



Manaaki Whenua
Landcare Research

Survey on pest management and environmental restoration in Hawke's Bay 2019

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Summary

Project and client

An online survey to measure behaviours and awareness of the general public resulting from the Cape to City project in Hawke's Bay was conducted by Manaaki Whenua – Landcare Research (MWLR) in late 2015 for Hawke's Bay Regional Council (HBRC). MWLR conducted an updated version of this survey in August 2019 for HBRC to measure changes in behaviours and awareness of the general public in relation to the Cape to City project since 2015.

Survey topics included encounters with native and non-native species, visits to restored natural areas, involvement in environmental activities, motivation for doing so or not, sources of information, and familiarity with environmental programmes.

Methods

Survey participants were recruited through local primary schools. Nine chose to distribute the survey to parents via email, and parents could then distribute the survey through their social networks. Of these nine schools, four were considered 'inside' the Cape to City project footprint while five were 'outside' the footprint. The survey was open for 3 weeks in August 2019. Of the 534 complete responses, 70% were affiliated with schools inside the footprint. The resulting data were analysed to understand community perceptions of how pest control has affected native and non-native species and native habitat, and how these perceptions have changed since the 2015 survey.

Key findings

Respondents inside the Cape to City footprint in 2019 recalled hearing or seeing more quails, thrushes, chaffinches, greenfinches, starlings, grey warblers, tūi, moreporks, dotterels, bellbirds, kererū, and New Zealand falcons than respondents outside the footprint in 2019. Respondents in 2019 recalled hearing or seeing more starlings than respondents in 2015.

The majority of respondents in 2019 were involved with at least one environmental activity. Those inside the Cape to City footprint were more likely to be involved with planting native trees in their gardens, sharing information about the environment with others, bird watching, community planting events, and permanently protecting private land than respondents outside the footprint in 2019. Kaitiakitanga/stewardship was the motivation for more respondents in 2019 to participate in community plantings, permanently set aside land for native habitat, plant natives in their gardens and/or control pests than in 2015. However, a higher proportion of respondents in 2019 did not spot lizards and/or insects because they did not know where to look compared with 2015.

Among those respondents who controlled pests, mice and rats were the most common targets for control. In 2019 a higher proportion of those inside the Cape to City footprint targeted possums and rabbits than those outside the footprint. Perceptions by respondents in 2019 of how mammals affect biodiversity may explain some of this

increase, as a higher proportion of those inside the footprint believed that possums negatively affect biodiversity than respondents outside the footprint.

However, the majority of respondents were not involved with controlling pests with baits or traps. The primary reasons for this were that respondents were too busy and/or lacked information. Also, 4% more respondents in 2019 cited expense as a reason to not control pests with baits or traps compared with respondents who did not control pests in 2015.

In 2019, respondents inside the footprint were more likely to visit Pekapeka Wetlands, Karituwhenua Stream and/or Waitangi Regional Park, but less likely to visit Ahuriri Estuary, Dolbel Reserve and/or Sturms Gully. The proportion of respondents who visited Dobell Reserve has also decreased since 2015.

Respondents received their information about biodiversity protection and habitat restoration primarily from the internet, schools, friends / word of mouth, print media, and/or HBRC. In 2019, a higher proportion of respondents inside the footprint received their information from newspapers, HBRC, community groups, Department of Conservation and/or friends / word of mouth than respondents outside the footprint. However, a lower proportion of respondents inside the footprint who received their information from the internet, HBRC, and/or another source trusted those sources the most compared with respondents outside the footprint in 2019.

1 Background

1.1 Purpose

A survey to measure behaviours and awareness of the general public resulting from the Cape to City project¹ in Hawke's Bay was conducted by Manaaki Whenua – Landcare Research (MWLR) in late 2015 for Hawke's Bay Regional Council (HBRC). The survey found that respondents inside the Cape to City project footprint reported seeing more native birds and reptiles and were more likely to participate in various environmental activities than respondents outside the Cape to City footprint (Brown 2015). MWLR conducted an updated version of this survey for HBRC in August 2019 to measure changes in behaviours and awareness of the general public relating to the Cape to City project since 2015. This report provides the findings from that survey.

1.2 Objectives

The objectives of this survey are to understand:

- community perceptions of how pest control and environmental restoration in Hawke's Bay have:
 - affected biodiversity, habitat for native plants, and animals and farm production
 - affected the abundance of native birds, insects and reptiles, non-native birds, and non-native mammals
- the opinions and behaviours of Hawke's Bay residents related to pest control and environmental restoration, and whether these opinions and behaviours are related to the Cape to City project
- how the community perceptions, opinions and behaviours of Hawke's Bay residents have changed since 2015.

2 Methods

2.1 Questionnaire

The survey was conducted using the computer-assisted web interviewing (CAWI) program Qualtrics. The program allowed for complex adaptive logic within the survey to show respondents relevant questions based on previous answers. There was a total of 56 questions, but each respondent saw only between 18 and 47 questions. All questions were optional.

¹ See <http://capetocity.co.nz/>

The survey covered the following topics:

- 1 Demographics
- 2 Encounters with native and non-native birds, insects and lizards

Respondents were asked to recall if they had seen or heard various non-native bird species, native bird species, and native lizard and insect species within the previous 12 months. Respondents in 2015 were also asked these questions.

- 3 Visits to areas that have undergone habitat restoration

Respondents were asked if they had visited various areas around Hawke's Bay that had undergone environmental restoration work at least once within the previous 12 months. Respondents in 2015 were asked about the same locations, except for Waitangi Regional Park, which was included in 2019 but not in 2015.

- 4 Impact of pests

Respondents were asked if feral cats, hedgehogs, mice, mustelids, possums, rabbits and/or rats negatively affect biodiversity, habitat for native plants and animals, and/or farm production. Respondents in 2015 were also asked these questions.

- 5 Statements on the environment

Respondents were asked the extent to which they agree with three statements:

- a 'Actions I take directly affect the natural environment'
- b 'The natural environment directly affects my quality of life'
- c 'It is not possible to grow the economy while protecting native plants and animals'.

Responses ranged from 0 ('strongly disagree') to 10 ('strongly agree'). Respondents in 2015 were also asked these questions.

- 6 Responsibility for protecting biodiversity and restoring habitat

Respondents were asked who they believe is responsible for protecting biodiversity and restoring habitat for native plants and animals in Hawke's Bay. Respondents in 2015 were also asked this question.

- 7 Involvement in environmental activities

Respondents were asked about their involvement with various environmental activities over the previous 12 months. Respondents who were involved with an activity were then asked about their motivations for becoming involved and when they first became involved with the activity. Respondents who were not involved with community planting days, controlling pests, lizard spotting, insect spotting, planting native trees in their garden, recycling, and/or bird watching were asked about their reasons for not participating in these activities. They could choose more

than one activity and more than one motivation or reason per activity. Respondents in 2015 were also asked these questions.

8 Sources of information and familiarity with environmental programmes

Respondents were asked about their sources of information about biodiversity protection and habitat restoration; their familiarity with the Cape to City, Poutiri Ao ō Tāne, Predator Free Hawke's Bay, and Whakatipu Māhia projects; and their sources of information about these projects. Respondents in 2015 were also asked these questions, although Predator Free Hawke's Bay and Whakatipu Māhia were added to the list of programmes in 2019.

2.2 Survey sample

Survey participants were recruited through local primary schools. This recruitment method was chosen because primary schools maintain email databases for people living in the area that researchers do not have access to. (See Brown 2015 for more detail.) Nine schools chose to distribute the survey to parents via email and newsletter. Parents could then distribute the survey through their social networks. Of these nine schools, four were considered 'inside' the Cape to City project footprint (Haumoana School, St Matthews Primary School, Taikura Rudolf Steiner School and Te Mata School) and five were considered outside the footprint (Napier Central School, Nelson Park School, Te Awa School, Arthur Miller School and Bledisloe School). Arthur Miller School and Bledisloe School did not take part in the survey in 2015.

Participation in the survey was voluntary, respondents could leave the survey at any time, and all survey questions were optional and could be skipped. Survey responses were anonymous, but each respondent could choose their affiliated school. For the first 1,000 responses \$10 was donated to their chosen school.

The survey was open for 3 weeks in August 2019. I received 572 responses, 536 (93.7%) of which were complete.² Of the complete responses, 376 (70%) were affiliated with a school inside the Cape to City footprint and 160 (30%) with schools outside the footprint. The proportion of responses affiliated with schools outside the footprint increased from 9% in 2015.

2.3 Data analysis

For each set of results I will describe the results from the 2019 survey. Any differences for respondents inside versus outside the geographical footprint of the Cape to City programme are compared using equality of means *t-tests*. I will then compare the results from the 2019 survey to the results of the 2015 survey using a difference-in-difference

² Responses were considered 'complete' if the affiliated school could be identified, as this was an important metric on which the analysis was carried out.

estimation approach and discuss any changes between the surveys.³ Survey data were processed and analysed using the statistical analysis software Stata.⁴ Results were tested for statistical significance, and only results that are significant at the 95% confidence threshold are discussed.

3 Results

3.1 Demographics

Respondents were predominantly female (79%) (Figure 1), between 40 and 44 years of age (Figure 2), and had lived in Hawke’s Bay for more than 20 years (45%) (Figure 3). Respondents to the 2015 survey were also predominantly female (78%) and between 40 and 44 years of age.

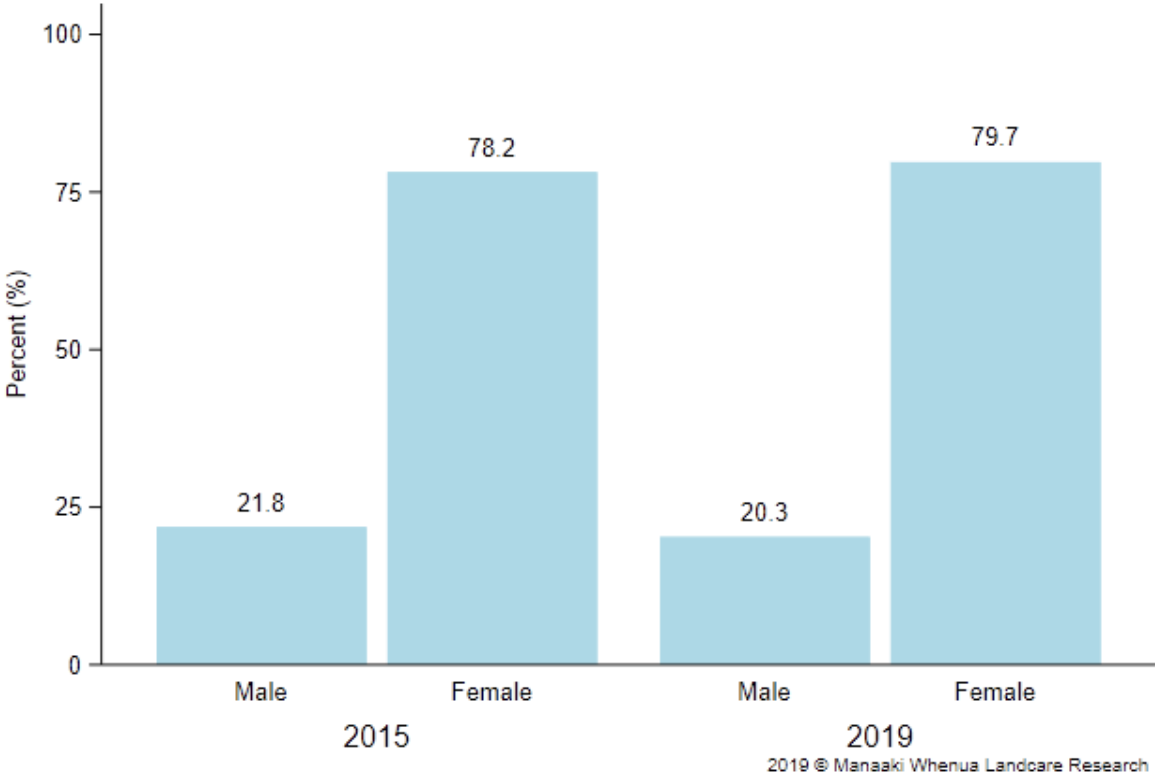


Figure 1. Gender of respondents.

³ A difference-in-difference regression method identifies the causal effect of a treatment (e.g. being inside the footprint) by controlling for differences in respondents that could influence a respondent’s likelihood of, for example, being involved with environmental activities that are not related to the treatment. Regression results for all available questions are in Appendix A.

⁴ <http://www.stata.com>

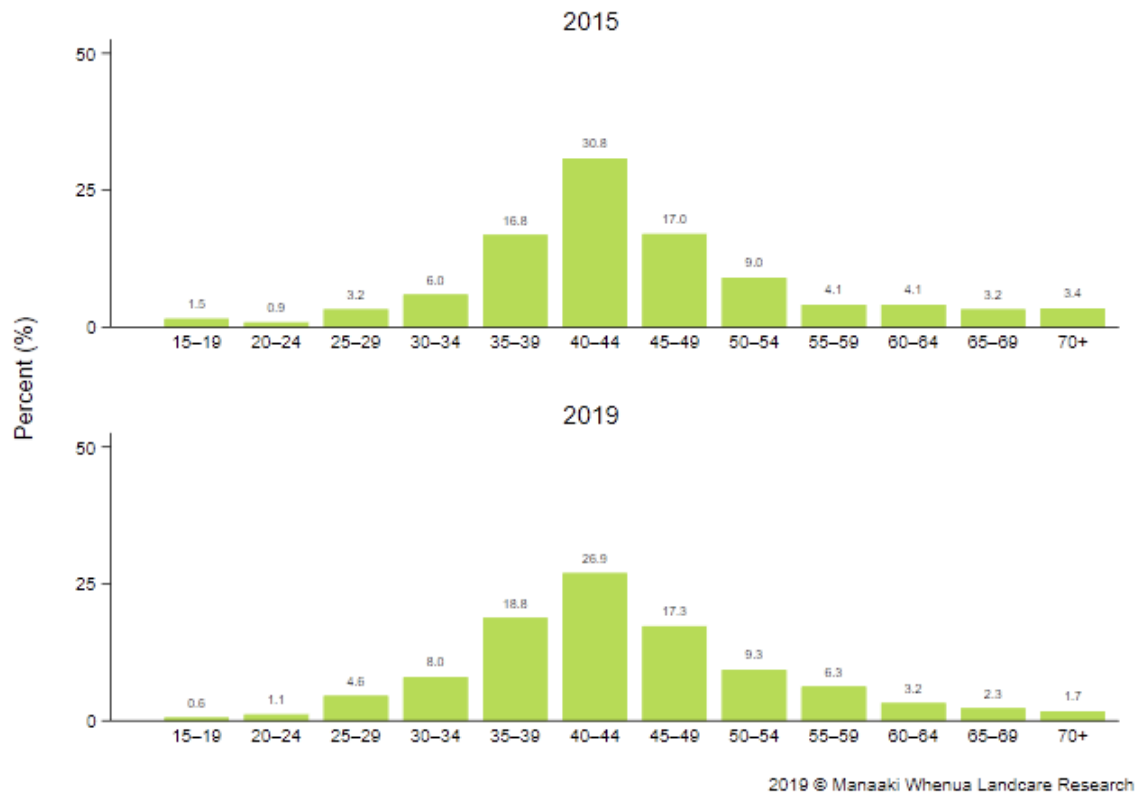


Figure 2. Age groups of respondents.

