for dogs says NZ First", 2004) however these dogs still represent a threat to wildlife – particularly kiwi (Department of Conservation, n.d.-c), although hunters are being encouraged to put their dogs through a kiwi aversion training programme and fit their dogs with radio tracking collars should they become lost (ibid.).

1.1.1.2 *Domestic cats*

The impact of cats on native wildlife in New Zealand is well documented (King, 1984; Sinclair, Fryxell, & Caughley, 2006) as well as their effectiveness as rodent and rabbit killers (Efford, Fitzgerald, Karl, & Berben, 2006; Flux, 2007). Despite cat owners' best intentions, domestic cats retain the instincts to hunt and kill regardless of how well-fed they are (B. M Fitzgerald & Turner, 2000, in Gillies, 2001). Although they do not have to rely on hunting to survive like feral cats, they will hunt and kill as part of their innate behaviour and "for the sheer pleasure of it" (Fogle, 1991, p. 120). They may not necessarily consume their prey but bring it back and deposit it in the house and/with or play with it until it is dead (ibid.).

Cats are opportunistic feeders in terms of the prey they catch, and prey is dependent on habitat and presence or absence. For example, where rabbits are present, cats will hunt these in preference to other prey (Flux, 2007; Gibb & Fitzgerald, 1998 cited in Efford et al. 2006). In two studies where the stomach contents and scat of feral cats were analysed (Efford, Fitzgerald, Karl, & Berben, 2006; B.M. Fitzgerald, Karl, & Veitch, 1991), rodents (particularly rats) were the main food and birds secondary in importance. The relative abundance of prey groups is not discussed. In another two studies (Gillies & Clout, 2003), (Flux, 2007); in which the prey of domestic cats is ascertained by what the animals brought home, mammals were again the dominant prey group with birds second.

The results of these two studies may not give a true representation of what a cat catches but would appear to fit the general trend. Gillies & Clout (2003) acknowledge the assumption that what the cats brought home was representative and Flux (2007) acknowledges that because the data is derived from the catches of one cat, this may not be representative of cats in general.

The proportion of native birds caught in these two studies reflect the location of the study area – i.e. more native birds are caught where cats are in range of likely habitat (forest fringe) as opposed to fully urban habitat (Jones, 2008). Lizards and insects have also been identified as prey (Gillies & Clout, 2003, Efford et al., 2006), but were excluded from the study by Flux (2007).

Although domestic cats have a much smaller foraging range than feral cats (B.M. Fitzgerald & Karl, 1986), studies have indicated that some domestic cats may go on extensive forays of between 2 – 4km (Meek, 1994). In another study, a domestic cat living 1.2km from a protected ecological area where kill traps were being used, was detected most commonly approximately 200m from the owner's house (Gillies, 2007). In this case it was considered highly unlikely the cat would pose a threat to native wildlife in the protected area (ibid.)

There is the potential for domestic cats to turn stray or feral in a rural environment (Van't Woudt, 1990) although this is more likely as a result of being dumped or abandoned.

1.1.2 NZ companion animal control laws

1.1.2.1 *Domestic dogs*

Within West Auckland's Waitakere City Council district the control of dogs comes under Council Bylaw No. 29 (based on the central government Dog Control Act 1996). Dogs are required to be registered annually and from 1 July 2006 microchipped. There is a restriction on the number of dogs an owner can have based on the size of the property (Waitakere City Council, n.d.-b). Generally, *all dogs must be under control but depending on the place, not necessarily on a lead, e.g. the owner being near the dog and using voice or body language to control the dog* (ibid.)

There are by-laws with regard to dog exercise areas at beaches and in areas deemed to be sensitive such as the buffer zones surrounding the water catchment dams and camping grounds/picnic areas within the Regional Park (Waitakere City Council, 2004).

Dog bylaws are enforced by Animal Welfare staff within Council. For infringements within the Waitakere Ranges Regional Park area, Auckland Regional Council rangers can issue infringement notices but currently do not have the jurisdiction of Animal Welfare officers (Olsen, N., 2008, pers. comm., April 3). Anecdotal evidence indicates that there is little enforcement of the dog bylaws particularly at the beaches.

In New Zealand destructive stray dogs are usually destroyed (Van't Woudt, 1990) and in the case of registered dogs attacking wildlife, owners may be prosecuted, however prosecutions are rare (Cumming, 2004).

1.1.2.2 *Domestic cats*

Currently there are no laws governing the management and control of cats in New Zealand. Cats are not required to be registered, neutered or identified (either through the wearing of a collar or micro-chipping). They are not required to be kept in at night or within the owner's property. There is no restriction on the number of cats any one individual can have. Animal welfare officers are only authorised to step in if cats are being mistreated (Waitakere City Council, n.d.-a)., but have no authority to deal with irresponsible owners who have unneutered cats that are continuously producing litters which are either disposed of (killed or dumped) or left to fend for themselves.

1.1.3 Australian companion animal control laws

1.1.3.1 *Domestic dogs*

In general Australian dog control regulations are similar to those in New Zealand, however in South Australia, wildlife wardens can wilfully injure or kill a dog that is found to be attacking a protected species ("South Australia Dog and Cat Management Act", 1995).

1.1.3.2 *Domestic cats*

Cat control regulations vary across Australian states and between councils.

In NSW, the Companion Animals Act 1998 requires all cats to be microchipped and registered from 1 July 1999. Cats are also prohibited from wildlife areas. Under the South Australia Dog and Cat Management Act 1995, wildlife wardens have the authority to *lawfully seize, detain, destroy or otherwise dispose of any cat found in a reserve, wilderness protection area or sanctuary* (p. 41). In remote areas anyone who finds a cat more than 1km from a place used as a residence is entitled to deal with the animal in the same way (p. 42).

1.2 Ecological restoration & predator control in New Zealand

1.2.1 History

Despite a history of unintentional and deliberate introductions of invasive species into New Zealand (Ji & Clout, 2006), New Zealanders have been concerned about protecting and preserving the native fauna and flora of this country since the late 1800's (Galbreath, 1993). Early conservationist Richard Henry was attempting to save Fiordland's Kakapo *(Strigops habroptilus)* from introduced predators as early as 1894 (Biosecurity Council, 2003), permanent protection had been granted to Little Barrier, Resolution and Kapiti Islands as reserves by 1895 (King, 1984), and the removal of cats from islands commenced from around 1924 (Clout & Russell, 2006).

Many of the earlier ecological restoration projects were based on off-shore islands where ecosystems tended to be less modified than those on the mainland due to isolation from other terrestrial habitats (Saunders, 1990).

The ability to locate and target all in the predator population on islands increases success of eradications (Galbraith & Blanchon, 2008). Predator release allows native species to recover and has provided opportunities to translocate native populations in decline or endangered (Saunders, 1990).

Due to the considerable success in eradicating invasive mammals on islands (Veitch & Bell, 1990), attention shifted to mainland ecosystems and the application of island experience to the concept of mainland islands where invasive species are controlled rather than eradicated (Saunders, 1990). On the mainland, 'island' borders can be physical structures of predator-proof fencing, or less tangible such as geographical features (for example open pasture surrounding a significant ecological area). In many cases, the mainland island is an area under intensive management (Department of Conservation, n.d.-b).

Currently throughout New Zealand there are many individuals, community groups and organisations involved in ecological restoration projects involving predator control (New Zealand Ecological Restoration Network, 2008). These

projects are taking place in rural and urban areas, and in a variety of natural environments from sand dunes to regenerating native forest (ibid).

1.2.2 Predator / prey interactions

The literature indicates that not enough is known about the effects of removal or reduction of a predator or prey species (Ogden, 2008) and a better understanding of the relationships between cats, rats and birds is required (Bull, 1953, cited in Flux, 2007). In areas where rodent and rabbit populations are being controlled, birds are considered a cat's next preferred prey group (Flux, 2007; Gillies & Clout, 2003). Similarly, when rodents are present, cats may have less of an impact on bird populations and can even enhance these populations by eliminating predatory rats (Flux, 2007). Ogden (2008) considers an integrated approach that targets all pest species over a relatively short period of time is the safest approach although admittedly this was in an island context – albeit the considerable expanse of Great Barrier Island (28,000 hectares), 100 kilometres off the north-eastern coast of Auckland (Great Barrier Island Charitable Trust, n.d.).

1.2.3 Communities, companion animals and conservation

In a number of New Zealand's new rural subdivisions and lifestyle blocks close to ecologically sensitive areas such as native forests, wetlands and sand dunes; the exclusion of domestic animals is one of the measures being adopted to protect these areas (Forest & Bird, 2002). The restriction is made clear prior to agreements being signed.

In areas where there are no such controls, the combination of conservation, communities and companion animals can be problematic (Meek, 1994). Domestic cats and dogs are acknowledged to have high value as companion animals (Nattrass, 1993) and killing pets is not conducive to good relationships between pet owners and those involved in ecological restoration, even if in the interests of protecting wildlife (Gillies, 2007). Amongst cat owners there is often the commonly held belief that their animal never catches wildlife (Jones, 2008) and/or that other predator species such as mustelids and rodents pose more of a threat (B.M. Fitzgerald, 1990).

1.3 The Waitakere Ranges

1.3.1 Wider region

Fig. 1: Location of Waitakere Ranges.

(Main map source: Jasons (Auckland Regional Council, 1996)
(Inset map source: www.forbo-siegling.co.nz/img/nz_map.jpg)

1.3.1.1 *Physical environment*

The Waitakere Ranges are situated in West Auckland within the Waitakere City Council District. The area encompassed by the Ranges includes the beaches bordering the northern Manukau Harbour from Titirangi to Whatipu on the west coast, and the west coast beaches such as Karekare and Piha, as far north as Bethell's beach. Landwards from Bethell's beach the foothills extend to the rural township of Waitakere in the northeast towards the village of Titirangi in the southeast (Fig. 1).

The Waitakere Ranges Heritage Bill (passed into law April 8, 2008) defines this 27,000ha area (Waitakere City Council, 2007). Natural environments

within the area include sandy beaches and rocky coastlines, river valleys, steep hill country with regenerating native forest dominated by kauri (*Agathis australis),* wetlands, dunelands and rolling foothills. The range of habitats supports a diversity of flora and fauna including endangered species such as Hochstetter's Frog (*Leiopelma hochstetteri*), long-tailed bat (*Chalinolobus tuberculatus*), and the Waitakere rock hebe (*Hebe bishopiana*) (ibid.)

The Waitakere Ranges Regional Park occupies an area of over 17,000ha and sits within this larger area. It is zoned as public open space and administered by Auckland Regional Council (ibid.). Waitakere City parks and reserves account for another 400ha and the Department of Conservation owns an additional 970ha which is administered by the Auckland Regional Council (Waitakere City Council, 2003).

