

1 **CONTRIBUTED PAPER**

2 **Prioritising cat-owner behaviours for a campaign to reduce wildlife depredation**

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22 efficacy would benefit from human-behavior prioritisation to identify plausible best-targets  
23 for research and stakeholder community engagement.

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26

27 **Abstract**

28 Behavior prioritisation is underutilised but critical to the success of conservation campaigns.  
29 It provides an understanding of the target audience's values to transcend conflict and informs  
30 the design of achievable and effective advocacy campaigns. Depredation by domestic cats  
31 may depress wildlife populations, leading to conflict between cat owners and  
32 conservationists. We surveyed veterinarians and cat owners at veterinary clinics to prioritise a  
33 list of nine cat-management behaviours. Cat-owner behaviours were ranked by their (i)  
34 likelihood of implementation and (ii) current adoption rate by cat owners, (iii) perceived  
35 effectiveness at reducing predation on wildlife, and (iv) veterinarians' opinions about their  
36 impact on cat welfare. Bringing cats in at night, from before dusk until after dawn, was  
37 revealed to be the behaviour most suited to a campaign to reduce cats' hunting. Behaviours  
38 ranked as more effective for conservation (e.g., 24-hour cat confinement) were unlikely to be  
39 adopted by cat owners or not supported by veterinarians, whose expert and normative support  
40 may be critical to a campaign. Although more conservation-effective behaviours received a  
41 lower priority, we discuss the repeated use of behaviour prioritisation to achieve incremental  
42 reductions in cat depredation by engaging with cat owners.

## Introduction

44

The primary causes of environmental and biodiversity decline are anthropogenic: habitat  
46 destruction, pollution, over-population, and over-harvesting (Wilson 2003). Addressing the  
root causes of these problems requires that human behaviours change (Schultz 2011).

48

Changing peoples' behaviour is challenging but the application of social science to  
conservation problems might mitigate human-caused biodiversity decline (Bennett et al.

50

2017a). Attempts to change behaviour should be guided by theoretical frameworks drawn  
from social marketing (Weinreich 1999; Kotler et al. 2002; McKenzie-Mohr et al. 2012,

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Michie et al. 2014), social psychology (Ajzen & Driver, 1992; Fishbein & Cappella 2006),  
and integrated systems for knowledge management (Allen *et al.* 1998). The body of literature

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where these concepts and methods have been applied to conservation challenges is growing  
but still small (Schultz 2014, Bennett et al. 2017b).

56

Fundamental to successful behaviour change is first identifying what behaviours  
(actions) to advocate to the target audience (e.g., the wider public). To conservationists the

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mitigation actions required can appear obvious (e.g., buying products sold with less  
packaging or reducing cats' opportunities to hunt wildlife). However, a trade-off often exists

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between an action's conservation impact and the likelihood that the target audience will  
implement the behaviour. Behaviours most likely advocated by conservationists are not

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necessarily those most likely to be widely adopted. An empirical and evidential strategy  
called behaviour prioritisation has been developed to resolve this trade-off (Schultz 2011). It

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should be the first stage of campaigns to change behaviour (McKenzie-Mohr et al. 2012).

66

Behavioural prioritisation is founded on the principle of engaging with the target  
audience before, not after, mitigating actions are decided. Early engagement with the target  
audience helps to define the full spectrum of possible mitigation actions from the myriad

68 possible. It also quantifies which actions the target audience do not currently perform but are,  
nonetheless, able and most likely to adopt and implement. This information, when combined  
70 with information about the behaviours of conservation benefit, contributes to ranking  
behaviours and deciding which should be advocated (McKenzie-Mohr 2000). Behaviours that  
72 have a low likelihood of adoption, even though they may have a high conservation impact,  
will receive a low ranking. Advocacy campaigns, instead, prioritise behaviours that are likely  
74 to have a conservation impact and high likelihood of adoption, although those behaviours are  
currently uncommon (Hine et al. 2015). Following this process avoids wasting time and  
76 resources on behaviours that will not be adopted (Hine et al. 2015).