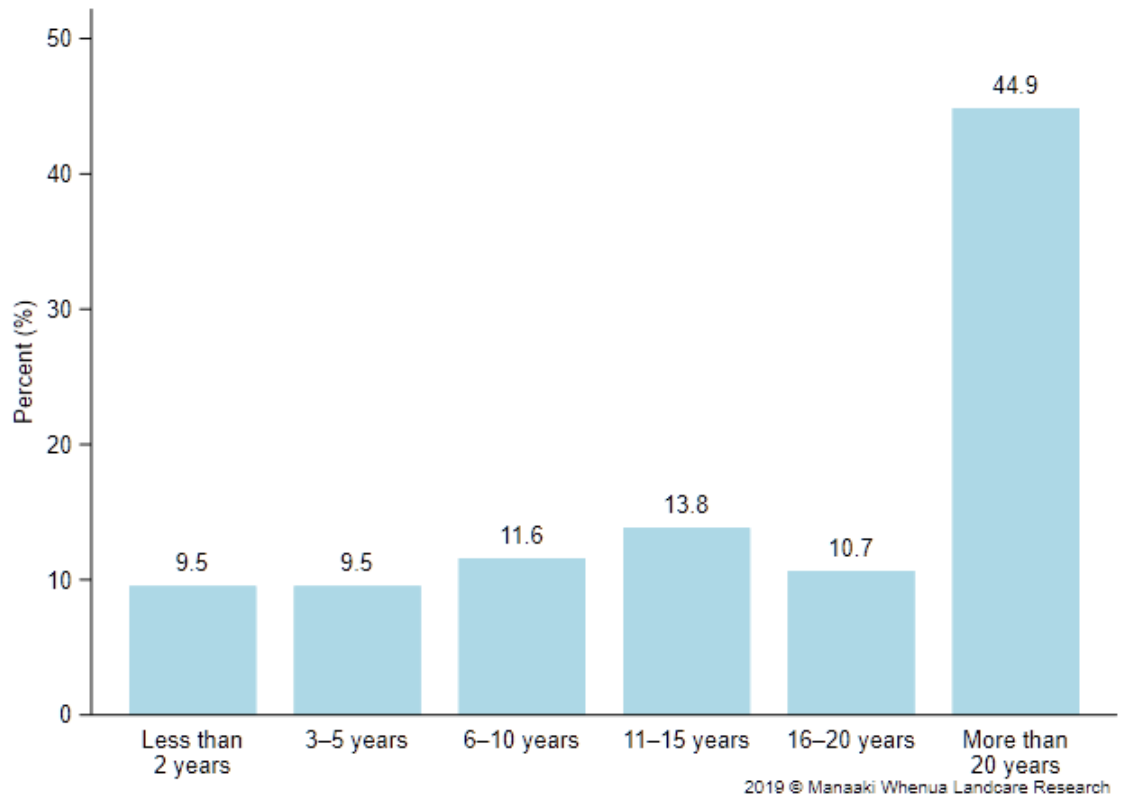


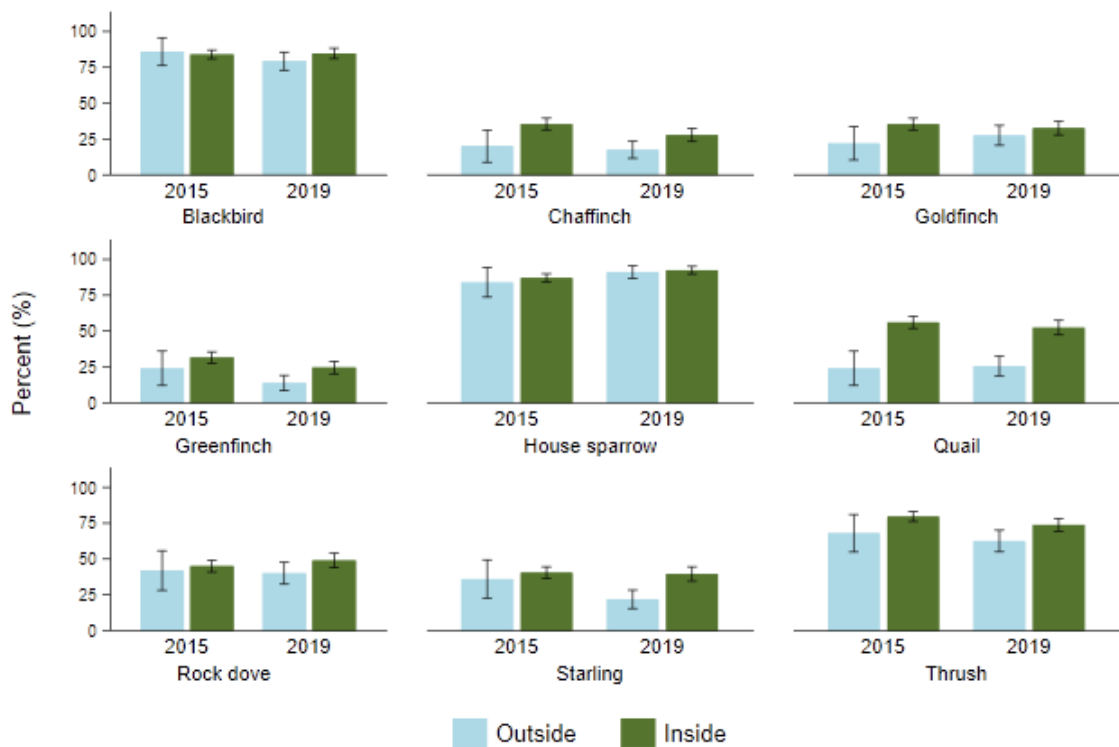
Figure 3. Years lived in Hawke's Bay.

3.2 Encounters with native and non-native birds, insects and lizards

Thrushes (70%), blackbirds (83%) and house sparrows (92%) were the most commonly heard or seen non-native bird species. Respondents inside the Cape to City footprint recalled seeing or hearing more quails, thrushes, chaffinches, greenfinches and starlings than respondents outside the footprint in 2019 (Figure 4). However, only the proportion of respondents who recalled hearing or seeing starlings has increased from 2015 to 2019 (Table 1, Appendix A).

Fantails (90%), kererū (63%) and tūī (89%) are the most commonly heard or seen native birds. Respondents inside the footprint recalled seeing or hearing more grey warblers, tūī, moreporks, dotterels, kererū, bellbirds and NZ falcons than respondents outside the footprint in 2019 (Figure 5). The proportion of respondents who recalled hearing or seeing any native birds did not change between 2015 and 2019 (Table 2, Appendix A).

Tree wētā (9%), the common skink (6%) and the common gecko (5%) are the most commonly heard or seen insect and/or lizard. However, respondents inside the footprint were no more likely to have seen or heard any native insects or lizards than respondents outside the footprint in 2019 (Figure 6). The proportion of respondents who recalled hearing or seeing any native lizards and/or insects did not change between 2015 and 2019 (Table 3, Appendix A).



Outside/inside refers to whether the respondent resides outside or inside the Cape to City footprint.
2019 © Manaaki Whenua Landcare Research

Figure 4. Proportion of respondents in 2015 and 2019 who recalled seeing or hearing non-native birds in Hawke's Bay during the past 12 months. Note: Error bars are 95% confidence intervals.

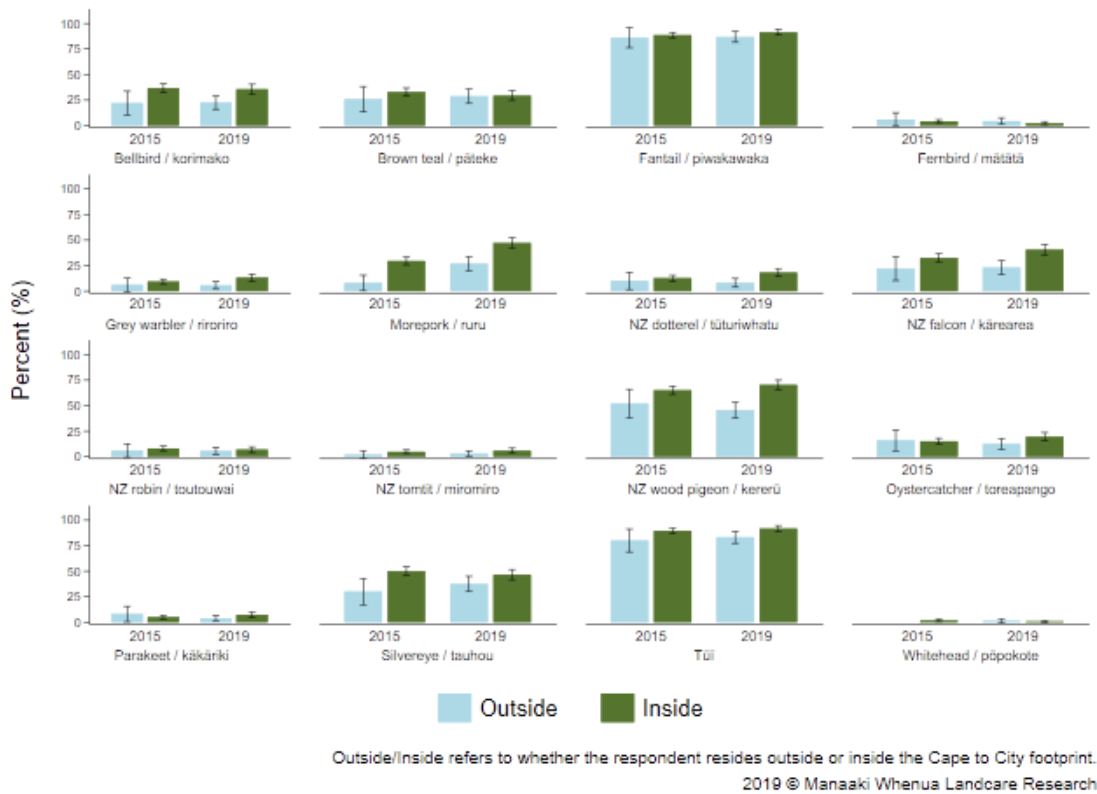


Figure 5. Proportion of respondents in 2015 and 2019 who recalled seeing or hearing these native birds in Hawke's Bay during the past 12 months. Note: Error bars are 95% confidence intervals.

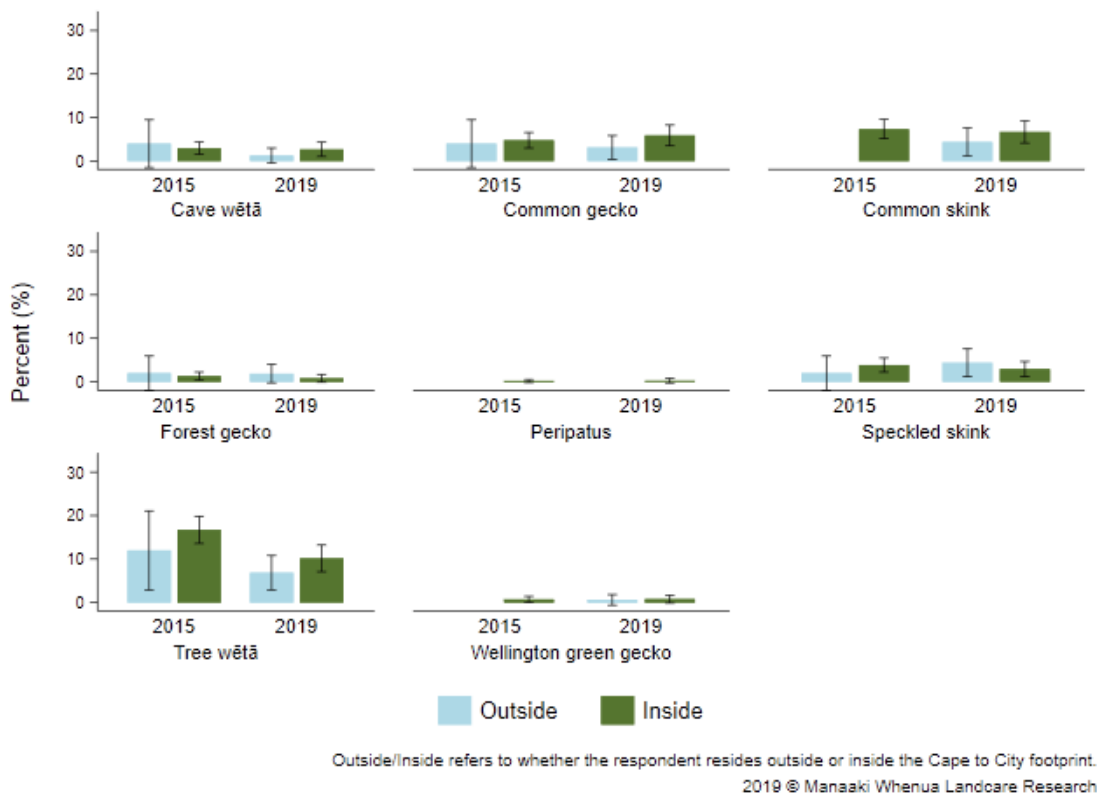


Figure 6. Proportion of respondents in 2015 and 2019 who recalled hearing or seeing these native insects and/or lizards in Hawke's Bay during the past 12 months. Note: Error bars are 95% confidence intervals.

3.3 Visits to areas that have undergone habitat restoration

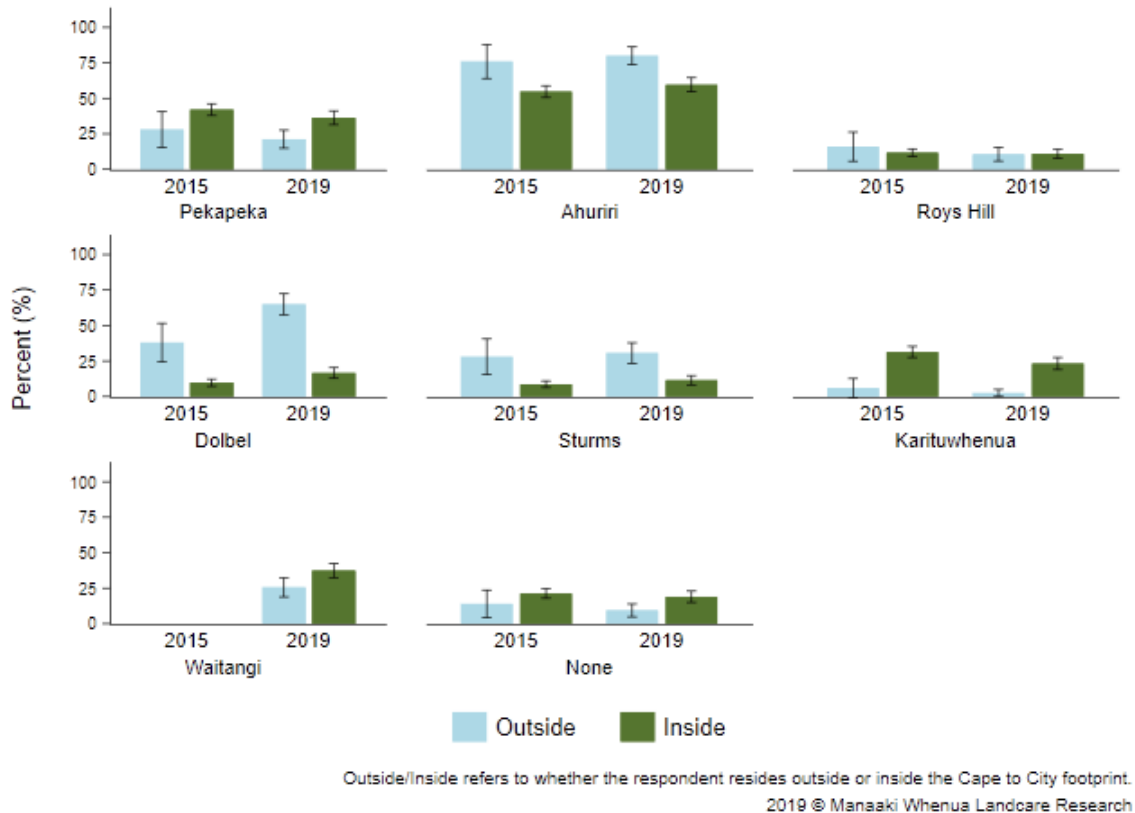


Figure 7. Proportion of respondents in 2015 and 2019 who had visited these restored areas at least once during the past 12 months. Note: Error bars are 95% confidence intervals.

Almost all respondents had visited at least one restored area in the previous 12 months (84%). Ahuriri Estuary was the most popular area to visit (65%), followed by Waitangi Regional Park (34%), Pekapeka Wetlands (32%) and Dolbel Reserve (31%). Respondents inside the footprint were more likely to visit Pekapeka Wetlands, Karituwhenua Stream, and/or Waitangi Regional Park. However, respondents inside the footprint were less likely to visit Ahuriri Estuary, Dolbel Reserve, and/or Sturms Gully (Figure 7; Appendix A). The proportion of respondents who visited Dolbel Reserve decreased by 20% from 2015 to 2019 (Table 4, Appendix A).

3.4 Impact of pests

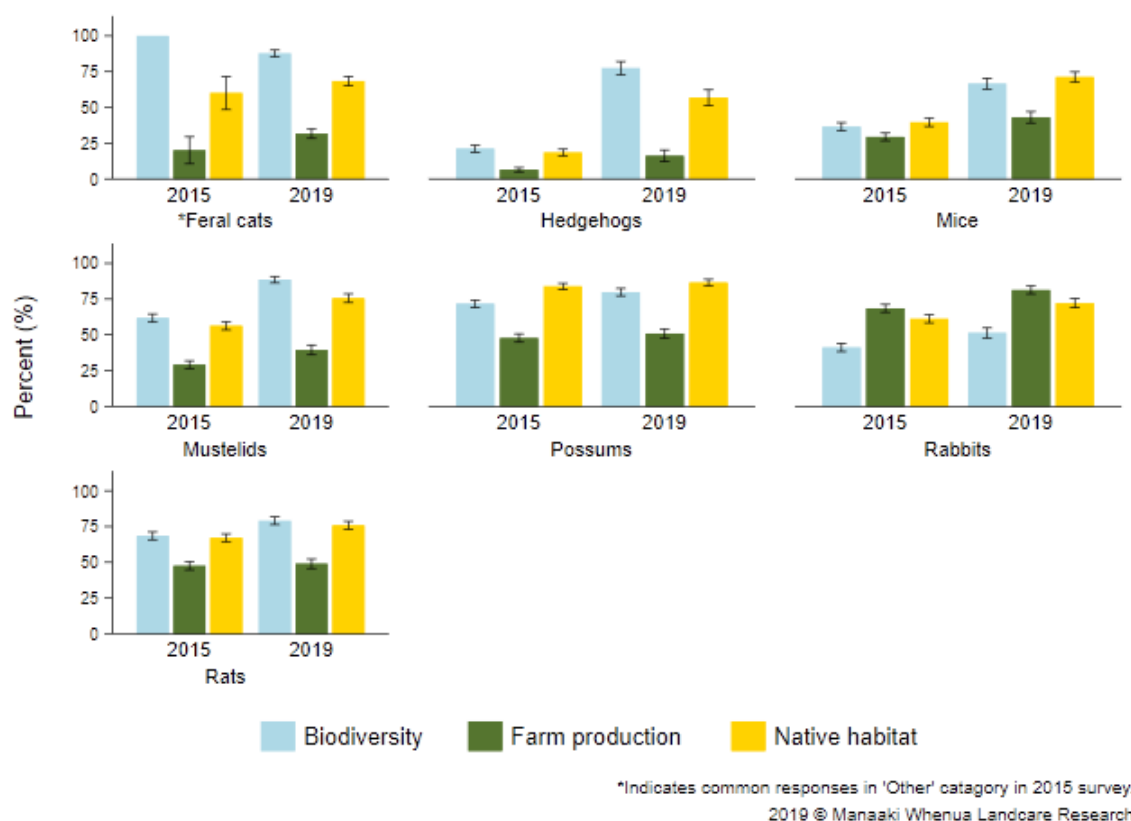


Figure 8. Proportion of respondents in 2015 and 2019 who believed that these non-native mammals negatively affect biodiversity, habitat for native plants and animals, and/or farm production. Note: Error bars are 95% confidence intervals.