Considerable importance has been placed on the Waitakere Ranges area due to its high scenic, recreational and ecological value – particularly in regard to its close proximity to metropolitan Auckland (Waitakere City Council, 2007). Numerous community-based ecological restoration projects have become established involving predator control, weed control and/or revegetation (ibid).

1.3.1.2 *Human environments*

Human communities are scattered throughout the ranges from the coastal settlements to bush communities. The Waitakere Ranges project background paper (Waitakere City Council, 2003) outlines the different zones of 'Human Environments' within the area. These include 'The Waitakere Ranges Environment' which are properties averaging 3.5ha in size, (of which there are approx. 950), containing significant bush cover and high/outstanding landscapes. At the other end of the scale is the 'Rural Village Environment' where the average site size is 4,000m^2 (ibid.).

1.3.2 Northern region – study area

On the northern boundary of the Waitakere Ranges in the vicinity of the Waitakere River Valley, there is a cluster of predator control projects targeting predominantly mustelids, rats and possums (Fig. 2).

- Ark in the Park – a mainland island project based within the Regional Park in the vicinity of Cascade Kauri Park. A joint project between Forest & Bird and Auckland Regional Council. By far the largest predator control operation at 1100 hectares with plans to increase this up to 2000 hectares in the future (Royal Forest & Bird Protection Society Inc., n.d.-b). Volunteers have been carrying out predator control work since the establishment of the project in 2003 (ibid.). Ecological restoration work has also involved the reintroduction of whitehead *(Mohoua albicilla),* Nth Island robin (*Petroica australis)*, and stitchbird *(Notiomystis cincta)*, previously locally extinct (Waitakere City Council, 2007). In the future there are plans to reintroduce kokako (*Callaeas cinerea)* brown teal (*Anas chlorotis)* and kiwi (*Apteryx. sp)* (Sumich, J., 2008, pers. comm., 14 March).
- Matuku Reserve – 120 hectares owned by Forest & Bird with pest control being undertaken by Forest & Bird's Waitakere branch volunteers (Royal Forest & Bird Protection Society Inc., n.d.-a).
- Buffer zone area – 800 hectares in (predominantly) private ownership with land owners receiving support from Auckland Regional Council and Forest & Bird in terms of advice and trapping equipment (Royal Forest & Bird Protection Society Inc., n.d.-b). The foundations for this project commenced in 2004 and required support from 75% of the landowners before it could proceed. This was achieved earlier this year (2008), with bait stations, poison and traps being delivered from May this year (Jack, S., 2008, pers. corr. 1 May). The Forest Ridge project within the buffer zone is a community group of private landowners (Royal Forest & Bird Protection Society Inc., n.d.-a).
- Bethell's beach / Waitakere Valley area – circled in red (refer to Fig.2 next page). A number of land owners within this area are undertaking predator control work with support from the Auckland Regional Council.

Fig. 2: Predator control projects in northern area of the Ranges
(Map source: www.arkinthepark.org.nz/maps/locating_the_ark/adjacent_projects_buffer_zo.html)

1.3.2.1 *Proposed reintroductions to study area*

Over the medium to long term there are plans to reintroduce brown teal and eventually kiwi back into the area. The Te Henga wetlands, Waitakere river and its headwaters within Ark in the Park would provide suitable habitat for brown teal, and the wide range of habitats within the Ranges would support kiwi. Both kiwi and brown teal are ground-nesting birds and vulnerable to predation. The threat domestic dogs pose to kiwi has been mentioned earlier in this report (p. 8). All life stages of brown teal including adults are preyed on by dogs and cats (O'Connor, Maloney, & Pierce, 2007).

2.0 PURPOSE OF STUDY

The purpose of this study is to gauge support for increased domestic animal management and control in an ecologically sensitive area where a number of predator control projects targeting other predator species are in operation.

2.1 Study objectives

- *To gauge community attitudes towards native animals*
- *To gauge opinions of the value of ecological restoration projects*
- *To gauge community attitudes towards domestic animal management & control*
- *To profile domestic animal ownership and control within community.*

3.0 METHODOLOGY

3.1 Establishment of target area for survey

Informal discussions were held with key people involved with the Ark in the Park mainland island restoration project; John Sumich, Ark in the Park chairman and Sandra Jack (former) Ark in the Park project manager, as well as Rachel Bebbington – predator control coordinator for the Bethell's beach community and valley area extending from the western boundary of the buffer zone to the coast (Refer to Fig. 2). Given the number of predator control operations throughout the valley, and the reestablishment of threatened species, there was interest in conducting a valley-wide survey to gather data about companion animal ownership, control and management; and gauge community attitudes towards increased animal control.

The boundaries of the target area were to be from the Te Henga/Scenic Drive intersection and all roads either side of the valley to the coast, as well as the ridge roads of Duffy, Wairere and Jonkers to the north.

3.2 Questionnaire design

A survey questionnaire was developed (Appendix 1) with 3 sections:

- Section 1: Demographics of respondents
- Section 2: Values and Opinions
- Section 3: Domestic animal ownership, control & management

Section 1 (Demographics) consisted of 3 questions with tick boxes to ascertain:

- Age range
- Gender
- Property status

Section 2 (Opinions & Values) sought data using sliding scales with a range of 1 to 5 where:

- a score of 1 indicated *little or no value* **or** *strongly disagree* through to
- a score of 5 which indicated *high value* **or** *strongly agree*

The rationale behind using a sliding scale with numerical values was the ease with which qualitative data could by quantified for the purposes of statistical analysis.

Section 3 (Domestic animal ownership, control & management) sought data via a series of tick boxes, options for circling and spaces where respondents could record details.

3.2.1 Proofing of questionnaire

As well as being proofed by the author's supervisor, the questionnaire was given to two associates of the author's for proofreading and feedback. Subsequent changes were made as a result of this feedback.

3.3 Ethics approval

Human ethics approval was required before the survey could be undertaken. An application was submitted to the Unitec Research Ethics Committee on 23 June 2008 with approval being granted on 28 July. An 'information for participants' sheet was also required (Appendix 2) and was submitted along with the ethics application for inclusion with the questionnaire.

3.4 Questionnaire delivery and collection

397 questionnaires were hand delivered to all letterboxes within the target area on 3 August. Participants were asked to return the survey before 25 August. Return of the questionnaire was facilitated by a postage paid portion of the questionnaire with a return address.

3.5 Data analysis

All statistical analyses were carried out using SPSS for Windows version 16.0.

4.0 RESULTS

4.1 Response rate and demographics

4.1.1 Questionnaire response

Of the 397 questionnaires distributed there were 121 returned (32.8%) of which 119 were analysed (30%). (2 responses were significantly late and consequently not included in the analysis).

4.1.2 Profile of respondents – gender and age distribution

Of the respondents to the survey, 28.6% were male and 67.2% were female. (The remaining 4.2% represented missing and/or unclear data where respondents had not specified their gender or had ticked both options). A chi squared test indicated that there was a significant difference in the proportions of male/female respondents (X^2 = 18.561, df = 1, P = < 0.001). There was also a significant difference in the distribution of ages of the female respondents compared with males (Fig. 3, X^2 = 12.766, df = 6, P = 0.047). The most common age for female respondents was in the 35 - 44 age group, whilst for male respondents it was the 55 – 64 age group.

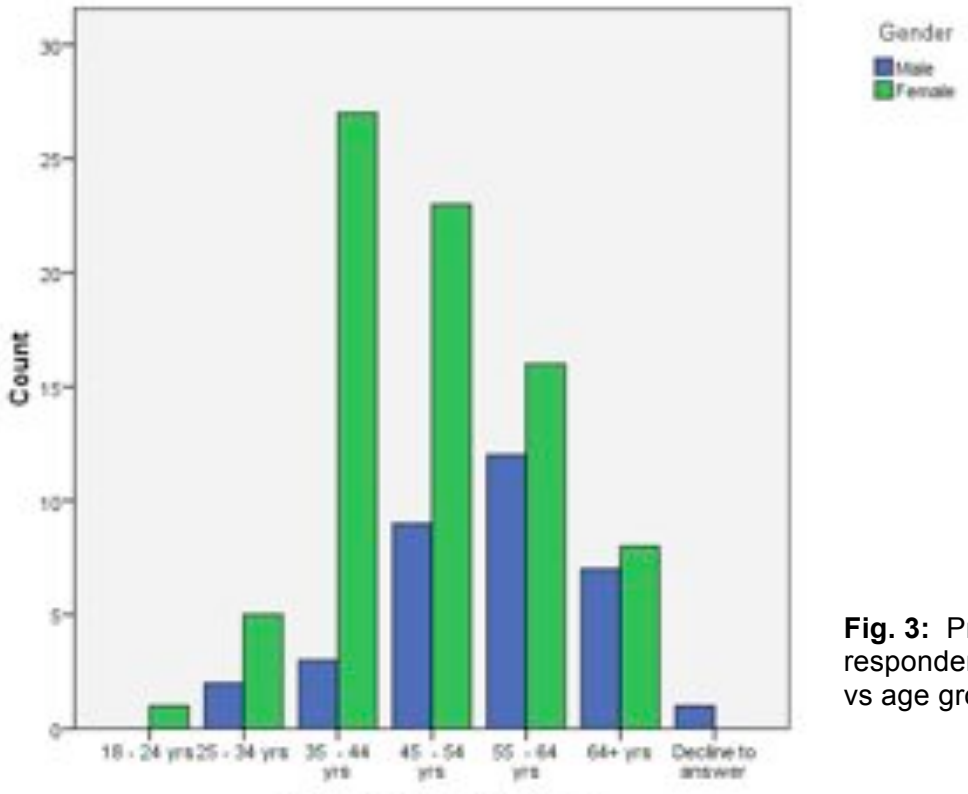
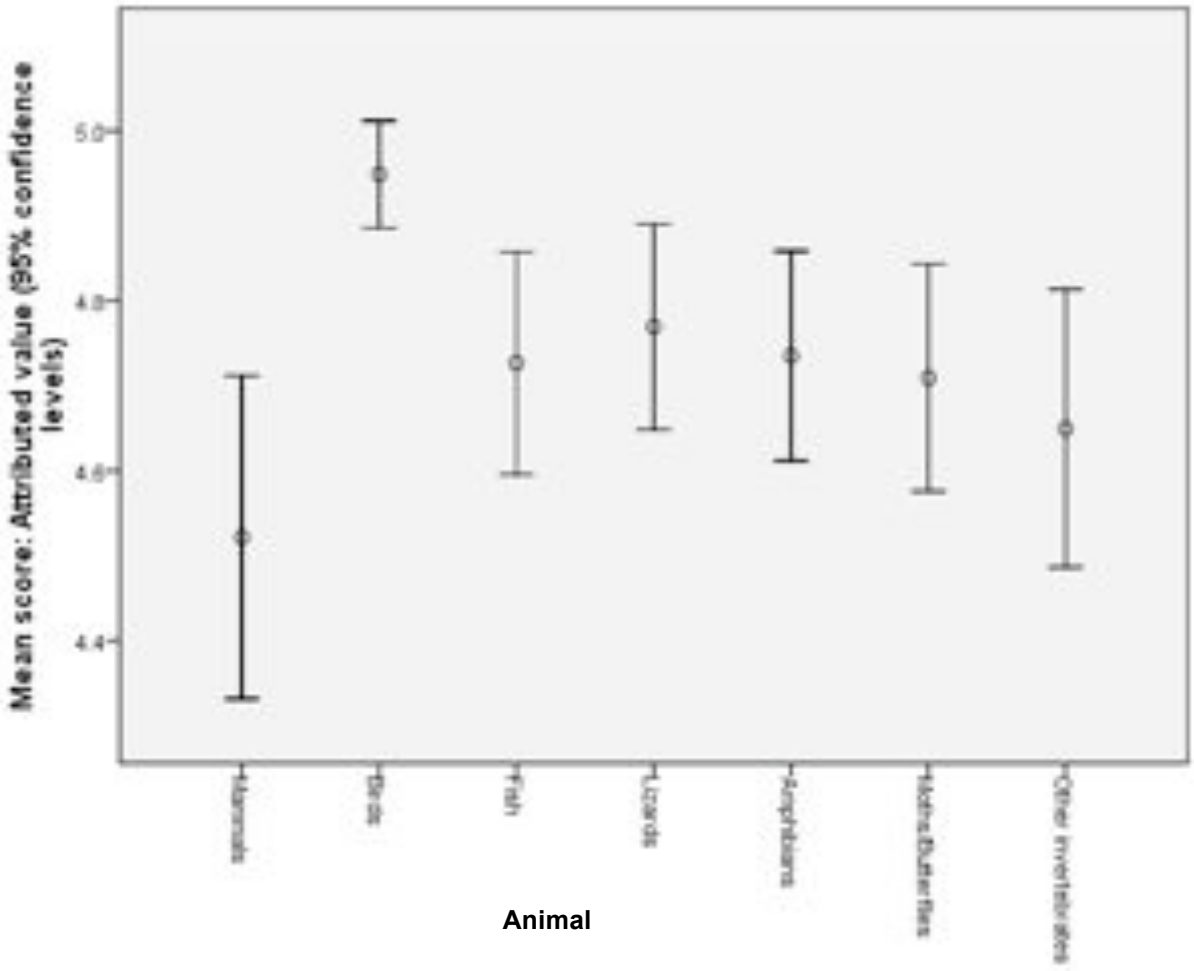