Domestic cats (*Felis catus*) may pose a significant risk as predators to the  
78 conservation of wildlife in many parts of the world, particularly if they stray and re-wild to  
become feral (Brickner-Braun et al. 2007, Loss et al. 2013; Liberg, 1984; Blancher 2013,  
80 Dickman 2014, Loyd et al. 2013). While the hunting by feral cats is known to cause  
population declines in wildlife, it is not clear that pet cats are also so ubiquitously  
82 detrimental. The evidence is mixed (Barratt 1997, Barratt 1998, Sims et al. 2008, van Heezik  
et al. 2010, Calver et al. 2011, Kikillus et al. 2016). The impact of pet cats might be small or  
84 idiosyncratic in space, time and among prey species. Nonetheless, it is certain that they kill  
wildlife which conflicts with growing efforts to improve the biodiversity value of  
86 anthropogenic landscapes (i.e. reconciliation ecology) or ecological restoration projects  
around and within them (Hanmer 2017). Areas of high ecological value and biodiversity  
88 habitat are often, and increasingly, found adjacent or within urban landscapes, especially  
because they are supported by nature-loving urbanites (Aguilar et al. 2012). Yet, pet  
90 ownership, particularly of cats, is on the rise, and especially high in cities (Pet Food  
Manufacturers Association 2018; American Pet Products Association 2018). There has  
92 emerged, therefore, a growing and high-profile conflict between cat ownership and

biodiversity conservation (Loss et al. 2018; Walker et al. 2017). A precautionary approach to  
94 managing cat predation may be warranted.

In New Zealand, cats are a particularly serious biodiversity threat because much of its  
96 native fauna (i.e., birds and reptiles) evolved without mammalian predators (McCarthy 2005;  
McLennan et al. 1996; van Heezik et al. 2010). In New Zealand's cities around 35% of  
98 households have at least one cat – a rate similar to, or higher than, estimates from other  
countries (summarised and compared in van Heezik et al. 2010; see also Baldock et al. 2003  
100 for Australia, 25%; Downes et al. 2009 for Ireland, 10.4%; and Murray et al. 2010 for the  
United Kingdom, 26%). Public opinions where biodiversity conservation and cat ownership  
102 and welfare intersect vary dramatically depending on both the beliefs and attitudes of the  
respondent (Farnworth et al. 2014; Peterson et al. 2012) and the lifestyle of the cat (i.e.  
104 companion, stray or feral; Farnworth et al. 2011; Walker et al. 2017). In New Zealand, like in  
other countries, there is a robust, ongoing and emotional debate about mitigating the  
106 biodiversity impact of domestic cats (Morgan Foundation 2013; Walker et al. 2017).

Research on the challenge cats pose to biodiversity conservation has, until now,  
108 largely focussed on understanding cat habitat-use and depredation (e.g. in New Zealand:  
Aguilar et al. 2015; Kikillus et al. 2016; UK: Hanmer et al. 2017; USA: Loyd et al. 2013;  
110 Australia: Lilith et al. 2008). Research dedicated to the human dimension of changing cat  
owner behaviour is comparatively uncommon but important (e.g., Gramza et al. 2016;  
112 McDonald et al. in press; McLeod et al. 2015; McLeod et al. 2017a; Peterson et al. 2012;  
Walker et al. 2017). Proposed solutions have largely focussed on changes to law and  
114 governance, gradually imposing greater constraints and obligations on cat ownership (Walker  
et al. 2017). However, these solutions do not resolve the conflict with cat owners, the risk of  
116 widespread non-compliance, and the costs of enforcement. More research to understand how

to engage with cat owners is required to resolve the conflict and mitigate cats' predatory  
118 impacts in ways that are motivated by, and motivating to, cat-owners (McLeod et al. 2017a).