The majority of respondents believed that feral cats (88% for biodiversity and 68% for native habitat), hedgehogs (75% and 57%), mice (67% and 71%), mustelids (89% and 76%), possums (80% and 87%), rabbits (51% and 72%), and rats (79% and 76%) negatively affect biodiversity and/or native habitat, while the majority of respondents believed that possums (51%) and rabbits (81%) negatively affect farm production. In 2019 a higher proportion of respondents inside the footprint believed that feral cats, mustelids, possums and rats negatively affect biodiversity, while a lower proportion of respondents inside the footprint believed that feral cats negatively affect farm production than respondents outside the footprint (Figure 8). However, there was no change in the proportion of respondents who believed that any non-native mammal species negatively affects biodiversity, native habitat and/or farm production since 2015 (Table 5, Appendix A).

3.5 Statements on the environment

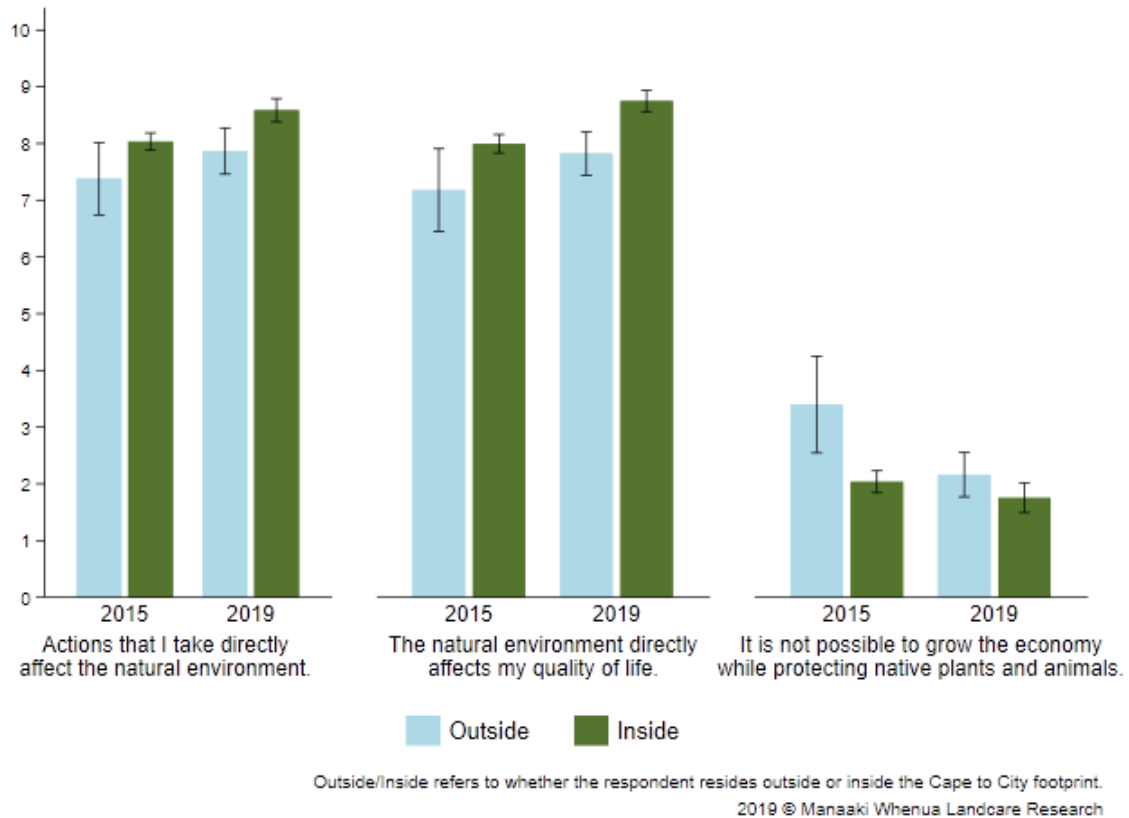
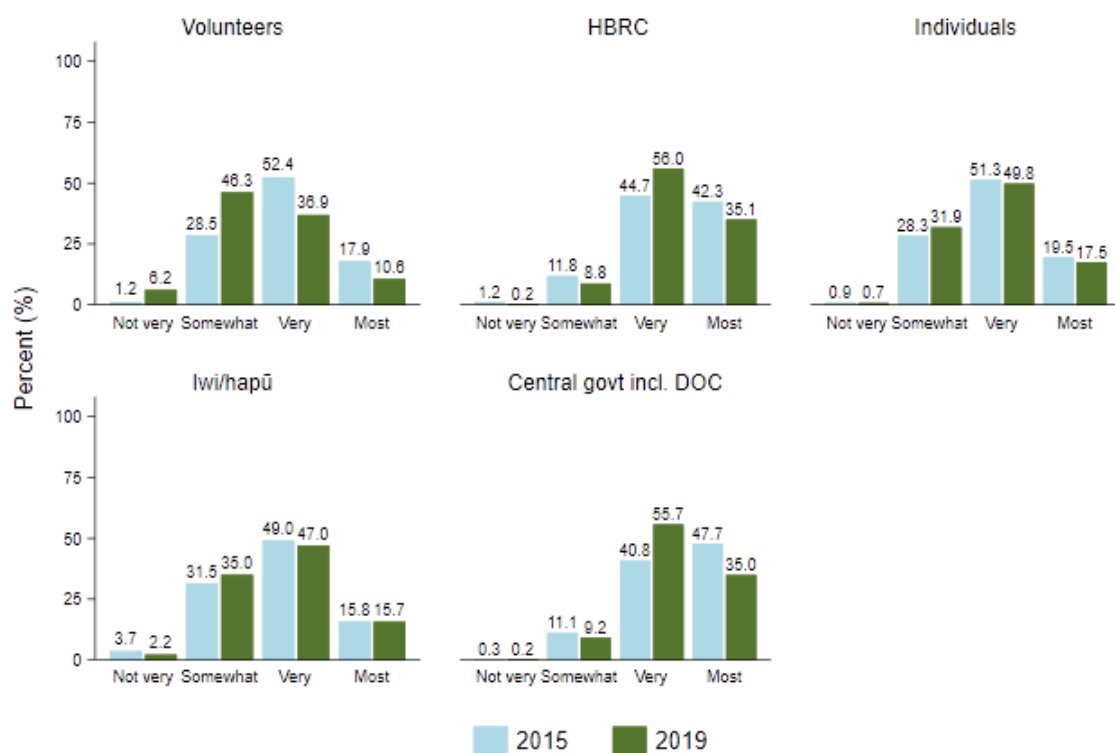


Figure 9. Mean extent to which respondents in 2015 and 2019 agree with statements on the environment. Note: Respondents were asked the extent to which they agree with each statement on a 0 (strongly disagree) to 10 (strongly agree) scale. Means for each question are reported here. Error bars are 95% confidence intervals.

The means of the first and second questions are 8.4 and 8.5, respectively, indicating a high level of environmental affiliation. This is an increase of 0.4 and 0.5, respectively, from the 2015 survey (Brown 2015). Respondents inside the footprint were also more positively affiliated with the environment than respondents outside the footprint (Figure 9). However, the average level of agreement has not changed since 2015 (Table 6, Appendix A).

The mean of the third question is 1.9, indicating a weak belief that one must trade off economic growth with environmental decline. This is slightly lower than the results found in Brown 2015, indicating that respondents in 2019 disagreed with the statement more than respondents in 2015. Respondents inside the footprint were no more likely to disagree with this statement than respondents outside the footprint (Figure 9). However, the average level of agreement has not changed since 2015 (Table 6, Appendix A).

3.6 Responsibility for protecting biodiversity and restoring habitat



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Figure 10. Extent to which respondents in 2015 and 2019 believed that volunteers, Hawke’s Bay Regional Council, individuals, iwi/hapū, and/or central government are responsible for protecting biodiversity and restoration of habitat for native plants and animals in Hawke’s Bay.

The majority of respondents believed that volunteers, HBRC, individuals, iwi/hapū, and central government (including DOC) are all at least somewhat responsible for protecting biodiversity and restoring habitat. Respondents assigned the most responsibility to HBRC and central government (including DOC). HBRC and central government (including DOC) also had the highest proportion of respondents saying that these groups are very responsible or the most responsible (91% and 90.6%, respectively) (Figure 10). A higher proportion of respondents in 2019 believed that individuals are the most responsible group for protecting biodiversity and restoring habitat than in 2015 (Table 7, Appendix A).

3.7 Involvement in environmental activities

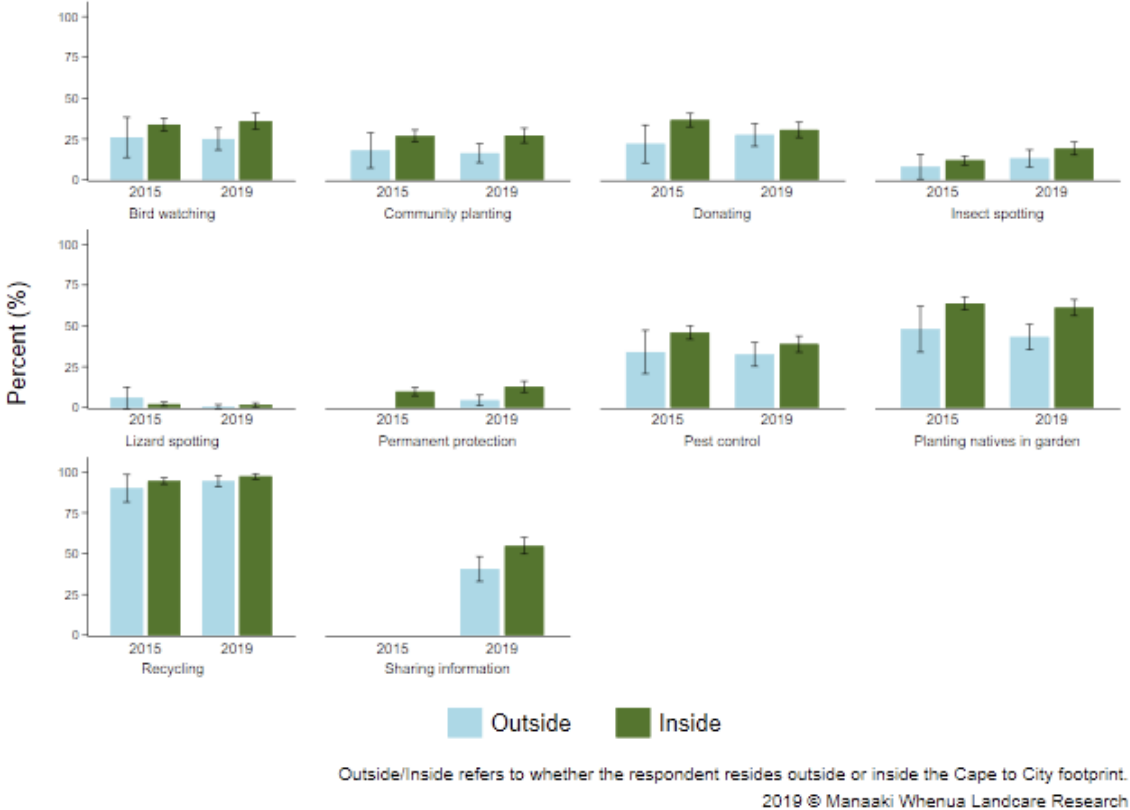


Figure 11. Proportion of respondents in 2015 and 2019 who were currently involved in, or had been involved in, environmental activities within the past 12 months. Note: Error bars are 95% confidence intervals.

Almost all respondents were or had been involved with at least one environmental activity (98.7%) within the past 12 months. The majority of respondents recycled (96.3%), planted native trees in the garden (55.8%) and/or shared information about the environment with others (50.6%). Respondents also watched birds (32.6%), donated to environmental causes (29.4%), and/or controlled pests (36.9%). A higher proportion of respondents inside the footprint planted native trees in the garden, shared information about the environment with others, watched birds, attended community planting events, and/or permanently protected private land compared with respondents outside the footprint (Figure 11). However, there was no change in the proportion of respondents who participate/participated in environmental activities from 2015 to 2019 (Table 8, Appendix A).

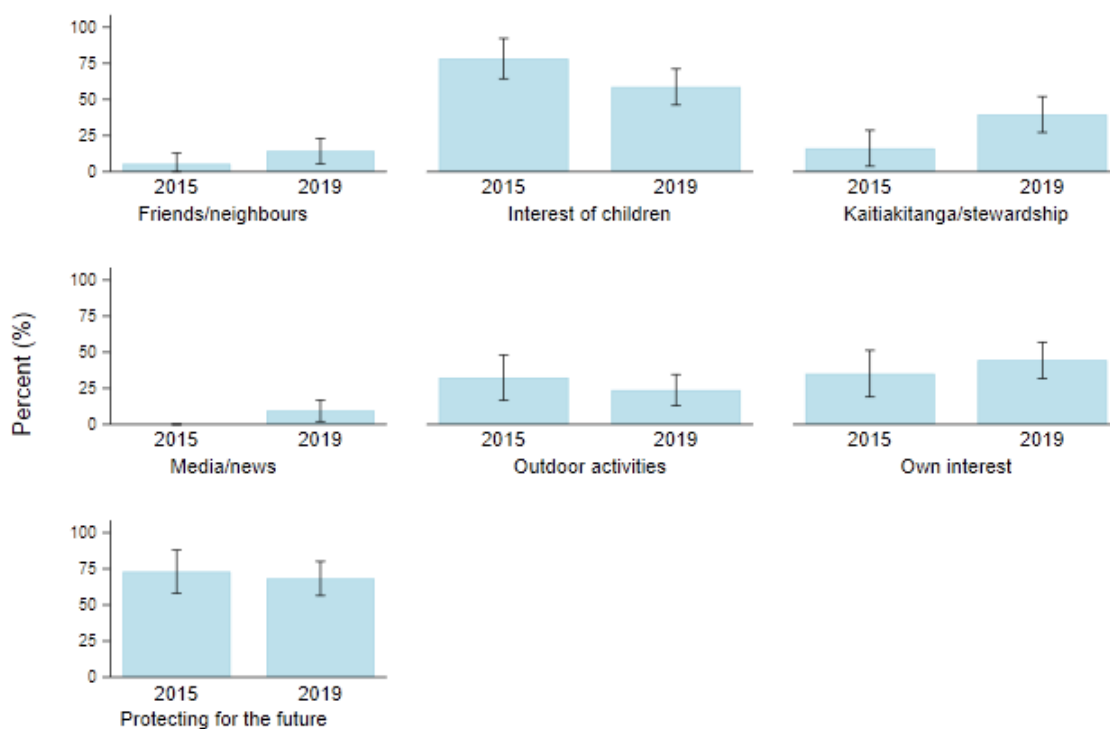
3.7.1 Community planting days

Of the 24% of respondents who participate/participated in community planting days, 77% were inside the Cape to City footprint and were primarily motivated to participate by the interest of children (59%) and a desire to protect resources for the future (68%).

Respondents were also motivated by their own interest (44%), kaitiakitanga/stewardship (40%), outdoor activities (24%), friends/neighbours (14%), and/or media/news (10%) (Figure 12).

A higher proportion of respondents inside the footprint were motivated by kaitiakitanga than respondents outside the footprint. A higher proportion of respondents in 2019 were motivated by kaitiakitanga/stewardship and/or media/news than in 2015, but a smaller proportion of respondents were motivated by the interest of children in 2019 than in 2015 (Table 9, Appendix A). Respondents became involved in community planting days relatively recently: almost three-quarters of respondents had become involved in community planting days since 2010, while 8.1% became involved over 20 years ago (Figure 13).

Most respondents do/did not participate in community planting days (76%) (Figure 14). The reasons given by respondents for not participating were they were too busy (56.7%), lacked information about plantings (38%), and/or faced physical limitations (11%). Respondents also cited lack of interest (5%), inconvenience (5%), transportation difficulties (2.4%), and/or expense (<1%). The proportion of respondents citing each reason for not participating in community plantings days had not changed since 2015 (Table 10, Appendix A).



Among respondents who are involved with community planting days.
2019 © Manaaki Whenua Landcare Research

Figure 12. Motivations for respondents in 2015 and 2019 to become involved in community planting days. Note: Error bars are 95% confidence intervals.

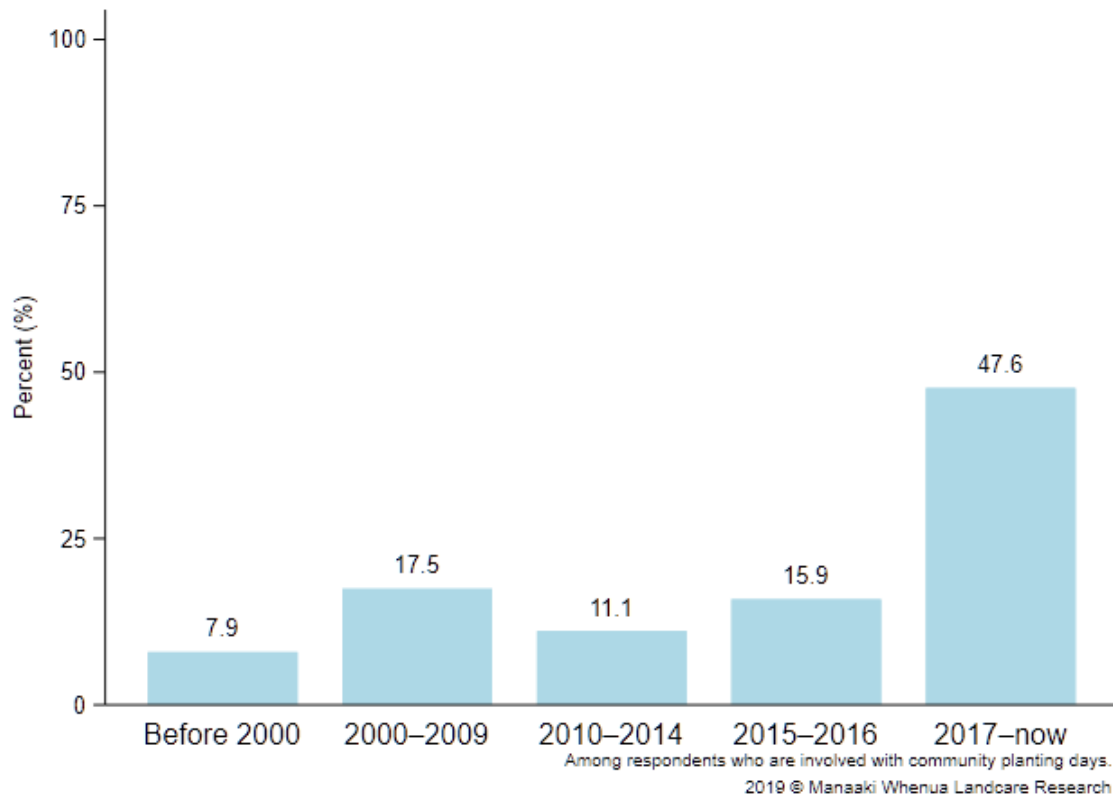


Figure 13. When did respondents in 2019 start participating in community planting days?