Fig. 3: Profile of respondents - gender vs age group

4.2 Values assigned to native animals within the Ranges

Respondents were asked to indicate to what extent they valued the presence of various native animals within the Waitakere Ranges by circling a number between 1 and 5 where 1 indicated little or no value and 5 indicated high value. Respondents rated all the animals very highly with the mean scores falling between 4.51 (mammals) and 4.95 (birds). A comparison of mean scores using 95% confidence level figures indicated that there was a significant difference in the mean values of mammals and birds, compared to the mean scores of the values assigned to the other animals. The mean value score of birds was significantly higher than all other means whilst the mean value score of mammals was significantly lower than all other means except that of 'other invertebrates' (Fig. 4). (Supporting data can be found in Appendix 3).

Fig.4: Value placed on native animals: comparison of means using 95% confidence levels (where 1 = little or no value and 5 = high value)



4.3 Values placed on Waitakere Ranges ecological restoration projects

Respondents were asked to indicate the value of ecological restoration projects within the Ranges involving the re-establishment of animal species that previously existed in the area but had become extinct or scarce (using a scale where 1 = little or no value - 5 = high value). They were asked to consider the value from two perspectives:

a) Increasing diversity of native wildlife
b) Public enjoyment/appreciation

Respondents considered ecological restoration projects had high value from both points of view with over 93% attaching a moderate – high value to the projects for increasing diversity of native wildlife (Fig. 5) compared with just under 72% indicating that ecological restoration projects were of moderate – high value in terms of public enjoyment/ appreciation (Fig 6).

Fig.5 Value of ecological restoration projects: Increasing biodiversity

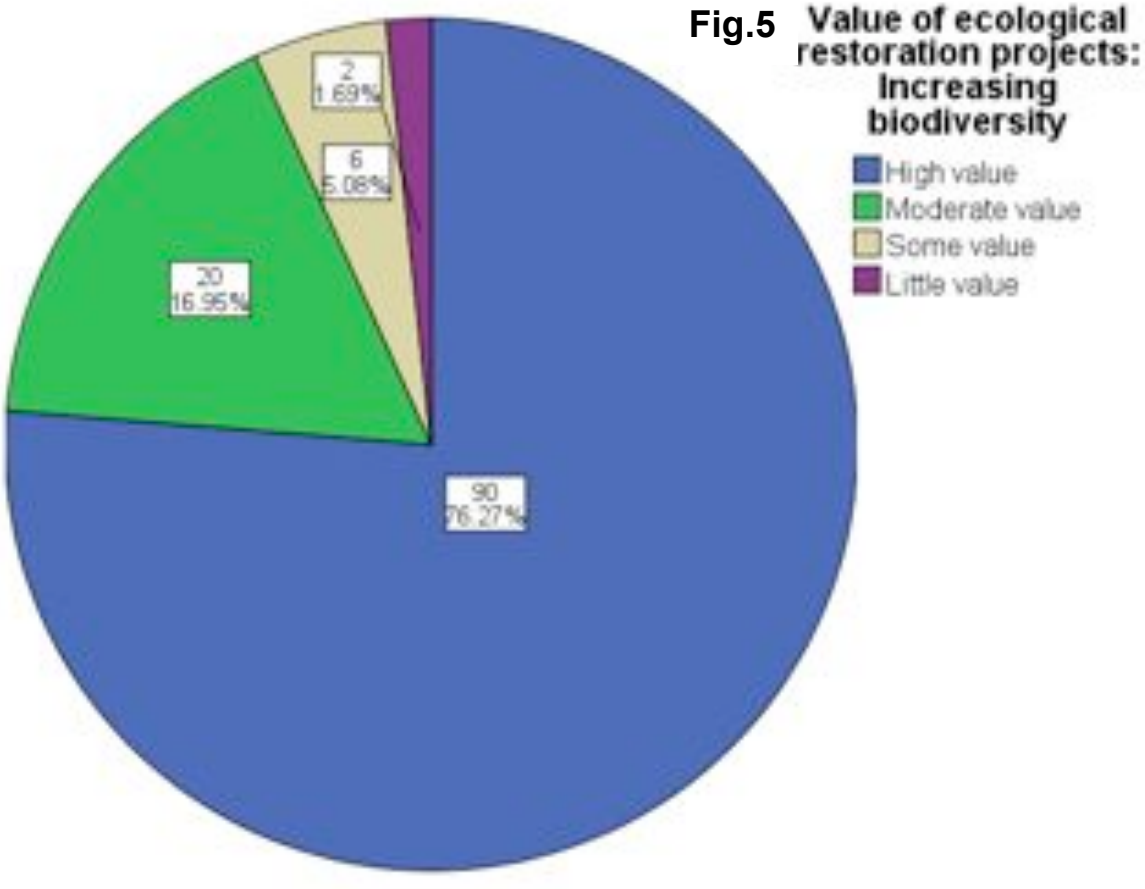
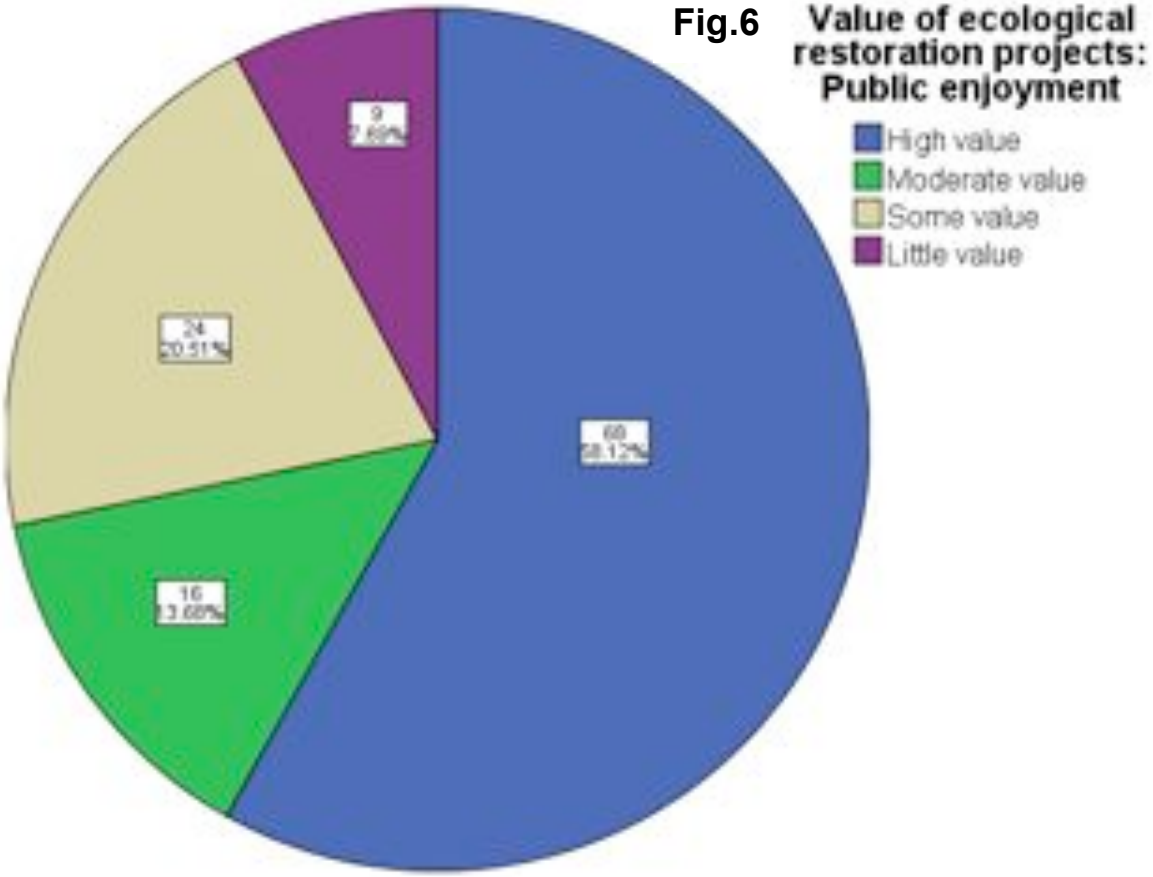