The aim of our study was to identify and prioritise cat-owner behaviours for a future  
120 advocacy campaign that is effective amongst cat owners. Our objective is to evaluate what  
cat-owner behaviours are most likely to be adopted as well as reduce domestic cats'  
122 depredation of wildlife. Our expectation is that a behaviour's conservation benefit will need  
to be traded-off against its likelihood of adoption, especially perceptions about its negative  
124 consequences for cat welfare.

126

## **Methods**

128

### *Behaviours and behavioural prioritisation*

130 Cat owners could take numerous actions to mitigate the impact of their cat on native wildlife,  
e.g., keep their cats inside, restrict them to an outdoor enclosure, or make them wear a collar  
132 with a bell. We selected nine behaviours that cat owners could implement to mitigate the  
impact of their domestic cat's predation on native species. The behaviours were selected  
134 based on a literature review (Table 1) and on the authors' knowledge of existing and potential  
behaviours that would limit cat wandering and hunting.

136 We adopted McKenzie-Mohr's (2000) formula for behavioural prioritisation that  
numerates the conservation gain of the behaviour, the current penetration rate of each  
138 behaviour, and the probability of each behaviour being adopted by the target audience (cat  
owners). Specific to our context and problem, we modified McKenzie-Mohr's (2000)  
140 formula by adding a fourth variable: veterinarians' ranking of the impact of the behaviour on  
cat welfare, because we were interested in delivering our future advocacy campaign from

142 veterinary clinics. Veterinarians have a strong expert and normative influence over cat  
owners, particularly with respect to animal welfare (MacDonald et al. 2015; Harrod et al.  
144 2016). Veterinarians have been successful advocates in previous owner-behaviour change  
initiatives (e.g., Byers et al. 2014 for improving owner and dog health) and could also be an  
146 important influence on cat owners. Thus, we wanted to ensure they would also support the  
prioritised behaviour. The likely effectiveness of a behaviour was calculated using the  
148 augmented prioritisation formula:

150  $\text{Effectiveness} = \text{Conservation Impact} * \text{Likelihood of Adoption} * (1 - \text{Current Penetration}$   
 $\text{Rate}) * \text{Cat Welfare}.$

152

Conservation Impact is represented by the average score between 1 and 10. Likelihood of  
154 Adoption and Cat Welfare (based on veterinarians' opinions about the actions' impact) were  
an average Likert score (range 1 to 7). Current Penetration Rate was represented as a  
156 proportion of survey respondents (ranging from 0 to 1). Behaviours were then ranked based  
on their Effectiveness with higher scores being judged better subjects for an advocacy  
158 campaign.

### 160 *Study population*

162 We quantified the variables for the behavioural prioritisation formula by surveying cat  
owners at 10 veterinary clinics and practices in three New Zealand cities: Wellington,  
164 Dunedin, and Palmerston North. Wellington is the nation's capital city and its second-largest  
metropolitan area. Approximately 191,000 residents live within the 290 km<sup>2</sup> city limits and  
166 an additional 280,000 residents live in the wider metropolitan area including smaller adjacent

cities. Dunedin has a population of 120,000 and Palmerston North 80,000 residents  
168 (Department of Statistics, New Zealand 2016).

A list of all veterinary clinics and practices in the three New Zealand cities was  
170 compiled from public listings. Clinics in each city were selected and contacted by telephone,  
informed of the study and its purpose, and asked if they would participate in the research.  
172 Two attempts were made to contact the clinics and obtain participation. Two clinics in  
Palmerston North, three in Dunedin, and five in Wellington agreed and participated.

174

### *Surveying*

176

During November and December 2014, customers in the 10 veterinary clinics were  
178 approached by a research assistant after they had checked into reception and were waiting for  
their appointment. A script was prepared to ensure consistency in the recruitment process and  
180 avoid bias. The research assistant identified themselves as being from the local university and  
conducting research on cat welfare. The customer was asked to self-complete a survey which  
182 took approximately five minutes to complete (Supplementary File 1).