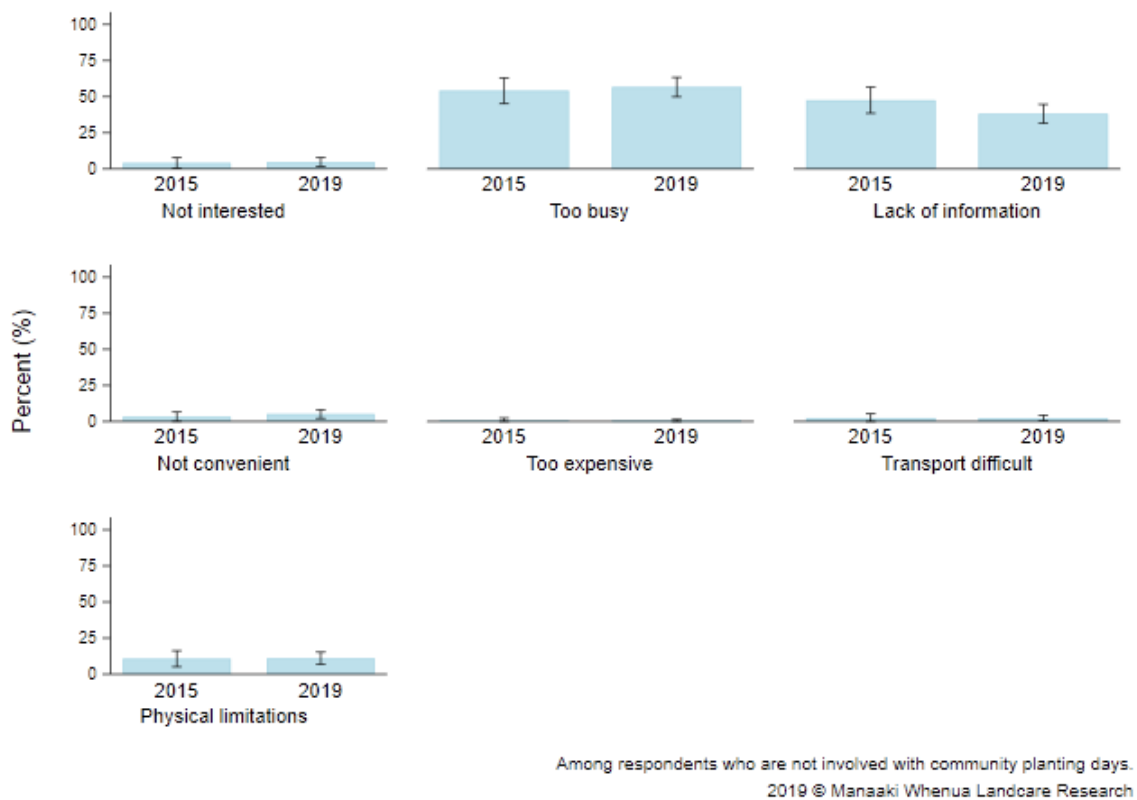
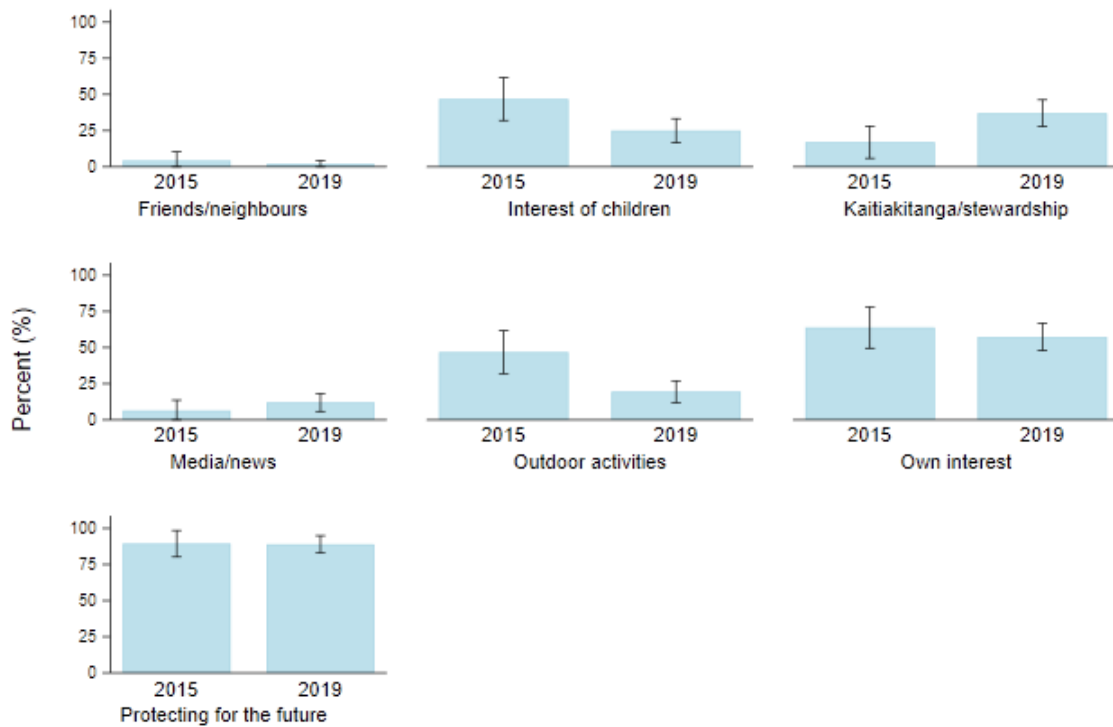


Figure 14. Main reasons respondents in 2015 and 2019 do not participate in community planting days. Note: Error bars are 95% confidence intervals.

3.7.2 Donating to environmental causes

Of the 29.4% of respondents who donate/donated to environmental causes, 72% were inside the Cape to City footprint and were primarily motivated to donate by a desire to protect resources for the future (89%) and their own interest (57%). Respondents were also motivated to donate by kaitiakitanga/stewardship (37%), the interest of children (25%), the media/news (12%), outdoor activities (19%), and friends/neighbours (<2%) (Figure 15). A higher proportion of respondents inside the footprint were motivated by kaitiakitanga than respondents outside the footprint. A higher proportion of respondents in 2019 were motivated by kaitiakitanga/stewardship, while a smaller proportion of respondents were motivated by the interest of children and/or outdoor activities compared with respondents in 2015 (Table 9, Appendix A). Respondents have been donating to environmental causes for a relatively long time (Figure 16). Roughly one-third had started donating to environmental causes within the last decade, while 45% had been donating for more than 20 years.



Among respondents who donate to environmental causes.
2019 © Manaaki Whenua Landcare Research

Figure 15. Motivations for respondents in 2015 and 2019 to donate to environmental causes. Note: Error bars are 95% confidence intervals.

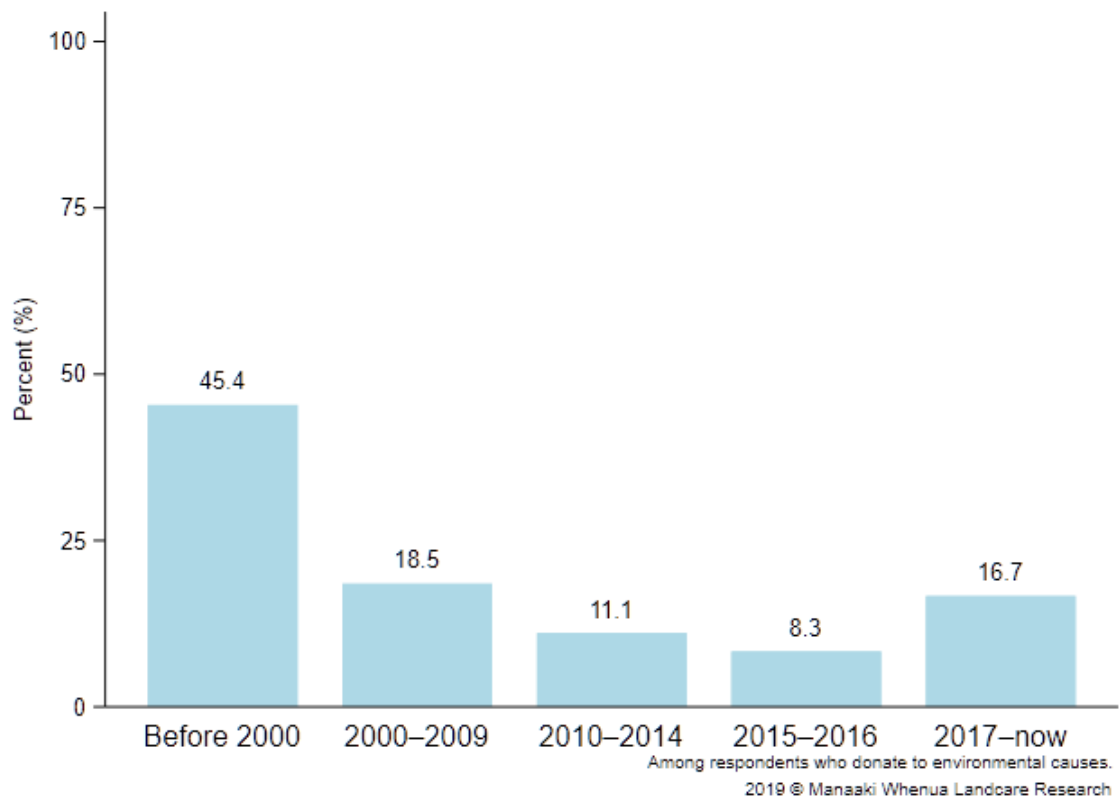
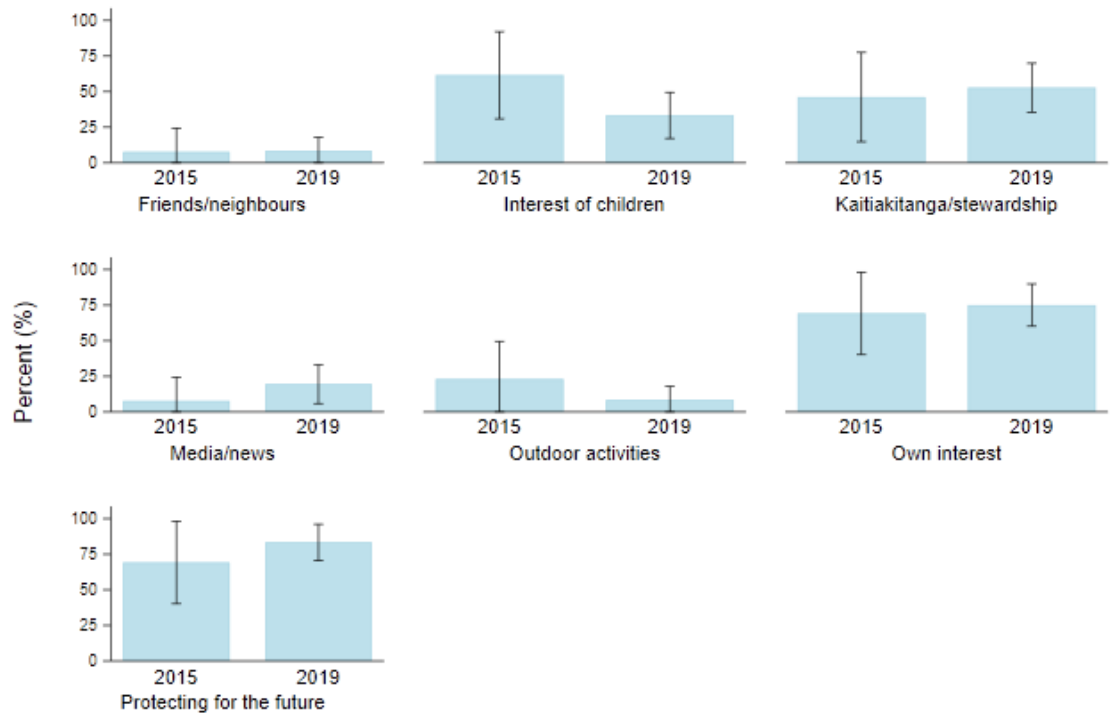


Figure 16. When did respondents in 2019 start donating to environmental causes?

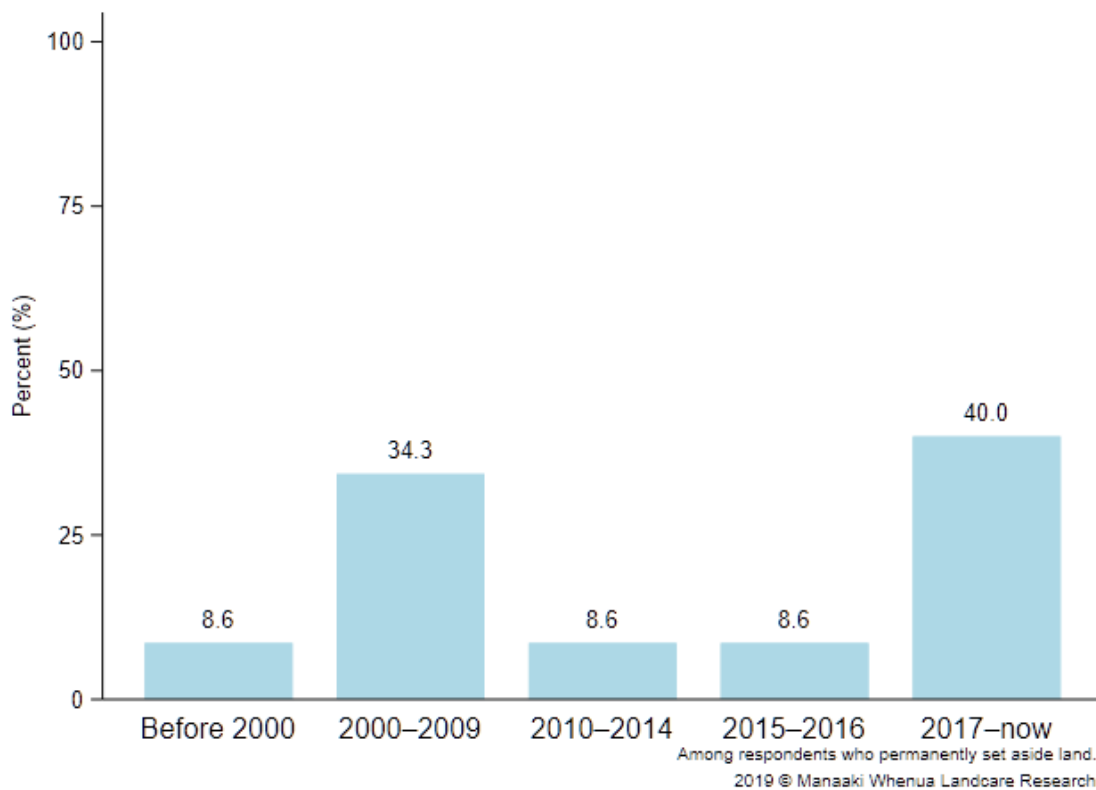
3.7.3 Permanently setting aside land to protect native plants and animals

Of the 10.3% of respondents who permanently set aside land for protecting native plants and animals, 87% were inside the Cape to City footprint and were primarily motivated by a desire to protect resources for the future (83%), their own interest (75%) and kaitiakitanga/stewardship (53%). Respondents were also motivated by the interest of children (33.3%), the media/news (19.4%), outdoor activities (8.3%), and/or friends/neighbours (8.3%) (Figure 17). Respondents had started permanently setting aside land to protect native plants and animals relatively recently. One-third of respondents had started setting aside land within the previous decade, while 40% had started since 2017. A smaller proportion of respondents (8.6%) had started setting aside land more than 20 years ago (Figure 18).



Among respondents who permanently set aside land.
2019 © Manaaki Whenua Landcare Research

Figure 17. Motivations for respondents in 2015 and 2019 to permanently set aside land to protect native plants and animals. Note: Error bars are 95% confidence intervals.