Fig.6 Value of ecological restoration projects: Public enjoyment



4.4 LEVEL OF SUPPORT FOR INCREASED CONTROL OF COMPANION ANIMALS

Respondents were given a number of statements concerning control and management of dogs and cats and were asked to indicate to what extent they agreed or disagreed with the statements. An analysis of the results is as follows:

4.4.1 Increased control/management of dogs

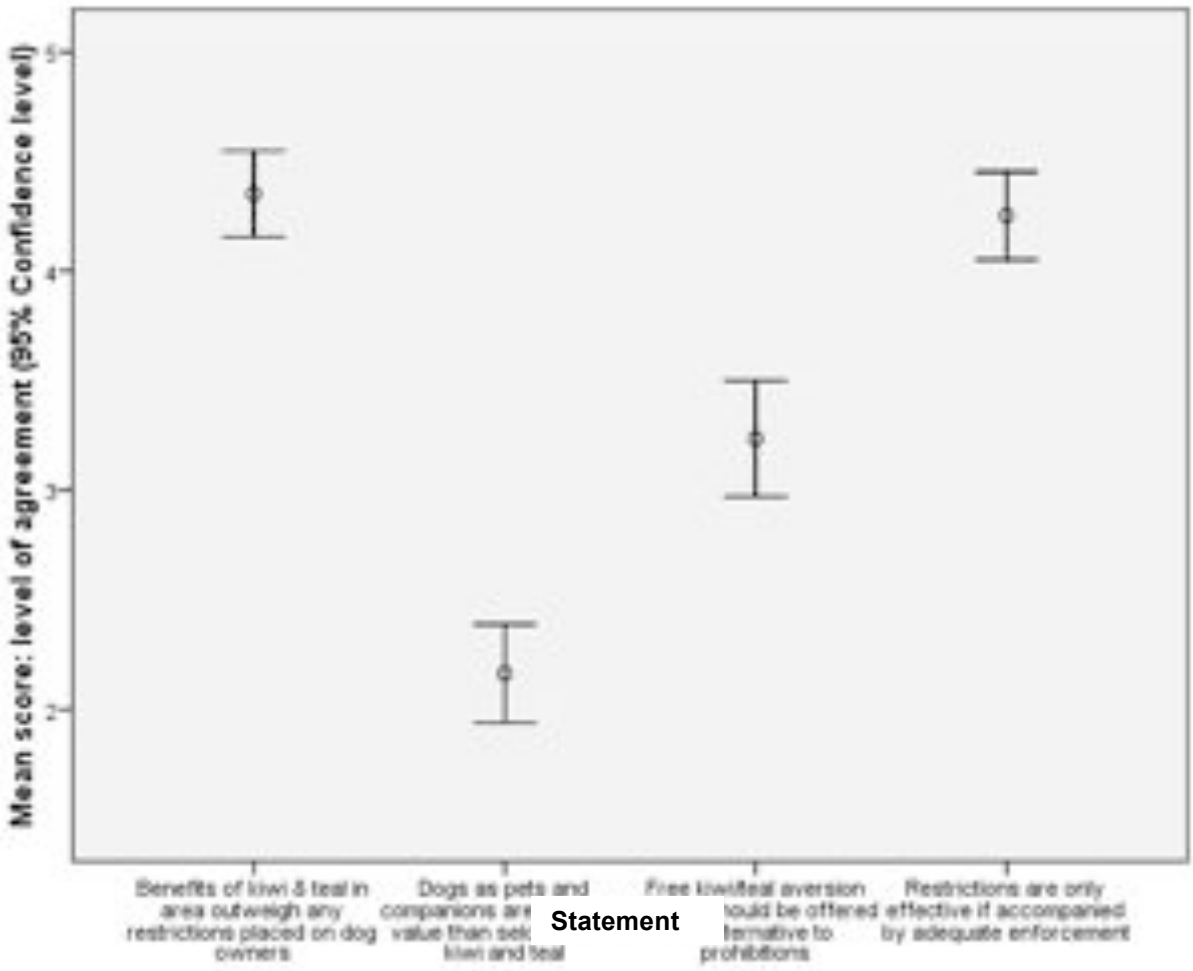
(Supporting data can be found in Appendix 4).

Respondents were given the following scenario:

> *A proposal to re-establish kiwi and brown teal in the Waitakere Ranges may result in some area being off-limits to dogs.*

Respondents indicated their opinion to statements based on this scenario.

Fig.7: Level of agreement for increased dog control & management (Scale: 1 = strongly disagree and 5 = strongly agree).



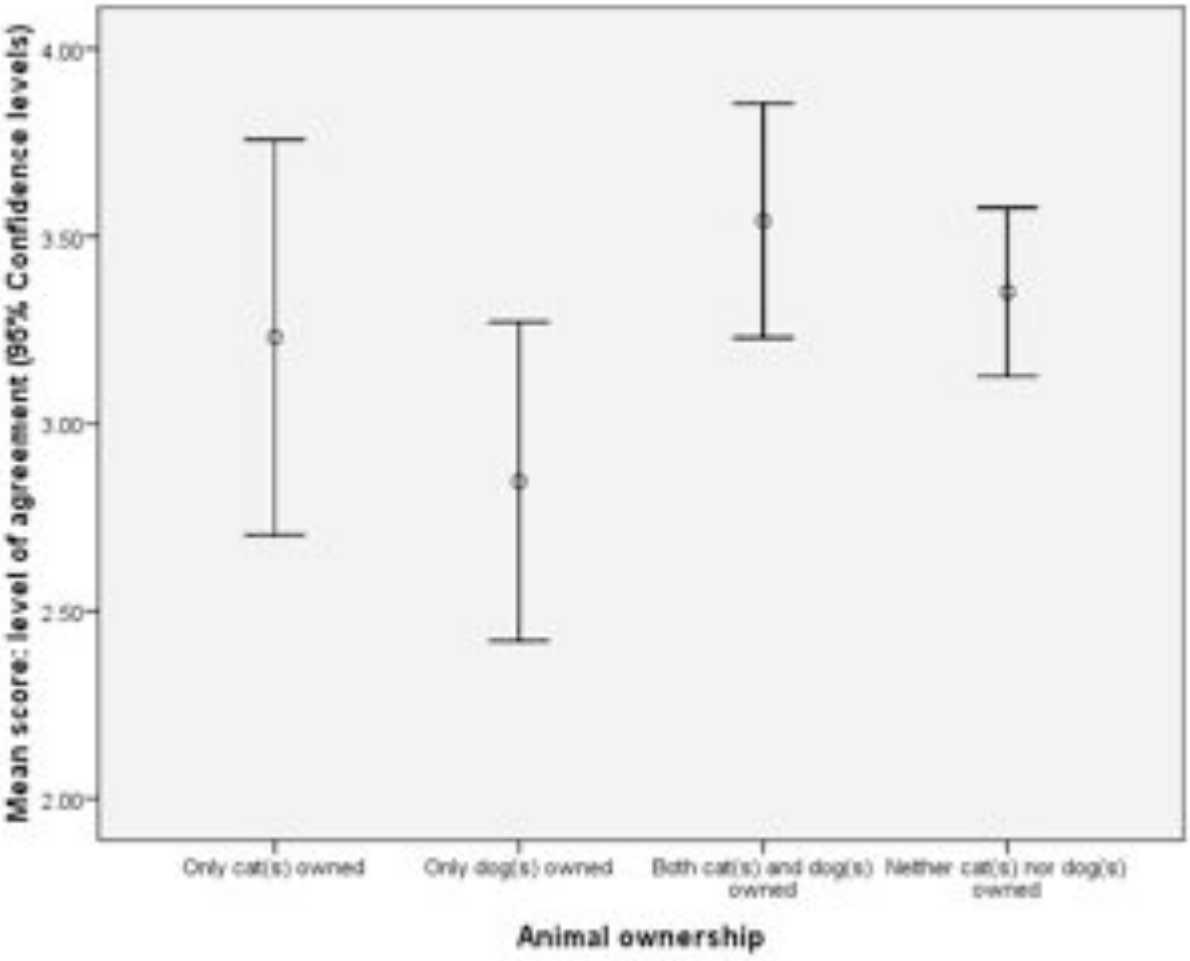
In the first two statements, respondents indicated that they rated the re-establishment of kiwi and brown teal quite highly in relation to likely dog control measures and the value of dogs versus kiwi and teal. 79.7% agreed or strongly agreed with restrictions being placed on dogs in areas where brown teal and kiwi may be re-introduced, with 65.8% of respondents disagreeing or strongly disagreeing that dogs were of higher value than the two bird species mentioned.

With regard to the third statement which sought to establish whether free aversion training programmes should be offered as an alternative to restrictions being placed on dog access, no clear conclusions could be drawn from the results.

Further analysis was carried out by looking out how this statement had been answered by the different categories of animal owners (i.e. cat owners, dog

owners, owners of both cat(s) and dog(s) and those who did not own either). Using 95% confidence levels (Data in Appendix 5) the means for the categories were compared however there was no significant difference (Fig. 8).

Fig. 8: Comparing mean scores of responses from different categories of animal owners to statement that *free kiwi/teal aversion training programmes should be offered as an alternative to prohibitions* (placed on dog owners)
(Scale: 1 = strongly disagree – 5 = strongly agree).



The response to statement 4 (*Restrictions are only effective if accompanied by adequate enforcement)* indicated that over three-quarters of respondents (78.6%) agreed or strongly agreed that adequate enforcement went hand-in-hand with the efficacy of restrictions.