The survey asked respondents to quantify how likely they would engage in the nine  
184 behaviours on a Likert scale from 1 to 7 (7 being highly likely). Respondents were also asked  
which of the nine behaviours they were already performing.

186 To calculate the conservation impact, we used a modified Delphi technique (Murry &  
Hammons 1995). This technique is used to develop consensus by a panel of experts on a  
188 particular topic and is widely used in public health (DeVillers et al. 2005). The authors, all  
animal and conservation biologists, were asked in an open-ended fashion to provide their  
190 input about the direct conservation impact of each owner behaviour based on the literature  
and their knowledge. A direct impact is one that reduces an individual and owned cat's ability



192 to hunt and kill native wildlife. Once this information was shared and discussed amongst  
them, all five authors individually ranked each behaviour on a scale of 1 to 10 (10 having the  
194 greatest impact). The indirect impacts of an owner's behaviour were not considered  
(Dickman 2007; Lilith et al. 2006). For example, de-sexing (sterilisation) may reduce the cat  
196 population over time to lower cats' hunting at a population level, but its impact is indirect  
because the de-sexed cat still hunts (Hall et al. 2016b). Furthermore, an owner's behaviour  
198 may directly reduce a cat's hunting (the direct impact) but increase hunting by other smaller  
introduced mammalian predators such as rats (an indirect impact) (as speculated in Wood et  
200 al. 2016). To date however, there have been few studies to look at the overall impact  
(cumulative effect of direct and indirect) of reduced cat predation on native species to inform  
202 cat management practices. Hence, we adopted the precautionary approach (Calver et al. 2011;  
Grayson & Calver 2004; Lilith et al. 2006) by assuming that domestic cats pose a direct risk  
204 to native wildlife (e.g., Morgan et al. 2009 found 11% of birds caught by cats were native and  
18% of all prey species were skinks). However, it was accepted that the overall extent of the  
206 impact is unknown (direct plus indirect). The authors, therefore, were instructed to base their  
ranking on the direct impact of an individual cat and not the population of cats. The average  
208 ranking of each behaviour was shared with the group followed by a discussion until a  
consensus was reached.

210 The impact of behaviours on cat welfare was determined by surveying veterinarians.  
A link to an electronic survey was sent out via the New Zealand Veterinarian e-newsletter (25  
212 Sept to 26 Oct 2014) with a follow-up reminder email sent ten days before the survey closed.  
In that survey veterinarians were asked to rate on a scale of 1 to 7 (7 being the greatest  
214 positive impact) the impact of the nine behaviours on cat welfare (Supplementary Table 2).  
We also asked the veterinarians to rank the nine behaviours for their impact on wildlife on a  
216 scale of 1 to 7 (7 having the greatest positive impact) so that we could compare with the

animal welfare ranking. Veterinarians were also asked: what their primary interest/practice  
218 type was (companion animal, equine, large animal/livestock, or wildlife).

220

## Results

222

One-hundred and fifty-nine surveys were completed (no missing data) by customers at  
224 veterinary clinics and 173 veterinarians completed their survey over a four-week period.  
Ninety-seven percent of those veterinarians identified as companion, small animal  
226 veterinarians.

The authors ranked “cats inside 24 hours” as likely to cause a greater direct reduction  
228 in cat depredation than other actions, while cat registration, micro-chipping, de-sexing and  
limiting the number of cats that could be owned were thought most likely to have a trivial  
230 benefit (Table 2). Limiting the roaming of the household cat(s) by containing inside at night,  
fencing them into the property or an enclosure, were considered to have a moderate to high  
232 biodiversity conservation benefit. Collaring cats was thought to have a moderate benefit too.  
The behaviours most likely to be adopted in descending order were de-sexing cats, limiting  
234 the number of cats per household, microchipping cats, and bringing them inside all night  
(Table 2). Registering cats (as is the practice for dogs in New Zealand), or putting a collar on  
236 them, were less likely to be adopted. Containing cats to the property via a fence, keeping cats  
inside 24 hours a day, and restricting cats to a run, were the actions that cat-owners thought  
238 they were least likely to implement.