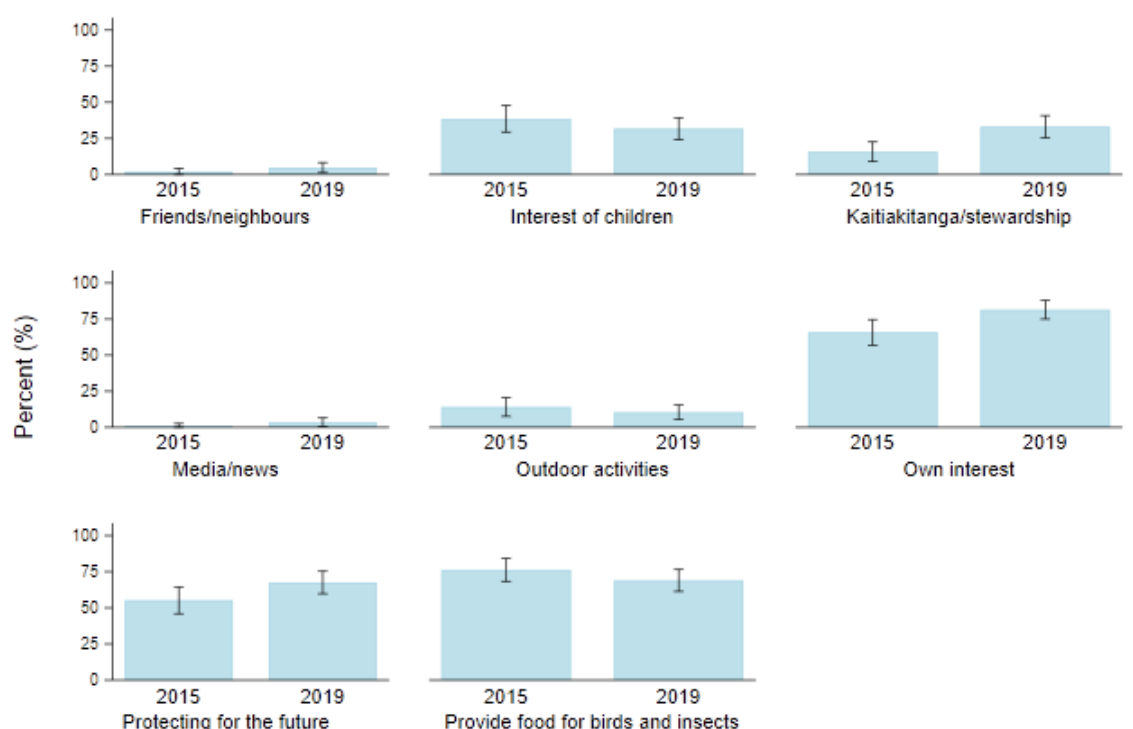
Among respondents who permanently set aside land.
2019 © Manaaki Whenua Landcare Research

Figure 18. When did respondents in 2019 start permanently setting aside land to protect native plants and animals?

3.7.4 Planting native trees in your garden

Of the 55.8% of respondents who plant/planted native trees in their garden, 77% were inside the Cape to City footprint and were primarily motivated by their own interest (82%), a desire to protect resources for the future (68%), and/or providing habitat for birds and insects (69%). Respondents were also motivated by the interest of children (31.7%), kaitiakitanga/stewardship (33%), outdoor activities (10.3%), friends/neighbours (4.8%), and/or the media/news (3.4%) (Figure 19). A higher proportion of respondents in 2019 were motivated by kaitiakitanga/stewardship and/or their own interest compared with respondents in 2015 (Table 9, Appendix A). Just over half of respondents had started planting native trees in their gardens within the last decade. One-fifth and one-quarter, respectively, of respondents had started planting trees in their garden over 20 years ago and within the previous decade (Figure 20).

Fewer than half of respondents do/did not plant native trees in their garden (44.2%). Respondents do/did not plant native trees in their garden because they were too busy (16%), lacked information (16%), faced physical limitations (21%), lacked interest (3%), found it inconvenient (<1%), and/or found it too expensive (14%) (Figure 21). The proportion of respondents citing each reason for not planting native trees in their gardens has not changed since 2015 (Table 10).



Among respondents who plant native trees in their gardens.
2019 © Manaaki Whenua Landcare Research

Figure 19. Motivations for respondents in 2015 and 2019 to plant native trees in their garden. Note: Error bars are 95% confidence intervals.

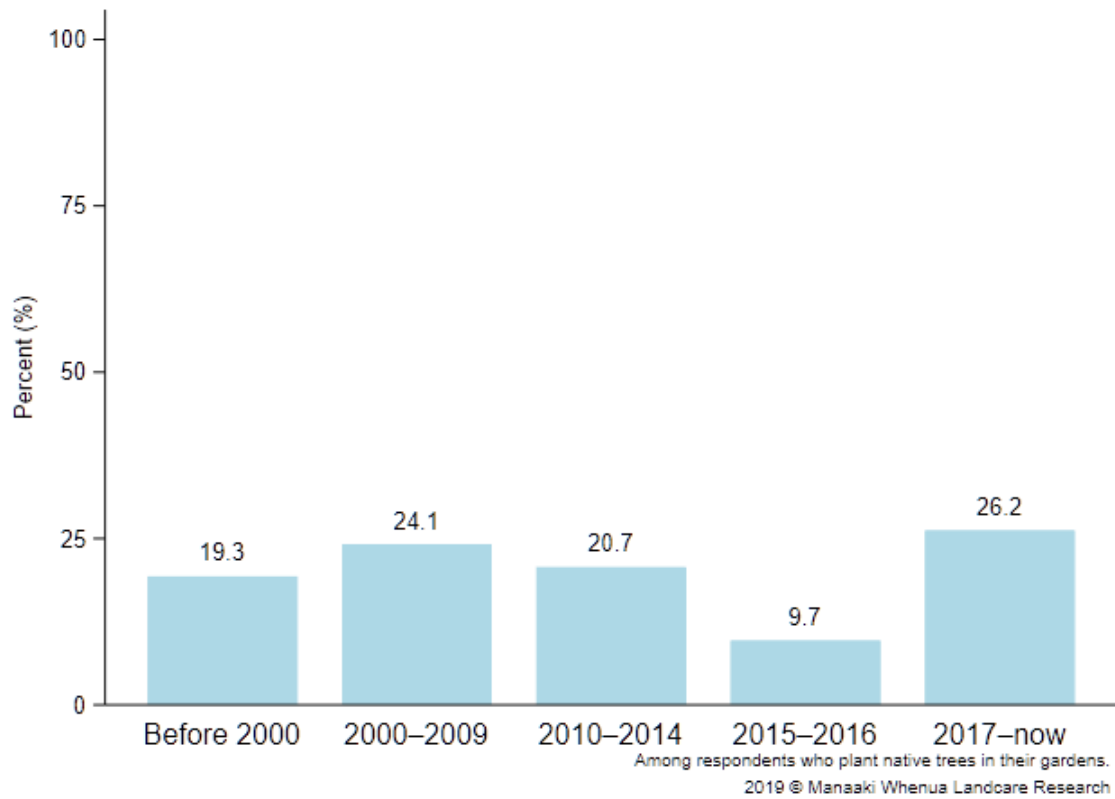


Figure 20. When did respondents in 2019 start planting native trees in their garden?

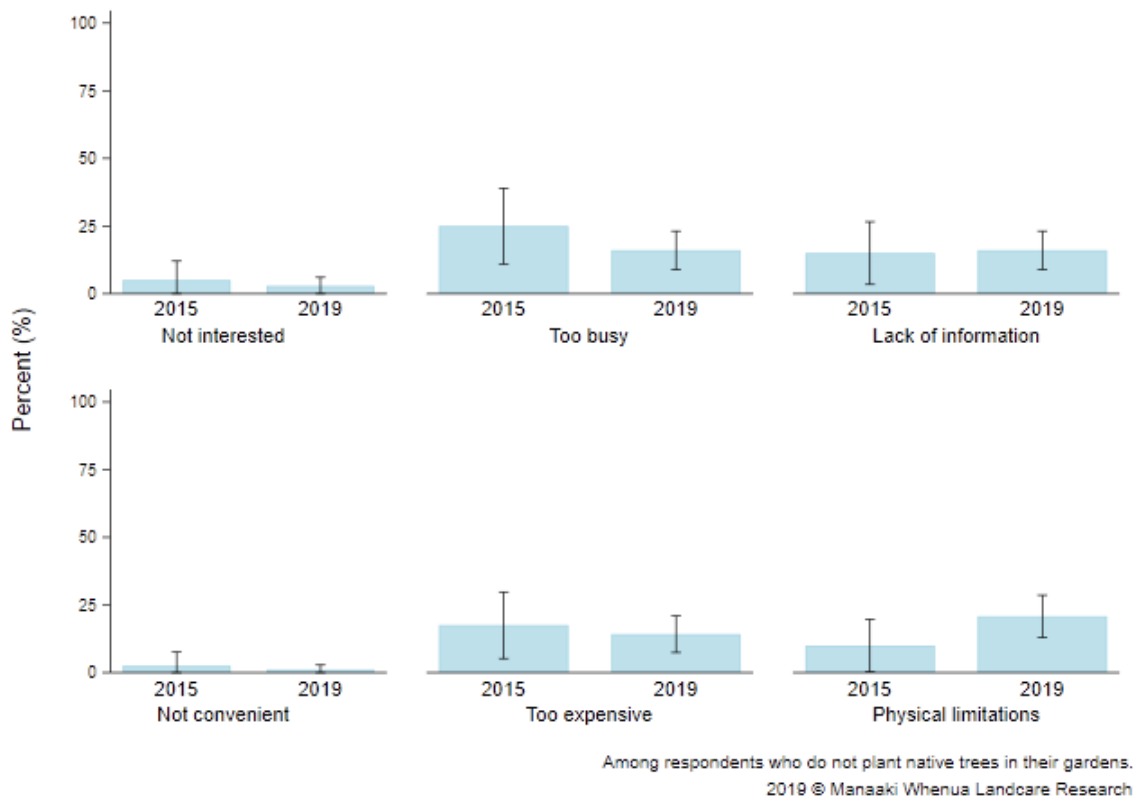


Figure 21. Main reasons respondents in 2015 and 2019 have not planted native trees in their garden. Note: Error bars are 95% confidence intervals.

3.7.5 Recycling

Of the 96.3% of respondents who recycle/recycled, 71% were inside the Cape to City footprint and were primarily motivated by their own interest (65%) and/or by a desire to protect resources for the future (83%). Respondents were also motivated by the interest of children (30.2%), kaitiakitanga/stewardship (28%), the media/news (18%) and/or friends/neighbours (14%) (Figure 22). A smaller proportion of respondents inside the footprint were motivated by the interest of children, while a higher proportion of respondents inside the footprint were motivated by kaitiakitanga/stewardship, than respondents outside the footprint. A higher proportion of respondents in 2019 were motivated by the media/news compared with respondents in 2015 (Table 9, Appendix A). Most respondents had started recycling over 20 years ago (61%). Fewer than one-quarter of respondents had started recycling within the previous 10 years (Figure 23).

Respondents do/did not recycle (3.8%) because of lack of interest (30%), lack of information (10%), they found it inconvenient (30%), and/or they found it too expensive (10%) (Figure 24). A smaller proportion of respondents in 2019 cited lack of time as a reason to not recycle than respondents in 2015 (Table 10, Appendix A).

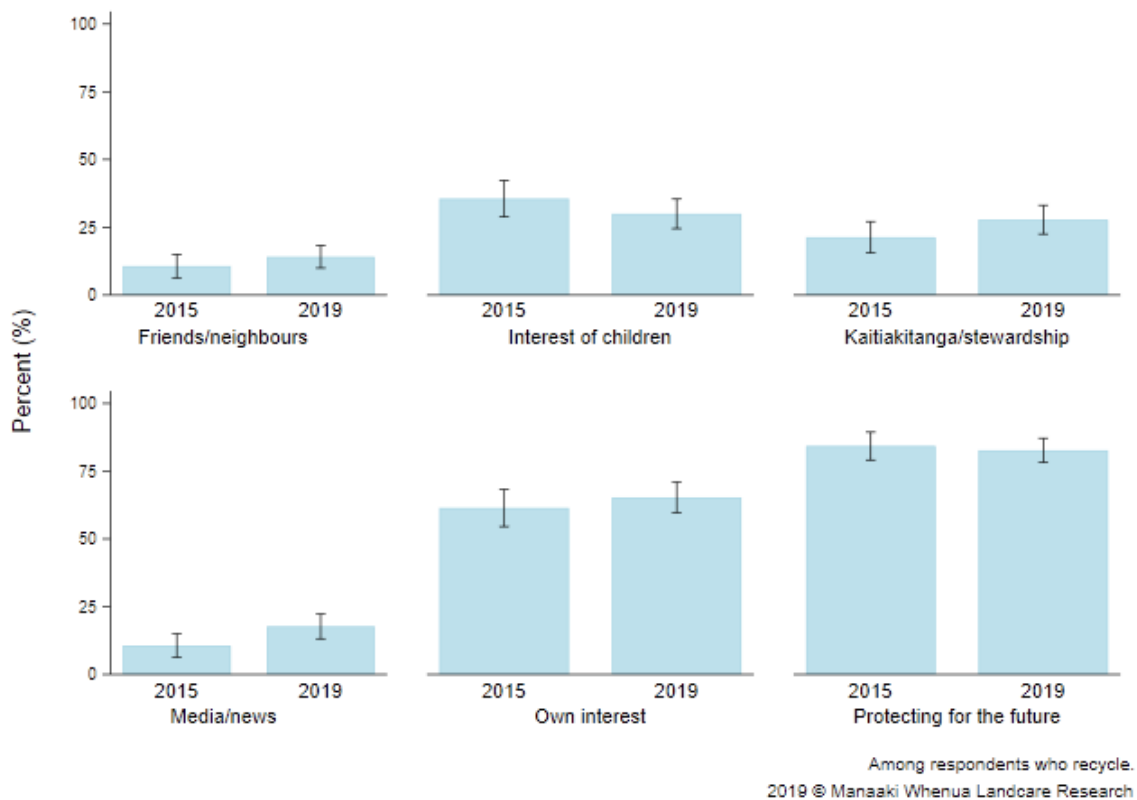


Figure 22. Motivations for respondents in 2015 and 2019 to recycle. Note: Error bars are 95% confidence intervals.

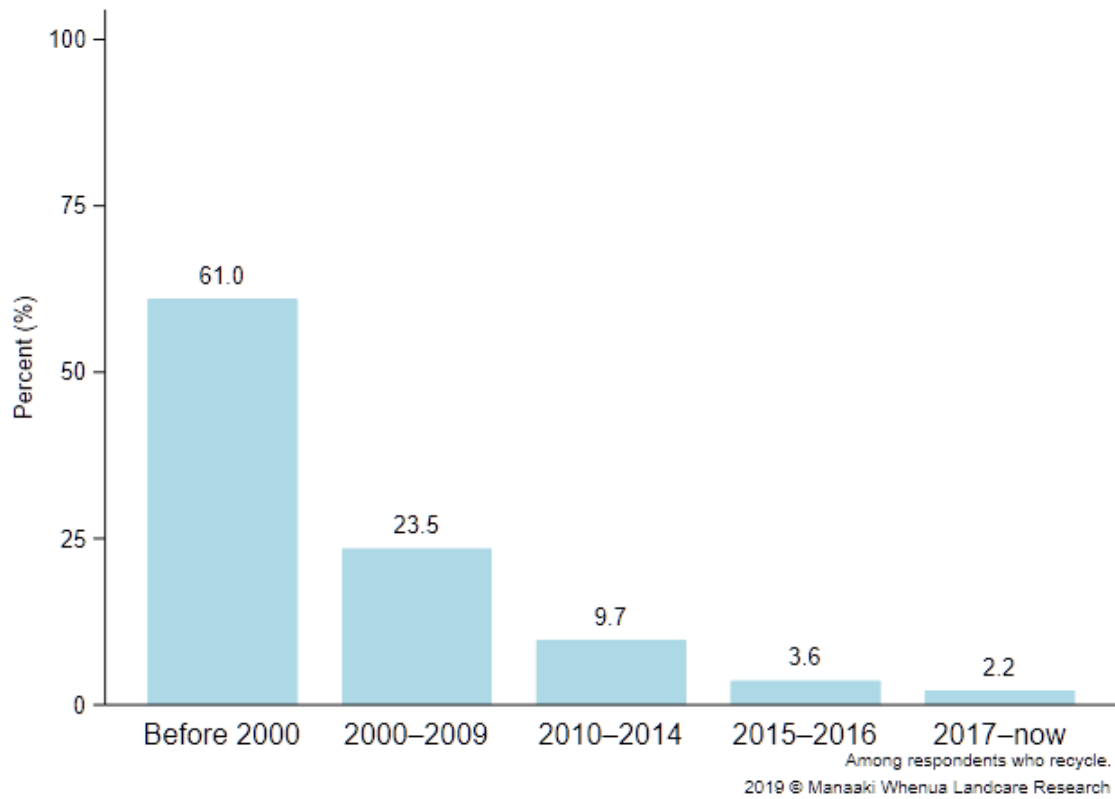


Figure 23. When did respondents in 2019 start recycling?