4.4.2 Increased control/management of cats

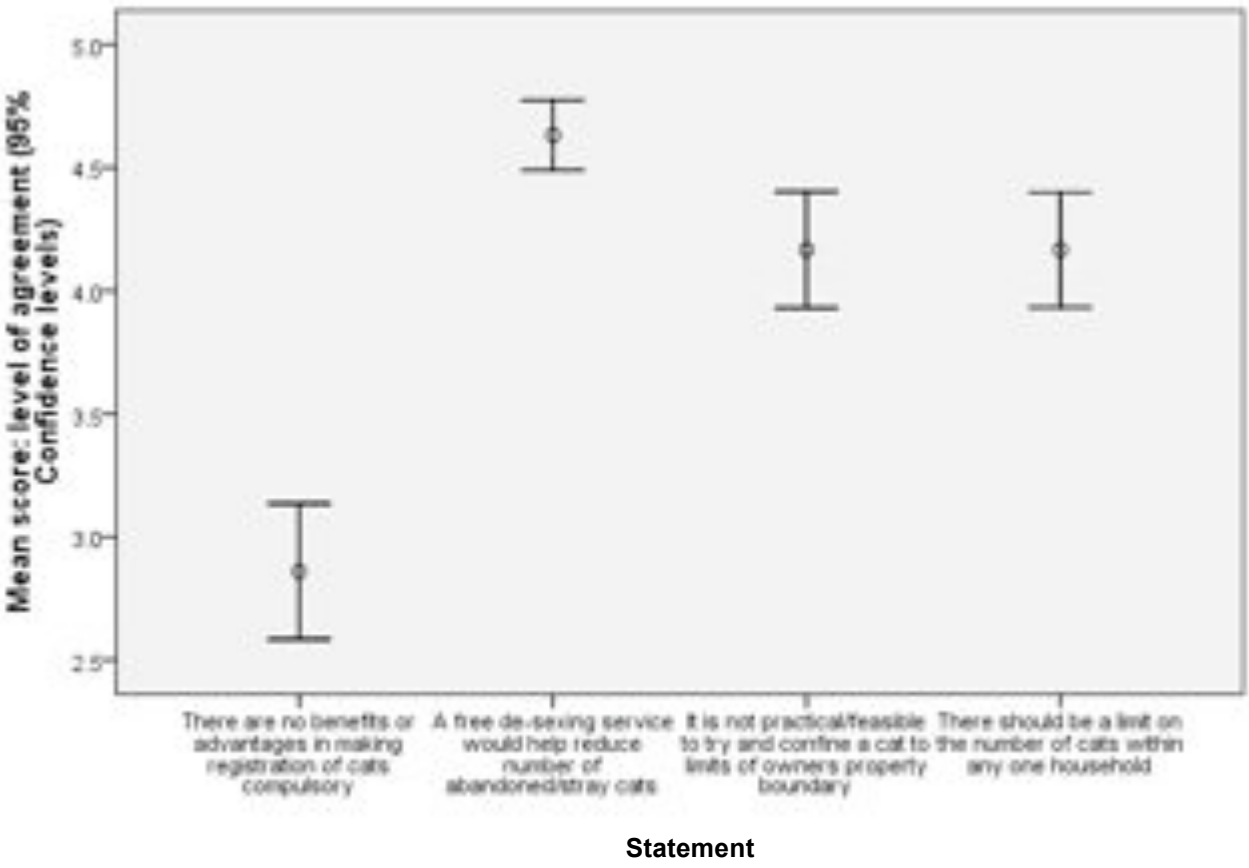
(Supporting data can be found in Appendix 6).

Respondents were given the following scenario:

Although there are laws governing the management and control of dogs in NZ, there are none for domestic cats.

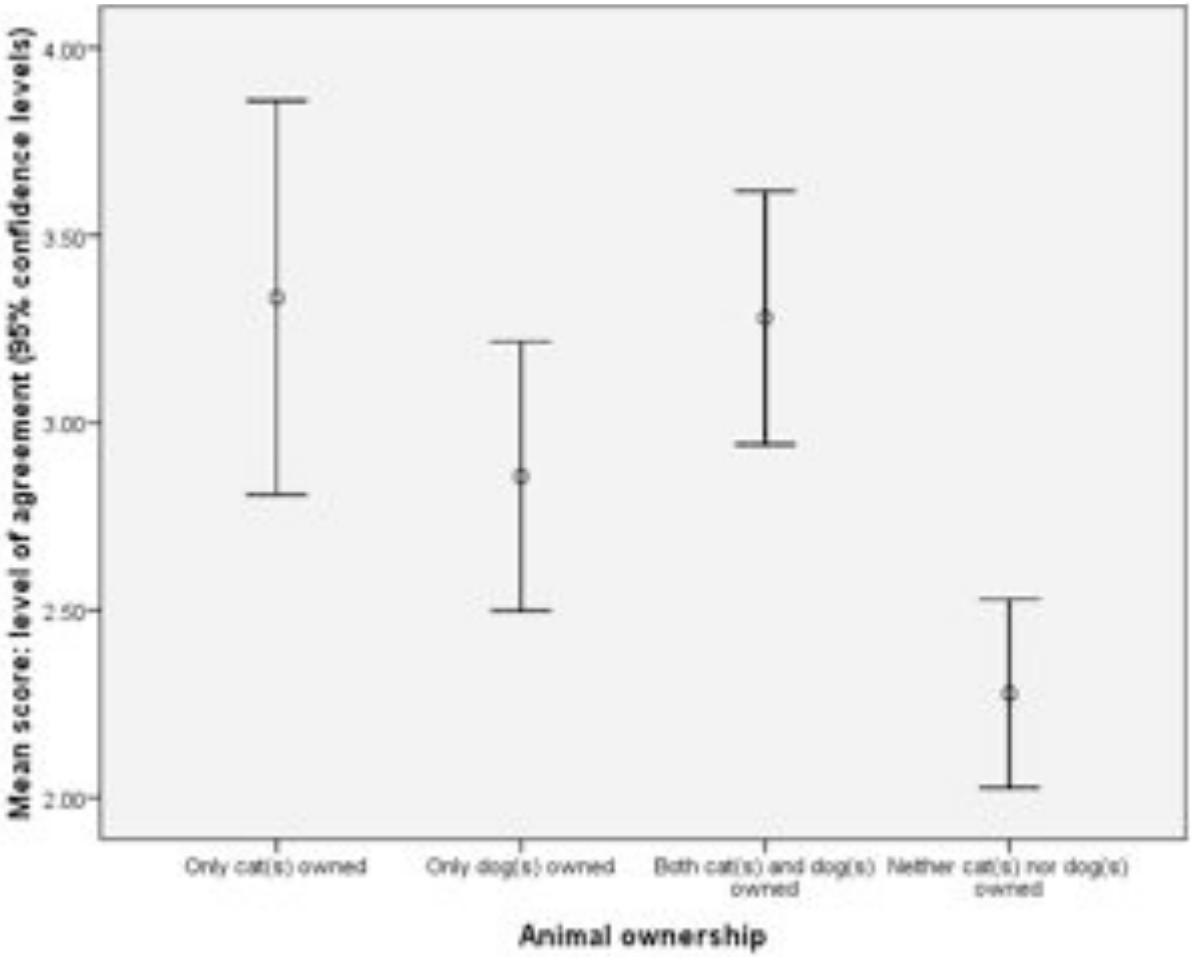
Respondents indicated their opinion to statements based on this scenario.

Fig.9: Level of agreement for increased cat control & management (Scale: 1 = strongly disagree and 5 = strongly agree).



There was no clear consensus amongst respondents regarding the benefits (or not) of making registration of cats compulsory. To see whether there was any significant difference in responses amongst different categories of animal owners, a comparison of mean scores using the 95% confidence levels was undertaken (Refer to Appendix 7). This indicated that the mean score of non-animal owners was significantly lower than animal owners (Fig. 10).

Fig. 10: Comparing mean scores of responses from different categories of animal owners to statement that *there are no benefits or advantages in making registration of cats compulsory.* (Scale: 1 = Strongly disagree – 5 = Strongly agree)



In response to statement 2, respondents overwhelmingly agreed or strongly agreed that a free de-sexing service would reduce the number of stray and abandoned cats (91.5%), with three-quarters (75.2%) agreeing or strongly agreeing that there should be a limit on the number of cats in any one household (statement 4).

The majority of respondents (77.8%) considered that it was not practical or feasible to try and confine cats within an owner's property boundary (statement 3).

4.5 COMPANION ANIMAL OWNERSHIP, CONTROL AND MANAGEMENT

The following information was sought from respondents:

- the number, age, sex, breed of companion animal(s) owned
- whether the animals were neutered,
- whether the animals wore a bell or collar (cats),
- how much freedom of movement they had (cats),
- whether the animal had brought home/caught any wildlife (cats & dogs)
- whether the animal was used for hunting (dogs)
- whether the animal had received any aversion training (dogs).

4.5.1 Ownership

Analysis of data relating to companion animal ownership indicated that 67.2% of respondents within the target area owned an animal. 22.7% of animal owners owned only cats, 23.5% owned only dogs and 21% owned both cats and dogs. 32.8% of respondents owned neither (Fig. 11).