Ninety-six percent of cat owners currently had less than four cats in their household  
240 and 96% of respondents had de-sexed their cat(s). Sixty-four percent of cats were micro-  
chipped. Twenty-nine percent of respondents locked their cat inside at night every night.

242 Twenty-six percent of cat owners used a cat collar. The other cat-owner behaviours: “Cats in  
24 hours a day”, “register cat like a dog”, “contain cat to property via a fence”, and “restrict  
244 cats to a run”; had a current penetration rate of 1% or less.

The behaviours ranked by veterinarians with the greatest positive impact on cat  
246 welfare was de-sexing, microchipping, limiting the number of cats per household, and cats  
kept inside at night, all having mean scores greater than five. “Registering a cat like a dog”  
248 and “containing cats to property via fence” received intermediate scores. “Cats wearing a  
collar”, “restricting cats to a run”, and “keeping cats inside 24 hours” received considerably  
250 lower scores for their positive impact on cat welfare.

Effectiveness was calculated using the augmented behavioural prioritisation formula.  
252 Behaviours were ranked based on their total score, with the greatest score aligning to the  
behaviour that should be the target of the future advocacy campaign (Table 2). “Keeping cats  
254 inside at night, from before dusk until after dawn” had the highest score and thus received a  
behavioural prioritisation rank of 1. This behaviour also had the highest probability of  
256 adoption, a moderate penetration rate, and a perceived robust impact on cat welfare and  
conservation outcomes (Table 2).

258

## 260 **Discussion**

262 Behavioural prioritisation techniques have been used much more widely and for substantially  
longer in fields such as public health (e.g., Booth 1992), but are under-utilised in biological  
264 conservation (Schultz 2011). Our work contributes to a small but growing number of  
examples where behavioural prioritisation has been conducted as a guide to behavioural

266 change interventions for species management (Please et al. 2017; Skoien et al. 2016, Verbeek  
et al. 2014), including a recent example with domestic cats (McLeod 2017).

268           Advocacy campaigns have a history of omitting the behavioural prioritisation stage  
(Weinreich, 1999), especially in conservation (Johnson et al. 2007; McKenzie-Mohr 2000;  
270 Novacek 2008). Instead, conservation experts can be inflexible about the action the target  
audience should take and believe their opinions superior (expert righteousness). Experts can  
272 also assume they know what the target audience thinks about the problem and possible  
solution, believing that their own knowledge and beliefs are representative of the target  
274 population (expert naiveté). As a result, the behaviour that conservationists select and  
advocate to the public, while having the potential to achieve substantial conservation gains,  
276 nonetheless fails because the public do not implement it (McKenzie-Mohr et al. 2012;  
Eisenhauer & Nicholson 2005; Lorenzoni, Nicholson-Cole, & Whitmarsh 2007). Behavioural  
278 prioritisation (Schultz 2011) is a systematic approach to avoid this mistake.

          In New Zealand, as has occurred in Australia (e.g. Department of Local Government  
280 1994), the first proposals to reduce cats' hunting of wildlife have been to first regulate cat  
ownership and legislate for cat confinement. However, reliance on voluntary compliance and  
282 problems with enforcement often result in less-than-effective adoption than anticipated by  
government agencies (McLeod et al. 2015). While some changes can be achieved this way, a  
284 significant number of cat owners may not be swayed by new rules and passively, or actively,  
flout them, allowing their cats to roam. Non-compliance poses uncertainties about the  
286 usefulness of policies and risks encouraging opposition. An alternative, or reinforcing,  
strategy would be to understand cat owners' experience and beliefs about cat husbandry and  
288 their implications for animal welfare and biodiversity impacts (McLeod et al. 2017c). Then,  
those can be used to identify cat-owner behaviours with both benefits for biodiversity and a  
290 high likelihood of adoption.