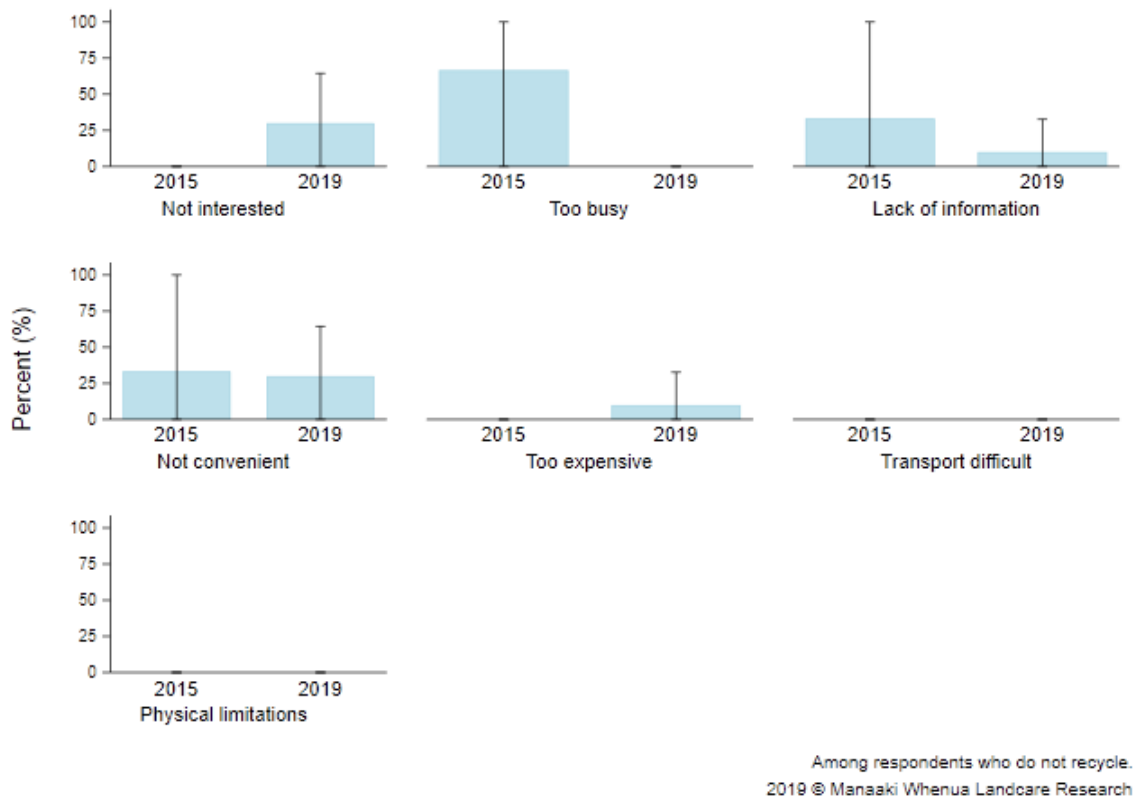
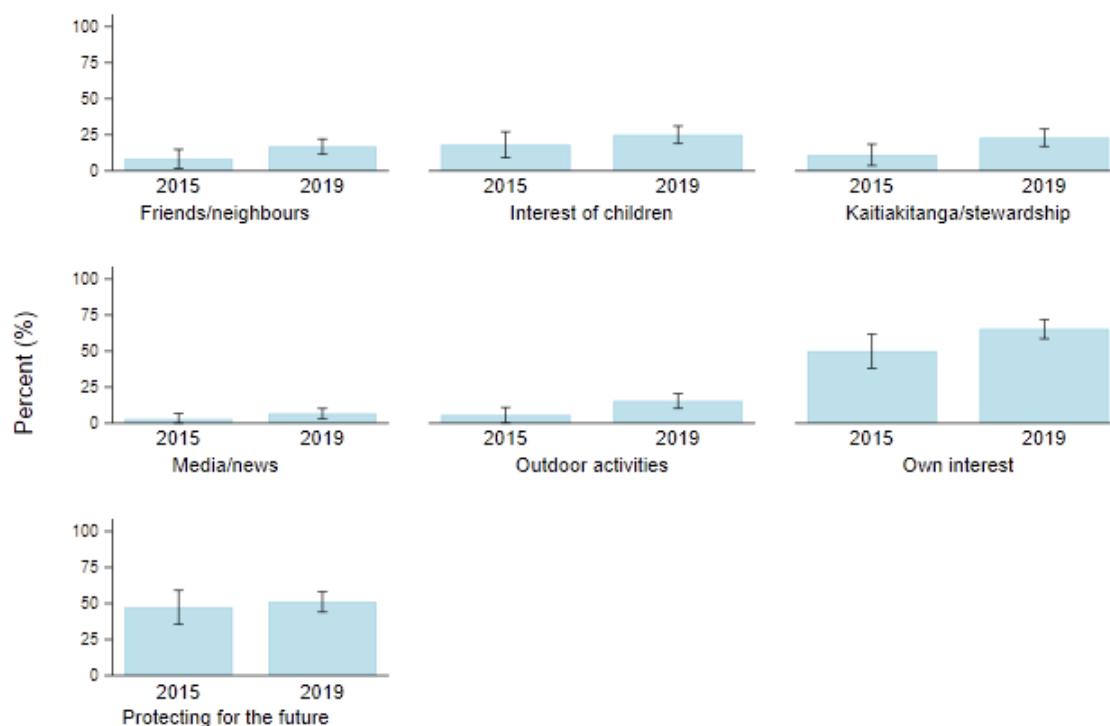


Figure 24. Main reasons respondents in 2015 and 2019 did not recycle. Note: Error bars are 95% confidence intervals.

3.7.6 Pest control with bait or traps

Of the 36.9% of respondents who control/controlled pests with baits and/or traps, 73.6% were inside the Cape to City footprint. Respondents were primarily motivated by their own interest (65%) and/or protecting resources for the future (51%). Respondents were also motivated by the interest of children (25%), kaitiakitanga/stewardship (23%), friends/neighbours (17%), outdoor activities (15.3%) and/or the media/news (6.6%) (Figure 25). A higher proportion of respondents inside the footprint were motivated by kaitiakitanga/stewardship, outdoor activities and a desire to protect resources for the future than respondents outside the footprint. A higher proportion of respondents in 2019 were motivated by kaitiakitanga/stewardship, outdoor activities and/or their own interest compared with respondents in 2015 (Table 9, Appendix A). Most respondents had started controlling pests with bait stations or traps within the previous 10 years, with 38% starting since 2017. Roughly one-fifth of respondents had started more than 20 years ago (Figure 26).

Most respondents were not involved with controlling pests with baits or traps (63%) (Figure 27). The primary reasons respondents do/did not participate in pest control are they were too busy (37.2%) and/or lacked information (48.5%). Respondents also cited physical limitations (7.2%), lack of interest (8.4%), inconvenience (6%), transportation difficulties (1.8%), expense (4%), and/or a dislike of killing (8%). A higher proportion of respondents inside the footprint cited physical limitations as a reason to not control pests than respondents outside the footprint. A higher proportion of respondents in 2019 cited expense as a reason to not be involved in controlling pests with baits or traps compared with respondents in 2015 (Table 10, Appendix A).



Among respondents who are involved with pest control.
2019 © Manaaki Whenua Landcare Research

Figure 25. Motivations for respondents in 2015 and 2019 to control pests with bait or traps. Note: Error bars are 95% confidence intervals.

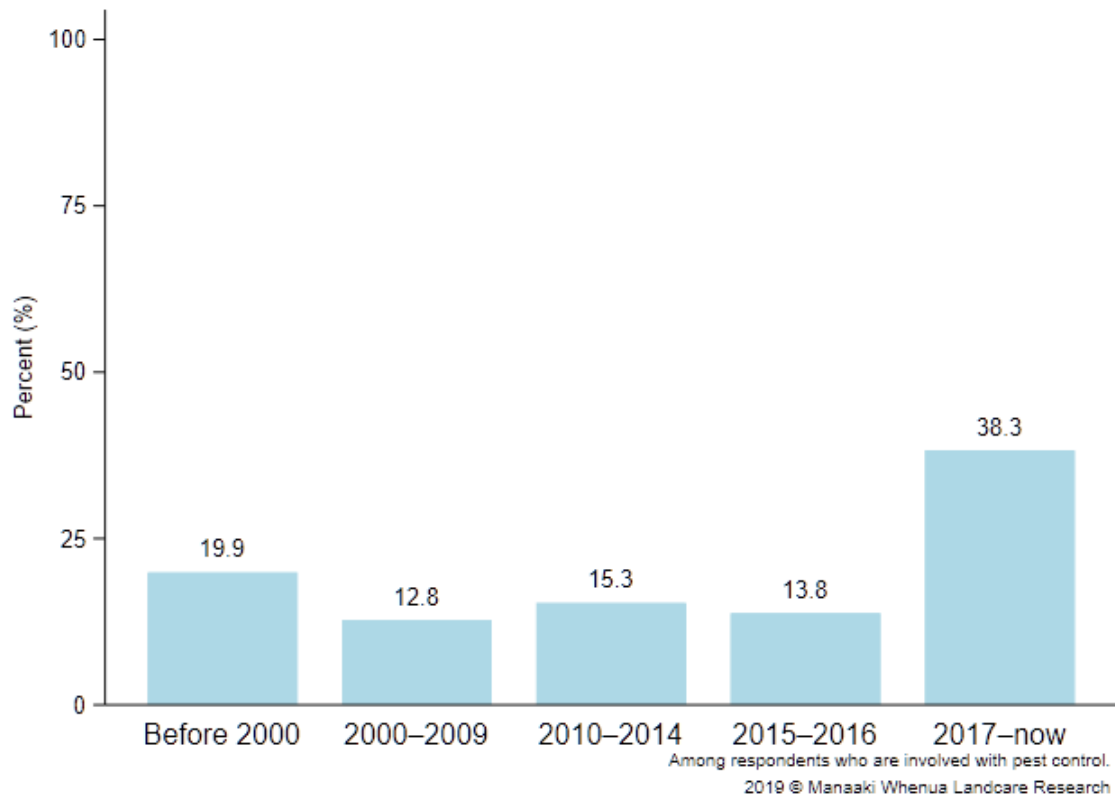


Figure 26. When did respondents in 2019 start controlling pests with bait stations or traps?

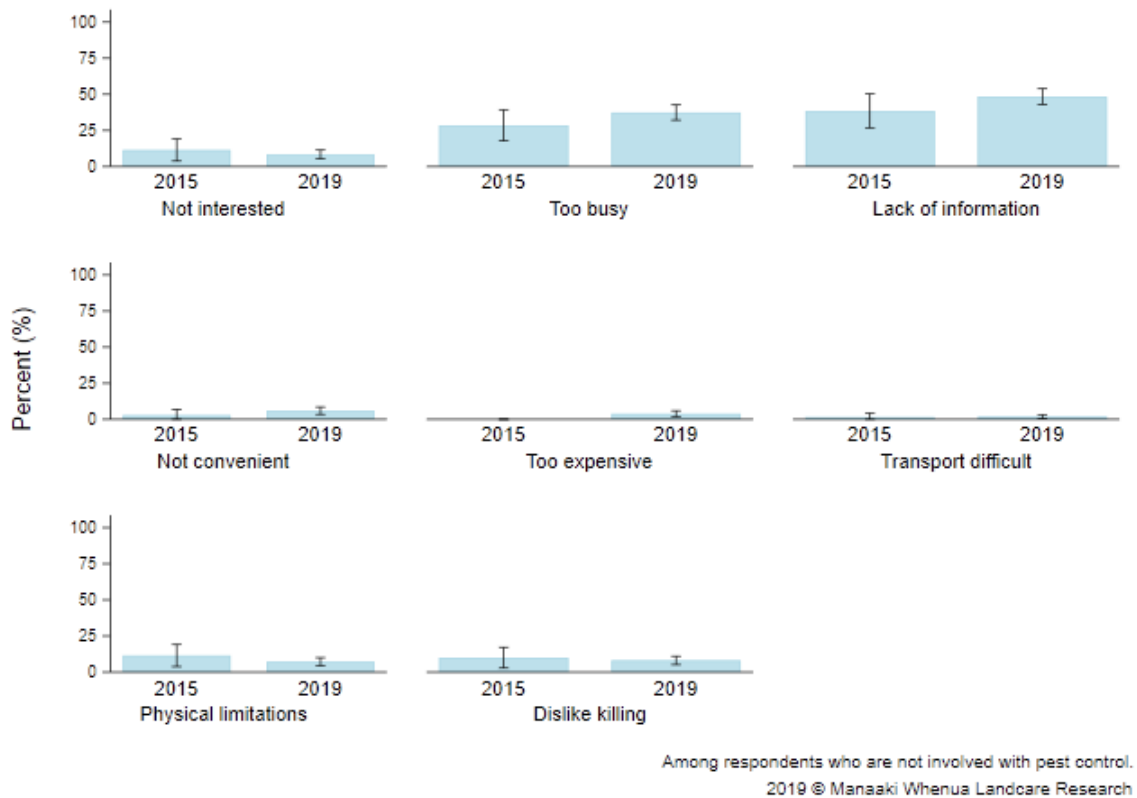


Figure 27. Main reasons respondents in 2015 and 2019 did not participate in pest control. Note: Error bars are 95% confidence intervals.

Among respondents who control pests, mice and rats were the most commonly targeted for control (60.5% and 88%, respectively) (Figure 28). Respondents in 2019 also targeted feral cats (11%), hedgehogs (4%), mustelids (19.5%), possums (25%), and/or rabbits (13.7%). A higher proportion of respondents inside the footprint targeted possums and/or rabbits compared with those outside the footprint. However, while hedgehogs and possums were targeted by a higher proportion of respondents inside the footprint in 2015 and in 2019, there was no significant change in the proportion of respondents targeting any pest species from 2015 to 2019 (Table 11, Appendix A).

Most respondents control/controlled pests on their own property (93.9%), and a minority of respondents control/controlled pests either elsewhere in Hawke’s Bay (13.7%) or outside Hawke’s Bay (6.6%) (Figure 29). However, the proportion of respondents doing pest control on their own property, elsewhere in Hawke’s Bay or outside of Hawke’s Bay did not change from 2015 to 2019 (Table 12, Appendix A).

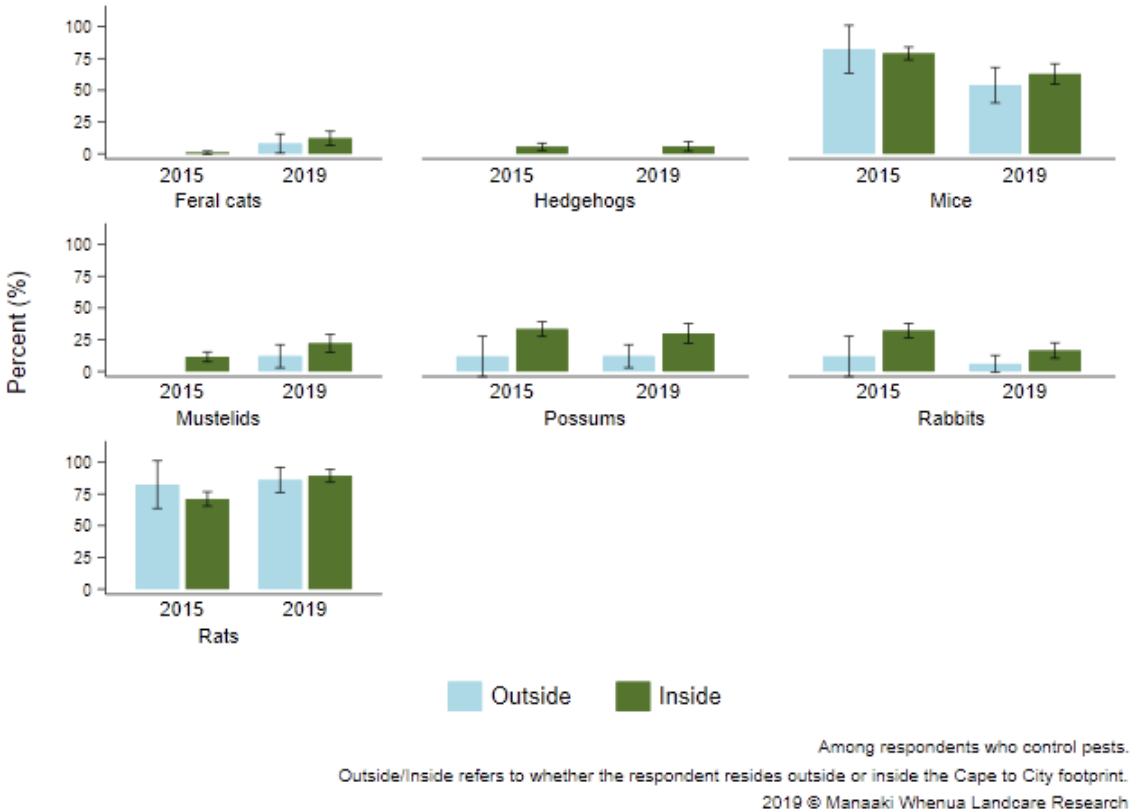


Figure 28. What pests did respondents in 2015 and 2019 target? Note: Error bars are 95% confidence intervals.