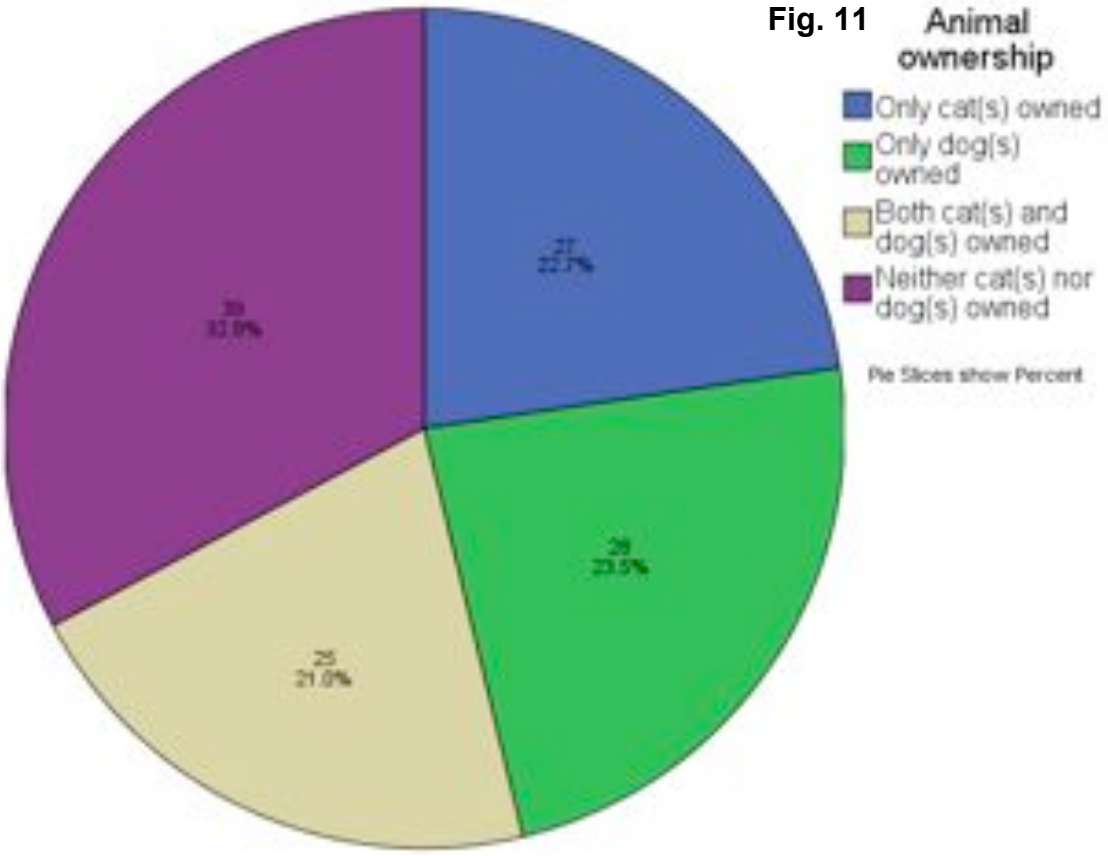


Fig. 11

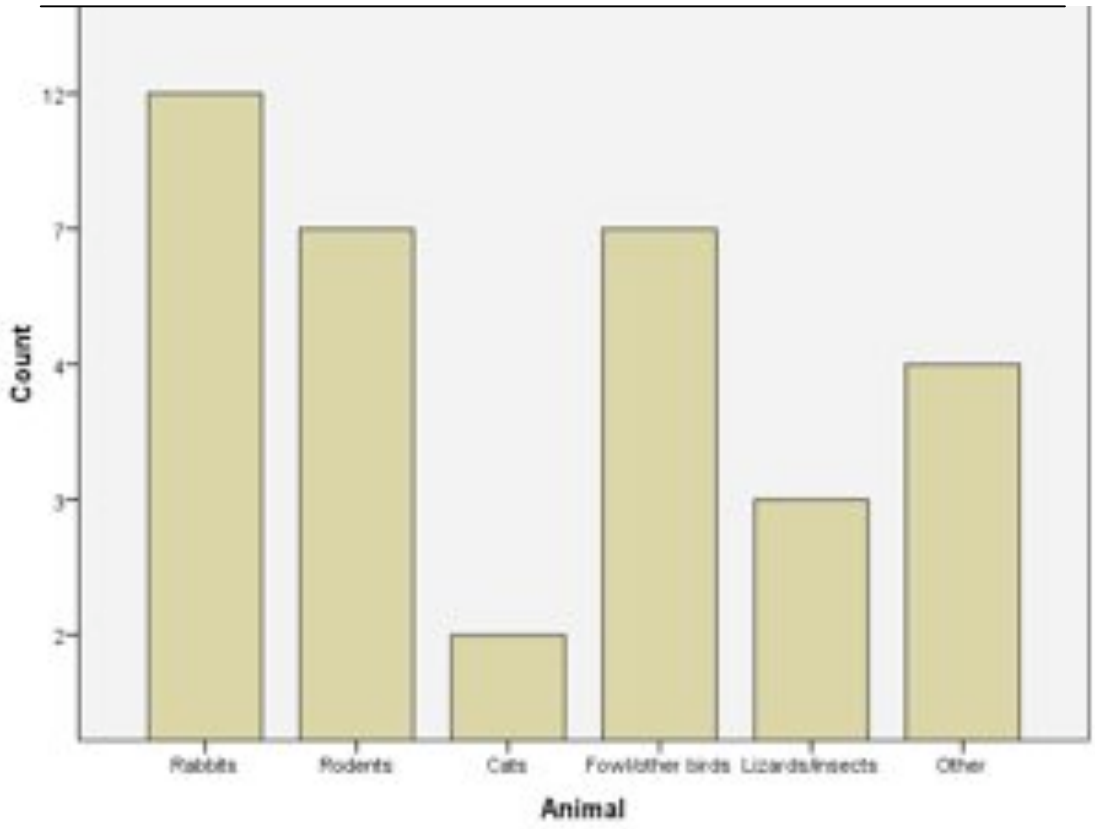
4.5.2 Animals per household:

Most households only owned 1 - 2 animals. In cat-only households 88.2% of owners had 1 – 2 animals compared with 94.2 % in dog-only households. In households where both cat and dogs were owned, 48% had a single cat and dog. Several household had multiple animals. 2 households owned 5 cats each, 4 households had 4 or more animals, 1 household owned 7 dogs and the household with the most animals had 5 cats and 3 dogs.

4.5.3 Domestic dog ownership and management

Respondents were asked various questions regarding management and control of the dogs they owned (n = 52). Respondents indicated that 23% of dogs were not neutered (n = 12) and cited breeding purposes (n = 7) and personal preference (n = 5) as reasons. Only 5 dog owners indicated that their dogs were used for hunting, with a number of targets being cited such as game birds, rabbits, rodents, cats, possums and fowl. An additional 15 dog owners indicated that their dog(s) caught wildlife either within or outside the property boundary. The frequency and range of animals caught are illustrated in Fig 12. The animals included in the 'other' category were hedgehog, wild piglet, possum and stoat.

Fig. 12: Frequency of wildlife caught by dogs within or outside owners' property



It was not expected that the dogs(s) would catch equal proportions of each animal and this was confirmed by a non parametric chi squared test (X^2 = 11.457, df = 5, P = 0.043).

4.5.3.1 *Aversion training*

26.4% of respondents (n = 14) indicated that their dog(s) had received some form of aversion training. This training was broken down into:

- Kiwi aversion (n = 1)
- Fowl aversion (n = 7)
- Other (n = 6)
  - owner's or kennel club/obedience classes (n = 4)
  - cattle/sheep (n = 2)

11 of the respondents indicated that this training had been effective with no indications to the contrary. This includes 3 of the respondents who indicated that their dogs either hunted or had caught fowl and had undertaken fowl aversion training.

4.5.4 Domestic cat ownership and management

Cat owners were asked various questions regarding management and control of the cats they owned (n = 51). Respondents indicated that all but one cat had been neutered and the owner of the unneutered animal highlighted cost as the reason for this procedure not yet having been done.

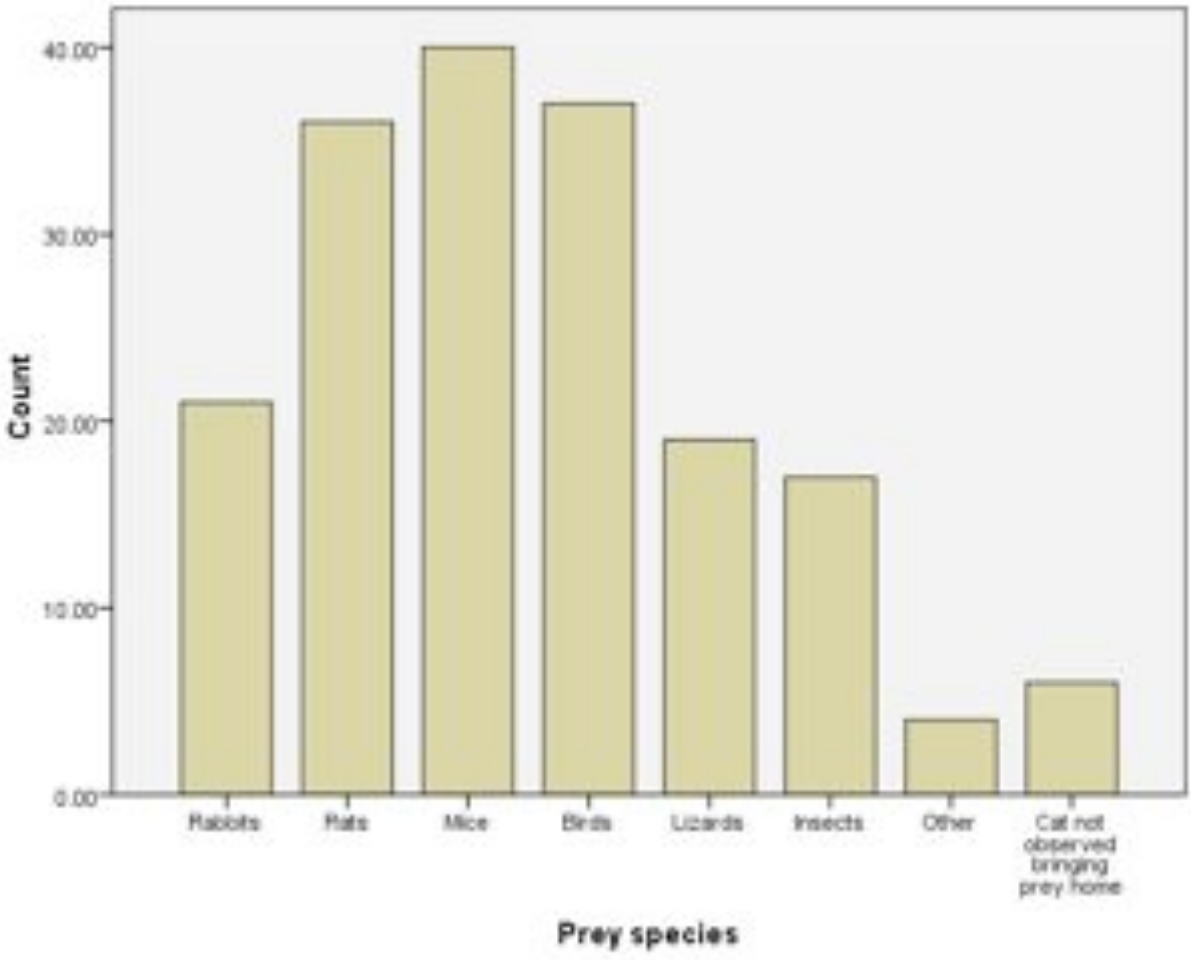
88% of cat owners indicated that their animal(s) did not wear a collar, 84.3% said that their animal(s) did not wear a bell and over three-quarters (78.4%) indicated that their cat(s) had free access to home, property and beyond the property boundary.

4.5.4.1 *Prey brought home by cats*

Respondents were asked to indicate which animals (from a list) the cat(s) had brought home. Mice and birds were the most frequently observed prey (n = 40, n = 37) followed closely by rats (n = 36). A small number of respondents (n = 6) indicated that they had not observed their cat bringing any animals home (Fig. 13).

It was not expected that the cat(s) would choose equal proportions of each prey and this was confirmed by a non parametric chi squared test (X^2 = 60.356, df = 7, P < 0.001).

Fig. 13: Prey species cat owners observed their animals bringing home



5.0 DISCUSSION

5.1 Assumptions and sources of error

This study acknowledges the significant difference in the gender balance and age distribution of respondents with regard to values and opinions expressed in the survey.