## 292 **Prioritising behaviours for a campaign**

294 Identifying the values of cat owners and working within their current value system is  
essential for behaviour change, rather than implementing a top-down approach to change cat  
296 owner beliefs and values (Manfredo et al. 2017; McLeod et al. 2017b). By following the  
behavioural prioritisation process, we identified keeping cats inside at night as a behaviour  
298 for a future advocacy campaign. As expected, the prioritised behaviour was not the one with  
the greatest conservation value (i.e. maximum reduction in cat predation) nor did it have the  
300 greatest likelihood of adoption by cat owners. Instead, the behaviour identified optimises the  
trade-off between likely conservation impact and probability of adoption, with strong support  
302 from veterinarians.

Behavioural prioritisation, by integrating several critical considerations and  
304 viewpoints, and not exclusively the conservation benefit, also exposed and quantified  
particular values and beliefs that could significantly impact the success of a campaign. For  
306 example, 67% of veterinarians thought that keeping cats inside 24 hours a day would have a  
significant negative impact on cat welfare (a belief that might not be always true, e.g.  
308 Kasbaoui et al. 2016), although it would also reduce cats' hunting to zero. Moreover, 24-  
hour containment is a behaviour that cat owners identify as unlikely to be achievable. Thus,  
310 implementing an advocacy campaign for keeping cats inside 24 hours a day would more  
likely fail to motivate cat owners and lose the support of veterinarians who are a strong  
312 influence on cat owners.

While we have demonstrated the behaviour prioritisation process for the biodiversity  
314 conservation goal of reducing domestic cat depredation, it remains for us to demonstrate that  
the prioritised behaviour can be successfully advocated and adopted by the cat-owning

316 public. To achieve this, we need to understand (1) what values and beliefs drive cat owners  
when keeping their cat inside at night, (2) how to appeal to these drivers in an advocacy  
318 campaign, and then (3) conduct and evaluate an advocacy campaign that is guided by these.  
For example, cat owners are less likely to believe that cats kill wildlife or they under-estimate  
320 its magnitude. Thus, cat owners are less likely to be motivated to act to reduce cat  
depredation of wildlife (Lilith et al. 2006, MacDonald et al. 2015). Instead, cat owner's  
322 willingness to keep cats in at night is better motivated by owners' perceptions that cats are  
more likely to be injured at night (e.g., cat fighting and traffic). It therefore follows that the  
324 best course of action may be to appeal to cat owners to confine cats inside for their welfare  
(Toukhasti et al 2012). Campaigns around cat safety rather than their impact on wildlife may  
326 be more effective (McLeod et al. 2017a). Discovering and applying these understandings  
should be the subject of future work.

328         Lastly, we confined our study to cat owners visiting veterinary clinics. Those  
surveyed are likely to be particularly responsible cat owners who are more responsive to  
330 others', especially veterinarians', suggestions about how cats are cared for. Other cat owners  
who are less likely to seek the services, and act on the advice, of a veterinarian may behave  
332 differently. Understanding those cat owners would require a different survey method and we  
would expect the behaviour prioritisation to yield different, perhaps very different, results.  
334 Nonetheless, understanding and changing the behaviour of a community begins first with the  
people and actions that are most tractable and moves incrementally on to those that are more  
336 difficult to implement and survey, in order to harness the potential for normative social  
expectations to generate a behaviour-change cascade.