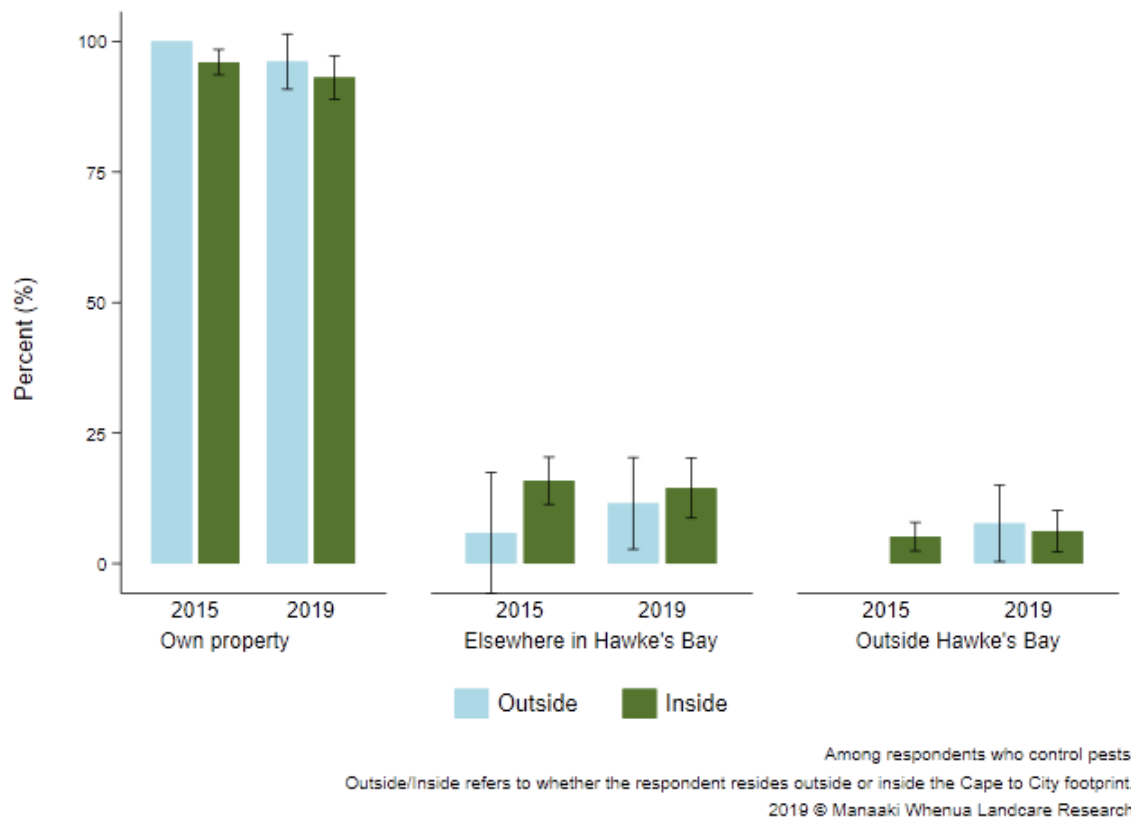


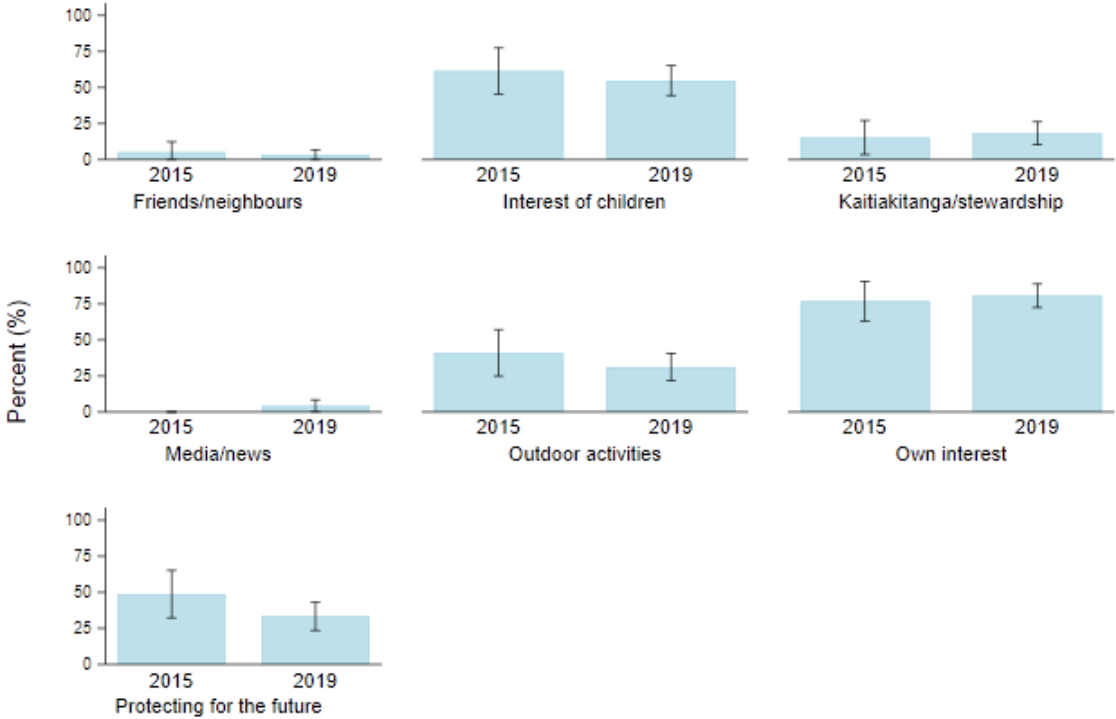
Figure 29. Where did respondents in 2015 and 2019 control pests? Note: Error bars are 95% confidence intervals.

3.7.7 Bird watching

Of the 33% of respondents who watch/watched birds, 77% were inside the Cape to City footprint. Respondents were primarily motivated to watch birds by the interest of children (55%) and/or by their own interest (81%). Respondents were also motivated by a desire to protect resources for the future (33%), outdoor activities (31%), and/or kaitiakitanga/stewardship (18.3%) (Figure 30). A higher proportion of respondents inside the footprint were motivated by a desire to protect resources for the future than respondents outside the footprint. A higher proportion of respondents in 2019 were motivated by the media/news compared with respondents in 2015 (Table 9, Appendix A). Respondents started bird watching either relatively recently (since 2010) or over 20 years ago (44.5 vs. 45.7%, respectively) (Figure 31).

Most respondents do/did not watch birds (67.4%). Respondents do/did not participate in bird watching because they were too busy (32%), lacked information (25.6%), and/or were not interested (42%) (Figure 32). Respondents also cited physical limitations (1.7%), inconvenience (1%), transportation difficulties (1%), and expense (<1%). A higher proportion of respondents inside the footprint said they were too busy to watch birds than respondents outside the footprint. A lower proportion of respondents in 2019 said they were too busy to watch birds compared with respondents in 2015 (Table 10, Appendix A).

Among respondents who watch birds, 27% participated in the New Zealand Garden Bird Survey in 2019 (Figure 33). However, there is no difference in the proportion of respondents inside the footprint in 2019 who participated in the survey compared with respondents outside the footprint, nor has there been any change in survey participation since 2015.



Among respondents who are involved with bird watching.
 2019 © Manaaki Whenua Landcare Research

Figure 30. Motivations for respondents in 2015 and 2019 to watch birds. Note: Error bars are 95% confidence intervals.

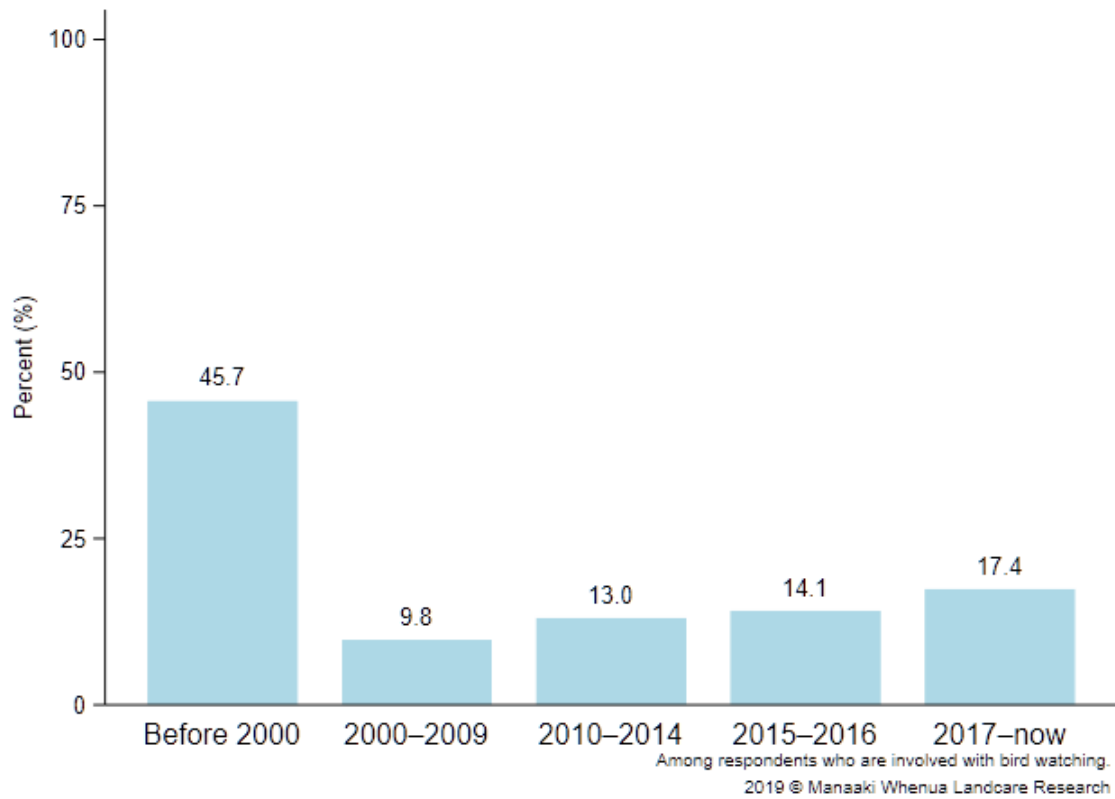


Figure 31. When did respondents in 2019 start watching birds?



Figure 32. Main reasons respondents in 2015 and 2019 have not participated in bird watching. Note: Error bars are 95% confidence intervals.

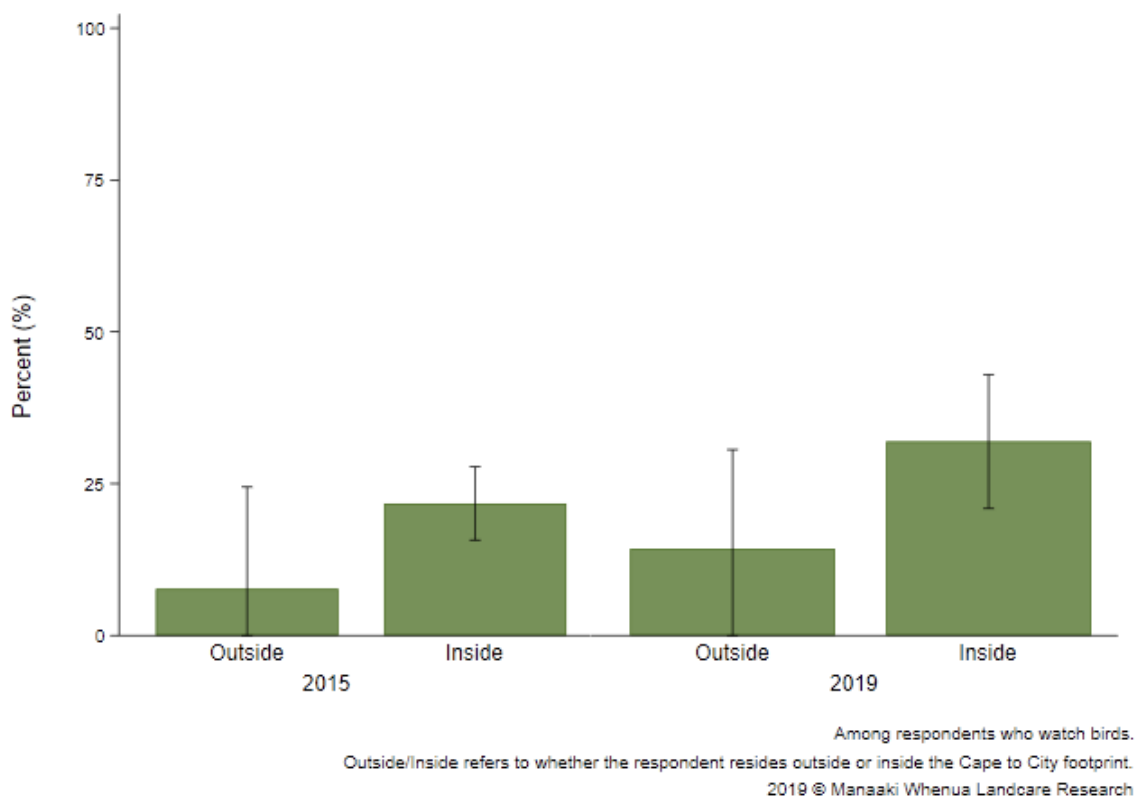


Figure 33. Proportion of respondents in 2015 and 2019 who participated in the NZ Garden Bird Survey. Note: Error bars are 95% confidence intervals.

3.7.8 Lizard spotting

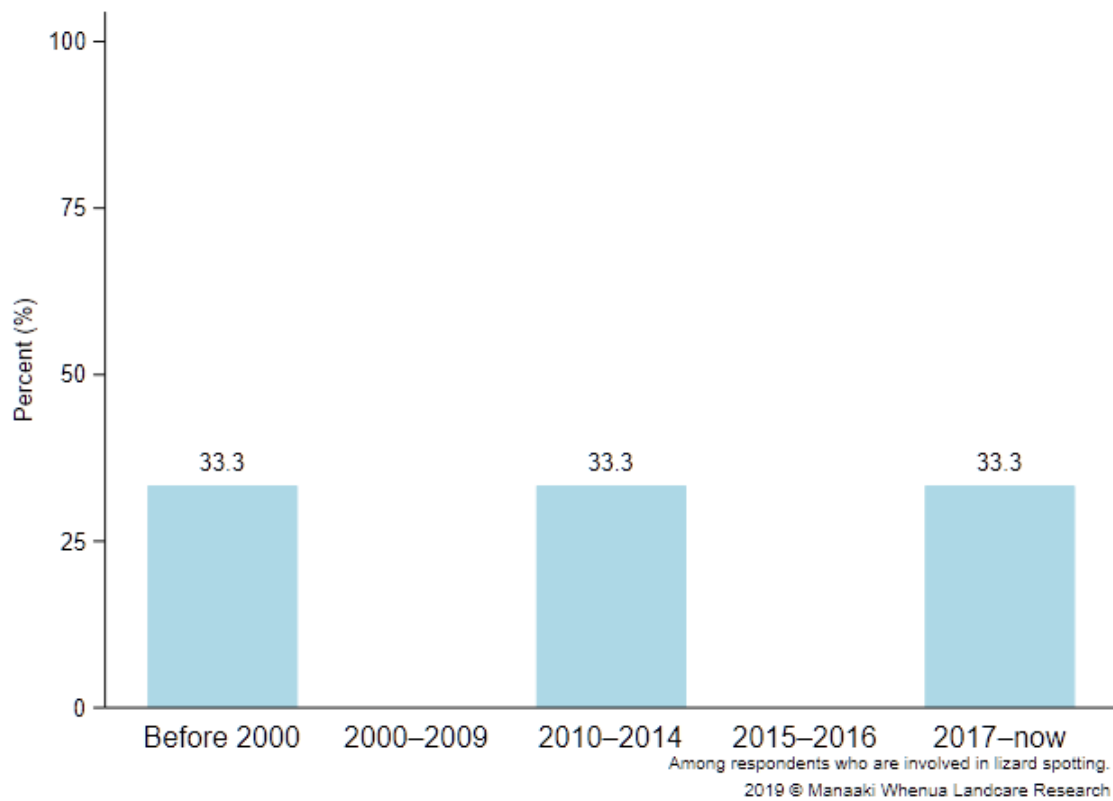
Of the 1.3% of respondents who spot/spotted lizards, 85.7% were inside the Cape to City footprint and were primarily motivated by the media (67%) and/or a desire to protect resources for the future (67%). Respondents were also motivated to spot lizards by kaitiakitanga/stewardship (33%), the interest of children (33%), and/or their own interests (33%) (Figure 34). However, the proportion of respondents citing each motivation for participating in lizard spotting had not changed since 2015 (Table 9, Appendix A). While lizard spotting is not a common activity for respondents, it has become more popular over the last 10 years. Two-thirds of respondents had started lizard spotting since 2010, while one-third had started over 20 years ago (Figure 35).

Most respondents do/did not participate in lizard spotting (98.7%). Respondents do/did not participate because they were too busy (20%), lacked information (43.5%), lacked interest (28%), and/or did not know where to look (38.2%). Respondents also cited inconvenience (3%), transportation difficulties (1.5%), and/or physical limitations (1.5%) (Figure 36). A higher proportion of respondents inside the footprint said they did not know where to look for lizards compared with respondents outside the footprint. A higher proportion of respondents in 2019 lacked interest and/or did not know where to look, while a lower proportion of respondents in 2019 cited lack of information as reasons to not participate in lizard spotting, compared to the 2015 proportions (Table 10, Appendix A).



Among respondents who are involved with lizard spotting.
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Figure 34. Motivations for respondents in 2015 and 2019 to participate in lizard spotting. Note: Error bars are 95% confidence intervals.



Among respondents who are involved in lizard spotting.
2019 © Manaaki Whenua Landcare Research

Figure 35. When did respondents in 2015 and 2019 start spotting lizards?