It is assumed that the use of a postal survey would be a potential source of bias in terms of participants who did (and did not) respond (De Veaux & Velleman, 2004). Questionnaires were delivered to letterboxes only. No attempt was made to identify residents who had other postal delivery arrangements.

Although not a specific aim, the survey sought to gather more in-depth data on the companion animals in the survey area. Participants were asked for data on individual animals namely age, breed and sex. It was thought for example that the age of a cat could be linked to prey caught to compare with data from other similar studies. During the analysis of the data a flaw in the design of the questionnaire was discovered and it was not possible to link any specific management and control with a particular animal in households with more than one cat or dog. There are a number of data in the questionnaire therefore that have not been analysed. Similarly, the question asking about the participant's legal position with regard to the property they were currently residing at were not analysed as the data were considered to be outside the scope of the study.

5.2 Values placed on native animals and restoration projects

This study anticipated that the community afforded the Range's native animals high value. It is also not surprising that restoration projects involving the reintroduction of endangered species were considered to be of high value from the perspective of increasing biodiversity.

During a number of different consultations with the community regarding protection of the Ranges, the residents assigned a high value to the native forest and wildlife (Waitakere City Council, 2003). Many would also be involved in ecological restoration projects for which the purpose is to restore biodiversity – at all levels.

What perhaps was surprising was the extent to which the respondents valued the less popular, 'not so cute' animals such as frogs and insects. It is not clear whether this is due to the choice of example given in the questionnaire, which included rare species found in the Ranges such as *Peripatus*, *Leiopelma hochstetteri* (Hochstetter's frog), or *Paryphanta busbyi* (kauri snail), or whether there was an awareness that these animals were equally as important in the ecosystem. Following this rationale, it is not clear why the mean value of mammals was significantly lower when the species chosen as the example was the long tailed bat (*Chalinolobus tuberculatus).*

Notably, a lower value was assigned to the public enjoyment/appreciation aspect of restoration projects that involved the reestablishment of endangered species. The Ark in the Park project is the highest profile project of this nature. A lower value could be attributed to respondents feeling they were not close enough to the project to benefit from, for example, the increasing birdlife. This could indeed be the case, given how long it could take for populations of the reintroduced species to build up to levels where observations were commonplace outside of the release area. Interestingly however, sightings of Hihi (stitchbird), the latest species to be reintroduced into the Ark, have occurred beyond the 'boundaries' of the Ark (Vaneveld, 2008), which is a positive sign.

5.3 Level of support for increased control / management of companion animals

5.3.1 Domestic dogs:

The support for tighter control of dogs in habitats where kiwi and brown teal could become established in the future is positive. Respondents would be keen to see any such controls backed up with enforcement which supports

comments that current dog enforcement in ecologically sensitive areas (such as beaches) is absent or ineffective.

That there was no consensus with regard to offering free aversion training programmes could have been a result of respondents' lack of understanding as to what this entailed, disagreement that the programmes should be free, or disagreement that these programmes should be offered as an alternative to prohibitions. Those who had undertaken aversion training unanimously agreed it had been effective, although there was some confusion as to whether fowl aversion training had been undertaken as a result of some of the dogs having caught fowl, or whether the respondents who indicated both that their dogs had caught fowl and fowl aversion had been effective, were confused over the question. Given that some respondents have indicated that their dogs either target game birds/fowl intentionally or unintentionally, the issue of kiwi/fowl aversion training may need to be revisited in the future.

5.3.2 Domestic cats

Responses to questions related to cat control and management reflect an absence of laws pertaining to domestic cat management and control. Given that it is difficult to contain a cat within the confines of an owner's property, management of cat numbers is dependent on owners getting their animals neutered. Due to a potential bias related to those who respond to a postal survey (De Veaux & Velleman, 2004), it is expected that there is a much higher number of unneutered cats and more households with multiple cats in the wider community.

The low number of cats wearing a collar with identification indicates that there is little chance of a cat being returned to its owner, or the owner being notified, if the animal became caught in a cage trap or killed as a result of predator control operations.

5.3.2.1 *Prey brought home by cats*

The results of this survey differ from two other similar surveys of prey caught by domestic cats in that this study gives an indication of frequency of prey type caught as opposed to actual numbers. Nevertheless the trends are similar. The study by Flux (2007) of the prey caught by a suburban cat and the study by Gillies and Clout (2003) of prey caught by cats living on an

urban/forest fringe indicate mammals were the main diet followed by birds and then lizards.

It is acknowledged that the data in all studies of this nature are highly likely to under-represent smaller prey (such as lizards and invertebrates), which are more likely to be eaten where captured (Jones, 2008).

Given that results are based on observations by owners, there is likely to be underrepresentation of prey. It is also likely that some owners would under-report prey killed so as not to put their pet in a bad light.

6.0 CONCLUSIONS

Although the community places high values on the native animals and restoration projects, their management and control of domestic cats, indicates they do not consider their pets to be a threat to wildlife. Domestic cats are also likely to be in higher numbers than the survey indicates. With the suppression of rodent populations via trapping and poisoning, there is the likelihood that cats will begin taking a larger proportion of birds, including those from the vulnerable populations recently released into Ark in the Park – where virtual boundaries are easily crossed from both sides.

Failing to recognise the potential threat of domestic animals on native wildlife could jeopardise the long term sustainability of mainland island projects where domestic animal populations are within range of vulnerable native animal populations. If it is not possible to introduce a certain level of cat control, projects such as the proposal to reintroduce brown teal to the Waitakere River / Te Henga wetlands area may not be feasible. There does however appear to be strong support for increased control of dogs to facilitate the reestablishment of endangered ground nesting species.

Predator control that specifically targets cats and could possibly impact on domestic cat populations has the potential to negatively affect relationships within the community and could also impact on the work being carried out in predator control projects in general.

7.0 RECOMMENDATIONS

7.1 Community involvement

Achieving positive outcomes in terms of ecological restoration goals without alienating pet owners who are living in an ecologically sensitive area where there are few or no animal control laws, is only likely to occur through increased community engagement.

This could possibly be achieved by providing information and advice to:

- Outline potential risks domestic animals pose to wildlife
- Facilitate community decision-making process with regard to management of domestic animals in ecologically sensitive areas – for example limiting the number of cats in a household, not replacing the animal when a pet dies, encouraging neutering, and the wearing of identification collars that would facilitate the return of a cat to its owner should it be inadvertently caught as a result of predator control operations.
- Raise awareness of endangered native species and what can be done to protect them – highlighting the public enjoyment / appreciation factor of having these species in the community
- Involve community in monitoring change in populations as a result of predator control operations – evidence that efforts are paying off
- Increase community networking between restoration projects in the area.

Undertake these recommendations via community workshops, field days, newsletters and publications – drawing on expertise from within and outside the community.

7.2 Local & territorial authority involvement

Despite the absence of any laws excluding companion animals from this ecologically sensitive target area, there is significant support for some forms of management and control namely:

- Restricting dog access to areas where ground nesting bird species are present

- Offering a free de-sexing service to help reduce the number of stray and abandoned cats
- Limiting the number of cats within any one household.

With regard to the latter two points pertaining to domestic cat ownership and management, community forums could be held where these points are discussed further with a view to establishing local animal control laws. This process could be used as a pilot study that would have relevance in other ecologically sensitive areas where there are no domestic animal control laws. In addition it could lead to greater protection of native wildlife from companion animals over the wider Waitakere Ranges area.

7.3 Future research

Given that predator control in the buffer zone has only recently commenced, there is an opportunity to gather baseline data on native species present, with a view to monitoring presence or absence and population density changes over time in relation to predator control operations.

To complement other research carried out of a similar nature (Metsers, 2008; Morgan, 2001) a study could be undertaken to ascertain the home range of domestic cats within the Northern Waitakere Ranges area in the vicinity of the predator control operations highlighted in this study.

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9.0 APPENDICES

Appendix 1 Survey (Questionnaire)

Appendix 2 Information for participants

Appendix 3 Values respondents placed on native animals within the Waitakere Ranges

Appendix 4 Summary of responses to increased level of dog control and management

Appendix 5 Comparing mean scores of responses from different categories of animal owners to statement that *free kiwi/teal aversion training programmes should be offered as an alternative to prohibitions*

Appendix 6 Summary of responses to increased levels of cat control and management

Appendix 7 Comparing mean scores of responses from different categories of animal owners to statement that *there are no benefits or advantages in making registration of cats compulsory.*

Unitec NEW ZEALAND Te Whare Wānanga o Wairaka

SURVEY: Participant views and perceptions of native & companion animals

e:

☐ 18 - 24 years ☐ 25 - 34 years ☐ 35-44 years ☐ 45-54 years

☐ 55 - 64 years ☐ 64 + years ☐ Decline to answer

2. Please select your Gender:

☐ Male ☐ Female

3. Please select / state your legal position regarding the property you are currently residing at.

☐ Rented ☐ Owned ☐ Other …… ☐ Decline to answer

Section 2 – Opinions and values:

Please circle number

4. To what extent do you value the presence of these **native** animals within the Waitakere Ranges area?

Animal	Little or no value ← → High value				
Mammals (i.e. long-tailed bat)	**1**	**2**	**3**	**4**	**5**
Birds (e.g. morepork, fantail)	**1**	**2**	**3**	**4**	**5**
Native fish (e.g. inanga, kokopu)	**1**	**2**	**3**	**4**	**5**
Lizards (e.g. Green gecko)	**1**	**2**	**3**	**4**	**5**
Amphibians (e.g. Hochstetter's frog)	**1**	**2**	**3**	**4**	**5**
Moths/Butterflies (e.g. Puriri moth)	**1**	**2**	**3**	**4**	**5**
Other invertebrates (e.g. 'Peripatus', kauri snail, weta)	**1**	**2**	**3**	**4**	**5**

5. Ecological restoration projects taking place within the Ranges have involved re-establishing animal species that previously existed in the area but became extinct or scarce.

To what extent do you believe these projects have value from the perspective of:

Perspective	Little or no value ← → High value				
Increasing diversity of native wildlife	**1**	**2**	**3**	**4**	**5**
Public enjoyment / appreciation	**1**	**2**	**3**	**4**	**5**

6. A proposal to re-establish kiwi and brown teal in the Waitakere Ranges may result in some areas being off-limits to dogs. To what extent do you agree or disagree with the following statements?