338

### **Incremental progress**

340

Our research found that 30% of cat owners bring their cat inside at night but less than 1%  
342 confined their cat inside or to their property 24 hours a day. This is a similar rate to  
Australians engaging in the same behaviour more than a decade ago (e.g., 34%, Van de Kuyt  
344 2004; 38%, Lilith et al. 2006) at which time there was also very low support amongst  
Australian cat-owners for 24-hour confinement. In Australia, 24-hour cat confinement was  
346 also not considered an essential component of responsible pet ownership with some viewing  
all-day confinement as cruel and ‘unnatural’ (McCarthy 2005; Rochlitz 2005, McLeod et al.  
348 2015). Lilith et al. (2006) also found only 6% of cat owners confined their cats to their  
property via an enclosure, but there was greater acceptance and implementation of bringing  
350 cats inside at night (Grayson & Calver 2004). However, starting in the late 1990s advocacy  
campaigns about cat owner behaviour began (McLeod et al 2015; Hall et al. 2016a) and many  
352 Australian towns and states (e.g., Western Australia: Cat Act 2011) adopted cat-confinement  
legislation at small scales, but avoided all-day confinement due to the public backlash  
354 (McCarthy 2005). As a result, cat owner behaviour changed over time. For example, more  
recently Toukhsati et al. (2012) found in the state of Victoria, Australia, 80% of cat owners  
356 contained their cat to their property during the night and 41% during the day too (i.e., 24-hour  
confinement), with 26% of owners having an enclosed yard or run. And, in Tasmania, those  
358 owners who were motivated to practice a nightly curfew became significantly more likely to  
state an intention to fully contain their cat(s) indoors (McLeod 2018).

360 The incremental changes in cat-owner behaviour that have occurred in Australia were  
preceded by a large amount of research to understand cat owners’ propensity to adopt new  
362 actions (Grayson & Calver 2004) that has led to successful government regulation of cats  
(Denny & Dickman 2010). Cat owner adoption of targeted behaviours (i.e., night time  
364 confinement) led to greater support for other, originally more challenging, management  
behaviours (e.g., cats inside 24-hours a day or confined to property). Once the first prioritised

366 behaviour has been embedded in the target audience, i.e., the penetration has greatly  
increased, another behaviour that has greater conservation gains but requires greater cat-  
368 owner commitment can be advocated (in our study this could be cats inside 24 hrs or  
confining cats to owners' property via fencing). Thus, asking people to keep cats inside at  
370 night may prime cat owners to adopt a future behaviour that is a larger commitment, i.e., a  
foot-in-door technique. This step-wise approach over time appears to have been successful  
372 because attitudes and beliefs among cat owners have shifted in Australia over the last decade  
(Toukhsati et al. 2012, Hall et al. 2016a).

374

### **Conclusions and recommendations**

376

Aspiring immediately to behaviour-change goals with greatest conservation benefit, but with  
378 little hope the targeted audience will adopt or engage in the behaviour, raises the risk of  
disengagement by cat owners. It may also polarise the debate, and even result in a reversal of  
380 progress. Focussing, instead, on achievable, smaller behaviour changes in the short term  
raises the possibility of on-going incremental change. Over longer periods of time it is  
382 possible to move towards other related behaviours and more aspirational goals, via the spill-  
over effect (Thøgersen & Crompton 2009) or foot-in-door technique (Burger 1999, Truelove  
384 et al. 2014). By designing and implementing an advocacy campaign that focuses, first, on a  
behaviour acceptable to cat owners (i.e., bringing cats inside at night in New Zealand) over  
386 time, there could be a more substantial shift in behaviour with greater conservation benefit.  
Although globally objectives may differ, we strongly suggest that engaging with cat-owners  
388 in this way may enable substantial change. Incremental changes through behaviour  
prioritisation may deliver longer-term and sustained reductions in the impact of domestic cats  
390 on native wildlife whilst not exacerbating conflicts and risks of non-compliance.



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398 Human Ethics Committee (#23123). The data are available via the following link to the data  
repository: [www.\\_\\_\\_\\_\\_](http://www._____).

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