Statement	Strongly disagree ◄				► Strongly agree
The benefits of having kiwi and brown teal back in the area outweigh any restrictions placed on dog owners	**1**	**2**	**3**	**4**	**5**
Dogs as pets and companions are of higher value than the seldom-seen species proposed for re-establishment	**1**	**2**	**3**	**4**	**5**
Free kiwi/teal aversion training programmes should be offered as an alternative to prohibitions	**1**	**2**	**3**	**4**	**5**
Restrictions are only effective if accompanied by adequate enforcement	**1**	**2**	**3**	**4**	**5**

7. Although there are laws governing the management and control of dogs in NZ, there are none for domestic cats. To what extent do you agree or disagree with the following statements?

Statement	Strongly disagree ◄				► Strongly agree
There are no benefits or advantages in making registration of cats compulsory	**1**	**2**	**3**	**4**	**5**
Offering a free de-sexing service would help reduce the number of abandoned and stray cats	**1**	**2**	**3**	**4**	**5**
It is not practical/feasible to try and confine a cat to the limits of the owner's property boundary	**1**	**2**	**3**	**4**	**5**
There should be a limit on the number of cats within any one household	**1**	**2**	**3**	**4**	**5**

Section 3 – Domestic animal ownership & management:

Please indicate as appropriate

8. Please indicate (tick) which animals you own:

Cat(s) ☐ *Please answer Qs 9 - 15*	**Dog(s)** ☐ *Please answer Qs 16 - 22*	**Neither** ☐ *Thank you! That is the end of the survey. (Postage instructions final page)*

9. How many cats do you own? ..... (please specify)

10. Please complete the following. (If you have more than 3 cats please attach a separate sheet).

Details	Animal 1	Animal 2	Animal 3
Age (approx)			
Breed			
Sex	**(Please circle)** M F	**(Please circle)** M F	**(Please circle)** M F
Neutered?	**(Please circle)** Yes No	**(Please circle)** Yes No	**(Please circle)** Yes No

11. If your animal(s) has not been neutered, please indicate reason for your decision

☐ Cost ☐ Breeding purposes ☐ Personal preference ☐ Other ……..……

12. Does your cat(s) wear a collar for identification should it become lost or injured?

☐ Yes ☐ No (Please indicate reason(s). Tick as many as applicable).

☐ Cost ☐ Concern for welfare ☐ Stays within property ☐ Other ……

13. Does your cat(s) wear a bell?

☐ Yes ☐ No

14. To what extent is your animal(s) free to move between indoors, property boundary and beyond property boundary?

☐ Confined indoors ☐ Free to move between indoors and outdoors but confined to property boundary

☐ Has free access to home, property and beyond property boundary.

15. Has your cat(s) ever brought home any of the following animals? (Tick as many as appropriate).

☐ Rabbits ☐ Rats ☐ Mice ☐ Birds ☐ Lizards ☐ Insects

☐ Other …… ☐ Cat has not been observed bringing any animals home

Dog owners:

16. How many dogs do you own? ..... (please specify)

17. Please complete the following. (If you have more than 3 dogs please attach a separate sheet).

Details	Animal 1	Animal 2	Animal 3
Age (approx)			
Breed			
Sex	**(Please circle)** M F	**(Please circle)** M F	**(Please circle)** M F
Neutered?	**(Please circle)** Yes No	**(Please circle)** Yes No	**(Please circle)** Yes No

18. If your animal(s) has not been neutered, please indicate reason.

☐ Cost ☐ Breeding purposes ☐ Personal preference ☐ Other ……..……

19. Is your dog(s) ever used for hunting? ☐ Yes (go to Q20) ☐ No (go to Q21)

20. Which species do you hunt with your dog's assistance? (Tick as appropriate)

☐ Game birds ☐ Pigs ☐ Deer ☐ Other (please specify)……..

21. Has your dog(s) ever caught any wildlife within or outside your property?

☐ Yes ☐ No ☐ Decline to answer

If yes, please indicate which of the following animals your dog(s) has caught

☐ Rabbits ☐ Rodents ☐ Cats ☐ Fowl/other birds ☐ Lizards/Insects

☐ Other (please specify)…….. ☐ Decline to answer

22. Has your dog(s) received any form of aversion training? ☐Yes ☐ No ☐ Don't know

If yes, what kind? ☐Kiwi aversion ☐ Fowl aversion ☐ Other ……..

Have you found this aversion training effective? ☐Yes ☐ No ☐ Don't know

That is the end of the survey – THANK YOU. Your time is appreciated.

Appendix 2

The Waitakere Ranges Community – a study of attitudes towards native wildlife and companion animals

Information for participants

This survey is part of a research project being undertaken by Maureen O'Higgins; a 3rd year Bachelor of Applied Science student majoring in Biodiversity Management at Unitec. This research involves gauging community attitudes towards native (indigenous) and companion (i.e. domestic dogs and cats) animals within the Waitakere Ranges area.

The research is **completely independent of any local or regional authority.**

Your assistance with this research is being sought by inviting you to complete this survey. **NO POSTAGE IS REQUIRED. It would be appreciated if the survey could be returned before 25 August 2008.** Return of the completed survey will be taken as implying consent for its use in this study. There will be no disadvantages to you or adverse consequences should you choose not to participate.

The questionnaires are completely **anonymous** and **confidential**. They will be stored in a locked facility accessible only to the researcher and research supervisor and will be destroyed once the information has been extracted.

If you have any questions at all regarding this research, please contact Maureen O'Higgins on 021 125 7816 or email mohiggins@unitec.ac.nz. Alternatively please contact the research supervisor Graham Jones on 815 4321 extn 7297 or gjones@unitec.ac.nz .

Thank you in advance for your time and participation - which are greatly appreciated.

(Maureen O'Higgins)

This study has been approved by Unitec's School of Natural Sciences Research and Advanced Practice Committee. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee Chairman Dan Blanchon (ph: 09 815-4321 ext 7188). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

Values respondents placed on native animals within the Waitakere Ranges (Scale: 1 = little or no value – 5 = high value)

Animal	Mean	Std Dev.	95% confidence levels	
			Lower	Upper
Mammals	4.51	1.04	4.32	4.70
Birds	4.95	0.34	4.89	5.01
Fish	4.72	0.71	4.60	4.86
Lizards	4.77	0.65	4.65	4.89
Amphibians	4.73	0.67	4.62	4.86
Moths etc	4.71	0.72	4.58	4.84
Other inverts	4.65	0.89	4.49	4.82

Summary of responses to increased level of dog control and management

(Scale: 1 = Strongly disagree – 5 = Strongly agree)

A proposal to re-establish kiwi and brown teal in the Waitakere Ranges may result in some areas being off-limits to dogs.
To what extent do you agree or disagree with the following statements?

1. *The benefits of having kiwi and brown teal back in the area outweigh any restrictions placed on dog owners*		2. *Dogs as pets and companions are of higher value than the seldom-seen species proposed for re-establishment*		3. *Free kiwi/teal aversion training programmes should be offered as an alternative to prohibitions*		4. *Restrictions are only effective if accompanied by adequate enforcement*	
Response	**%**	**Response**	**%**	**Response**	**%**	**Response**	**%**
Strongly disagree	5.1	Strongly disagree	40.2	Strongly disagree	17.7	Strongly disagree	4.3
Disagree	3.4	Disagree	25.6	Disagree	8.8	Disagree	3.4
Ambivalent	11.9	Ambivalent	19.7	Ambivalent	31.0	Ambivalent	13.7
Agree	16.1	Agree	8.5	Agree	15.9	Agree	20.5
Strongly agree	63.6	Strongly agree	6.0	Strongly agree	26.5	Strongly agree	58.1
Mean	4.2966	Mean	2.1453	Mean	3.2478	Mean	4.2479
Std Dev	1.12705	Std Dev	1.21247	Std Dev	1.40491	Std Dev	1.08997
95% Confid. level:		95% Confid. level:		95% Confid. level:		95% Confid. level:	
Lower	4.0911	Lower	1.9233	Lower	2.9859	Lower	4.0483
Upper	4.5021	Upper	2.3673	Upper	3.5097	Upper	4.4474

Comparing mean scores of responses from different categories of animal owners to statement that *free kiwi/teal aversion training programmes should be offered as an alternative to prohibitions* (placed on dog owners)
(Scale: 1 = strongly disagree – 5 = strongly agree).

Animal ownership	Mean	Std Dev.	95% confidence levels	
			Lower	Upper
Only cat(s) owned	3.23	1.31	2.70	3.76
Only dog(s) owned	2.85	1.54	2.22	3.47
Both cat(s) and dog(s) owned	3.54	1.35	2.97	4.11
Neither cat nor dog owned	3.35	1.40	2.89	3.82

Summary of responses to increased level of cat control and management (Scale: 1 = Strongly disagree – 5 = Strongly agree)

Although there are laws governing the management and control of dogs in NZ, there are none for domestic cats.
To what extent do you agree or disagree with the following statements?

1. *There are no benefits or advantages in making registration of cats compulsory*		2. *Offering a free de-sexing service would help reduce the number of abandoned and stray cats*		3. *It is not practical / feasible to try and confine a cat to the limits of the owner's property boundary*		4. *There should be a limit on the number of cats within any one household*	
Response	**%**	**Response**	**%**	**Response**	**%**	**Response**	**%**
Strongly disagree	27.6	Strongly disagree	0.0	Strongly disagree	10.3	Strongly disagree	5.1
Disagree	12.9	Disagree	1.7	Disagree	4.3	Disagree	9.4
Ambivalent	24.1	Ambivalent	6.8	Ambivalent	7.7	Ambivalent	10.3
Agree	14.7	Agree	16.9	Agree	18.8	Agree	12.8
Strongly agree	20.7	Strongly agree	74.6	Strongly agree	59.0	Strongly agree	62.4
Mean	2.8793	Mean	4.6271	Mean	4.1197	Mean	4.1795
Std Dev	1.48708	Std Dev	0.76008	Std Dev	1.32719	Std Dev	1.24302
95% Confid. level:		95% Confid. level:		95% Confid. level:		95% Confid. level:	
Lower	2.6058	Lower	4.4885	Lower	3.8766	Lower	3.9519
Upper	3.1528	Upper	4.7657	Upper	4.3627	Upper	4.4071

Comparing mean scores of responses from different categories of animal owners to statement that *there are no benefits or advantages in making registration of cats compulsory.*

(Scale: 1 = Strongly disagree – 5 = Strongly agree)

Animal ownership	Mean	Std Dev.	95% confidence levels	
			Lower	Upper
Only cat(s) owned	3.33	1.33	2.81	3.86
Only dog(s) owned	2.86	1.35	2.33	3.38
Both cat(s) and dog(s) owned	3.28	1.49	2.67	3.89
Neither cat nor dog owned	2.28	1.54	1.76	2.80