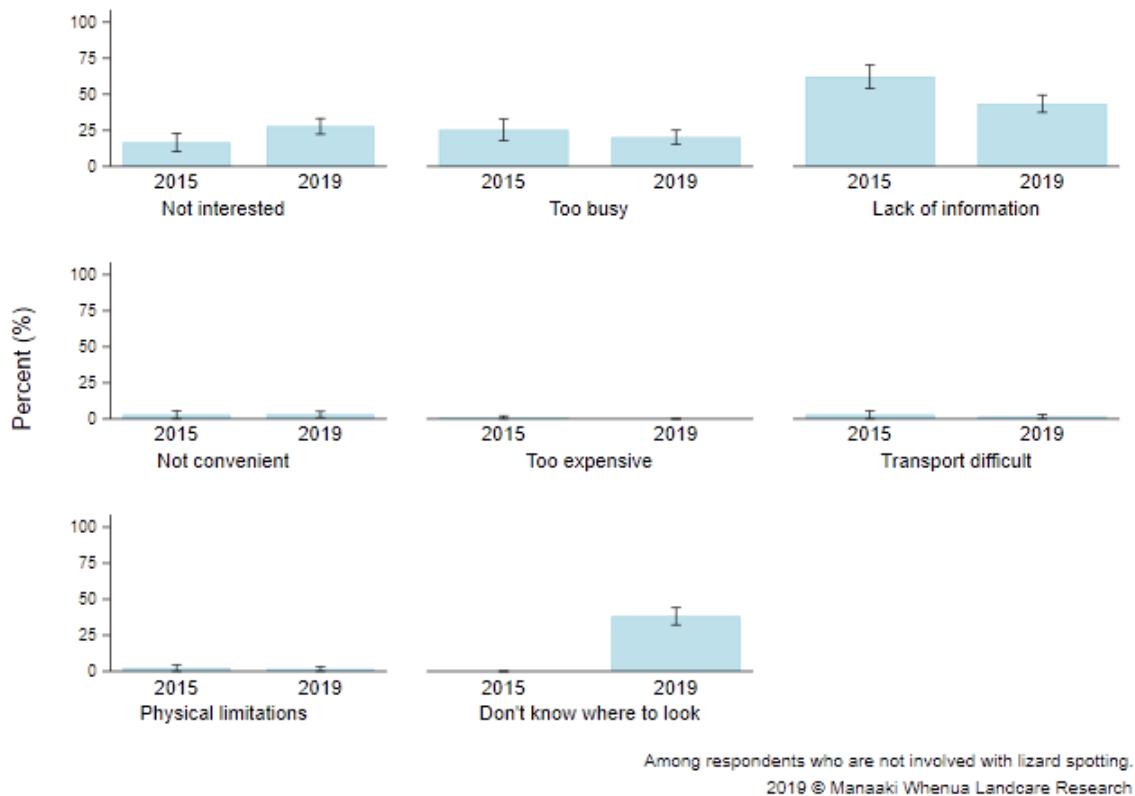
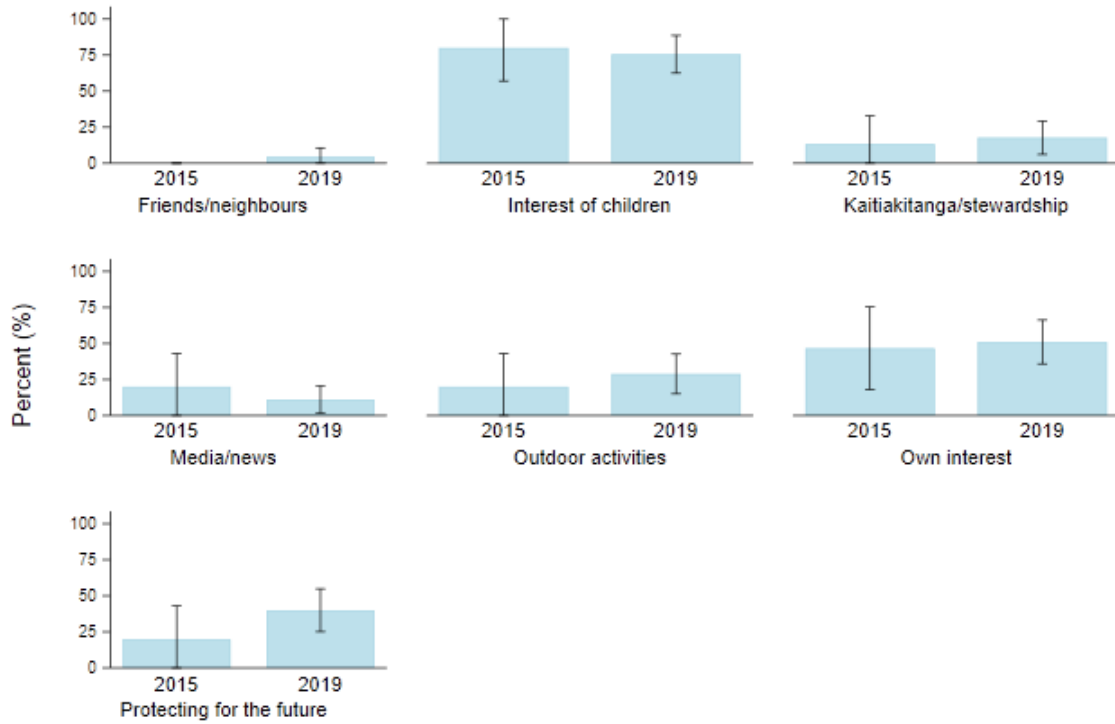


Figure 36. Main reasons respondents in 2015 and 2019 had not participated in lizard spotting. Note: Error bars are 95% confidence intervals.

3.7.9 Insect spotting

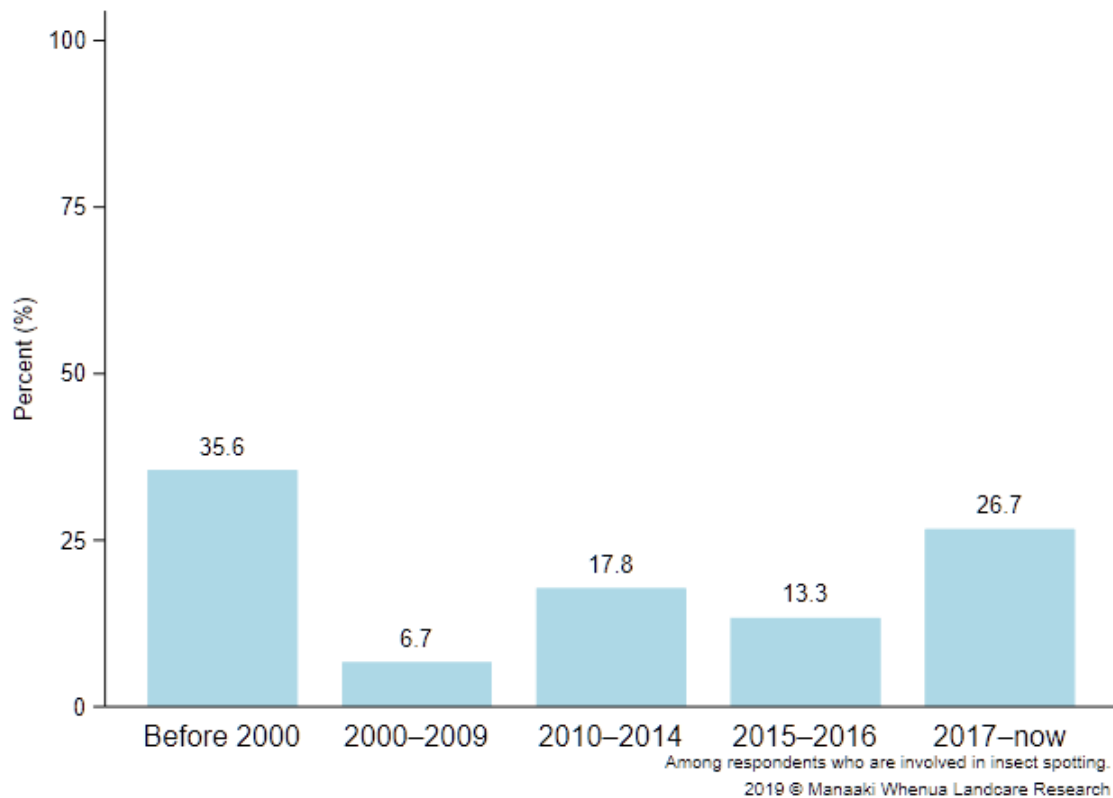
Of the 17.4% of respondents who spot/spotted insects, 77% were inside the Cape to City footprint and were primarily motivated to spot insects by the interest of children (76%) and/or their own interests (51%). Respondents were also motivated by a desire to protect resources for the future (40%), outdoor activities (29%), kaitiakitanga/stewardship (17.8%), the media/news (11.1%), and/or friends/neighbours (4.4%) (Figure 37). A higher proportion of respondents in 2019 were motivated by a desire to protect resources for the future as a reason to participate in insect spotting compared with respondents in 2015 (Table 9, Appendix A). Insect spotting has become increasingly more popular since 2000. Between 2000 and 2009 6.7% of respondents starting insect spotting, 17.8% started within the next 5 years, and 40% have started since 2015 (Figure 38).

Most respondents do/did not participate in insect spotting (82.6%). Respondents do/did not participate in insect spotting because they lacked interest (43%), were too busy (22.7%), lacked information (31.9%), and/or did not know where to look (17.9%). A few respondents also cited inconvenience, expense, transportation difficulties, and/or physical limitations (all <1%) (Figure 39). A higher proportion of respondents inside the footprint said they did not know where to look for insects compared with respondents outside the footprint. A higher proportion of respondents in 2019 cited lack of interest and/or did not know where to look, while a lower proportion of respondents in 2019 cited lack of information as a reasons not to participate in insect spotting, compared with respondents in 2015 (Table 10, Appendix A).



Among respondents who are involved with insect spotting.
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Figure 37. Motivations for respondents in 2015 and 2019 to participate in insect spotting. Note: Error bars are 95% confidence intervals.



Among respondents who are involved in insect spotting.
2019 © Manaaki Whenua Landcare Research

Figure 38. When did respondents in 2015 and 2019 start spotting insects?

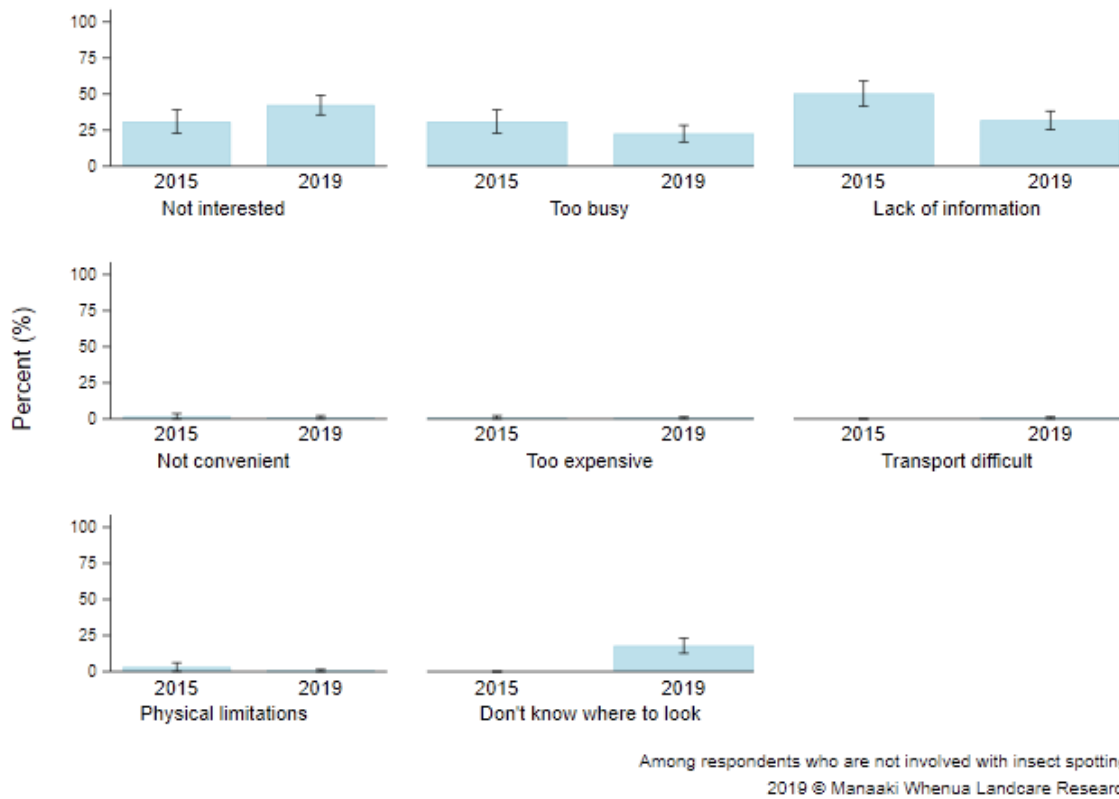
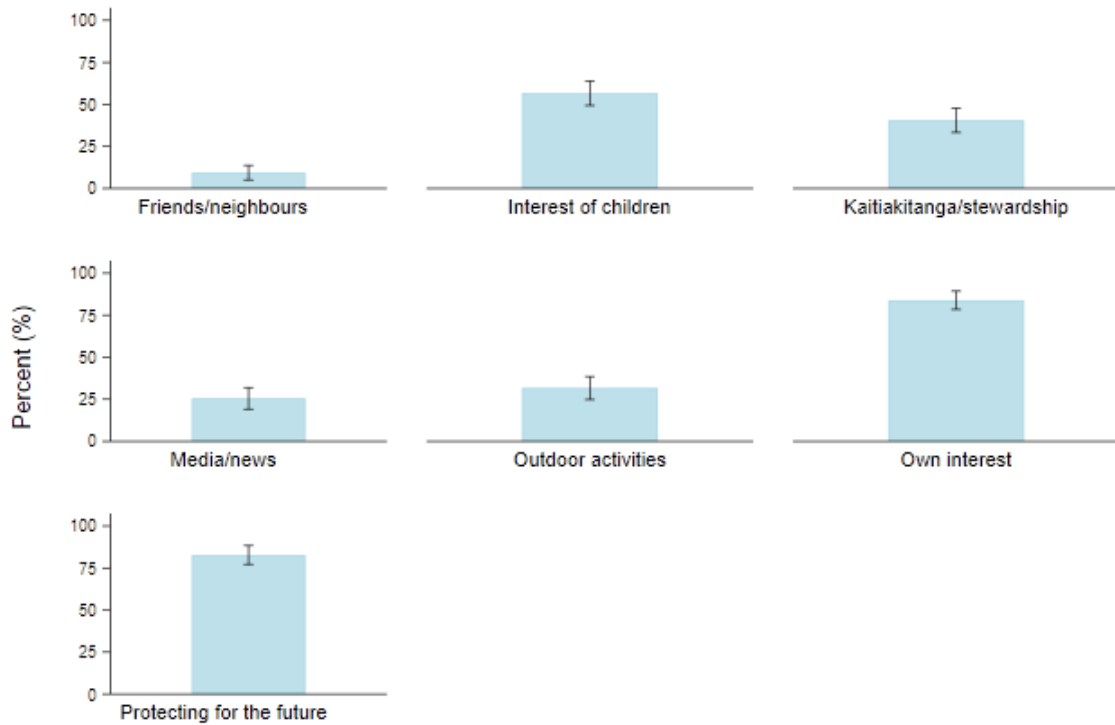


Figure 39. Main reasons respondents in 2015 and 2019 did not participate in insect spotting. Note: Error bars are 95% confidence intervals.

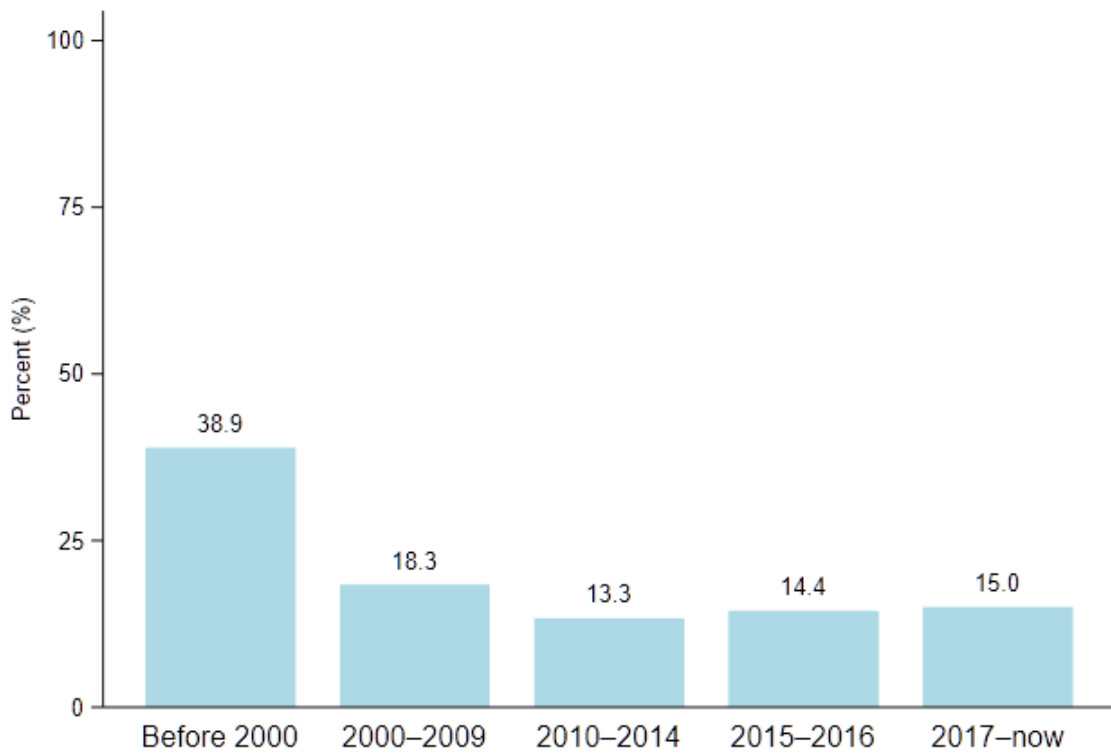
3.7.10 Sharing information about the environment with others

Of the 50.6% respondents who share/shared information about the environment with others, 75% were inside the Cape to City footprint. Respondents were primarily motivated by the interest of children (57%), their own interest (84%) and/or a desire to protect resources for the future (83%). Respondents were also motivated by kaitiakitanga/stewardship (40.6%), outdoor activities (32%), the media/news (25.6%), and/or friends/neighbours (9.4%) (Figure 40). Most respondents had started sharing information about the environment with others since 2000 (61.4%) (Figure 41).



Among respondents who are involved with sharing information about the environment with others.
 2019 © Manaaki Whenua Landcare Research

Figure 40. Motivations for respondents in 2019 to share information about the environment with others. Note: Error bars are 95% confidence intervals.



Among respondents who are involved with sharing information about the environment with others.
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Figure 41. When did respondents in 2019 start sharing information about the environment with others?

3.8 Sources of information

Respondents in 2019 receive/received their information about biodiversity protection and habitat restoration primarily from the internet (58.6%), schools (46%), word of mouth (42.4%), print media (38%), and/or HBRC (37.1%) (Figure 42). A higher proportion of respondents inside the footprint receive/received their information from newspapers, HBRC, community groups, DOC, and/or friends than respondents outside the footprint. However, the proportion of respondents who receive/received their information about biodiversity protection and habitat restoration from any source has not changed since 2015 (Table 13, Appendix A).

Among respondents' sources of information about biodiversity protection and habitat restoration, the most trusted sources in 2019 were DOC, HBRC and schools (Figure 43). A lower proportion of respondents inside the footprint who received their information from the internet, HBRC, and/or another source trusted those sources the most compared with respondents outside the footprint. However, the proportion of respondents who trusted their source(s) of information about biodiversity protection and habitat restoration the most did not change from 2015 to 2019 (Table 14).

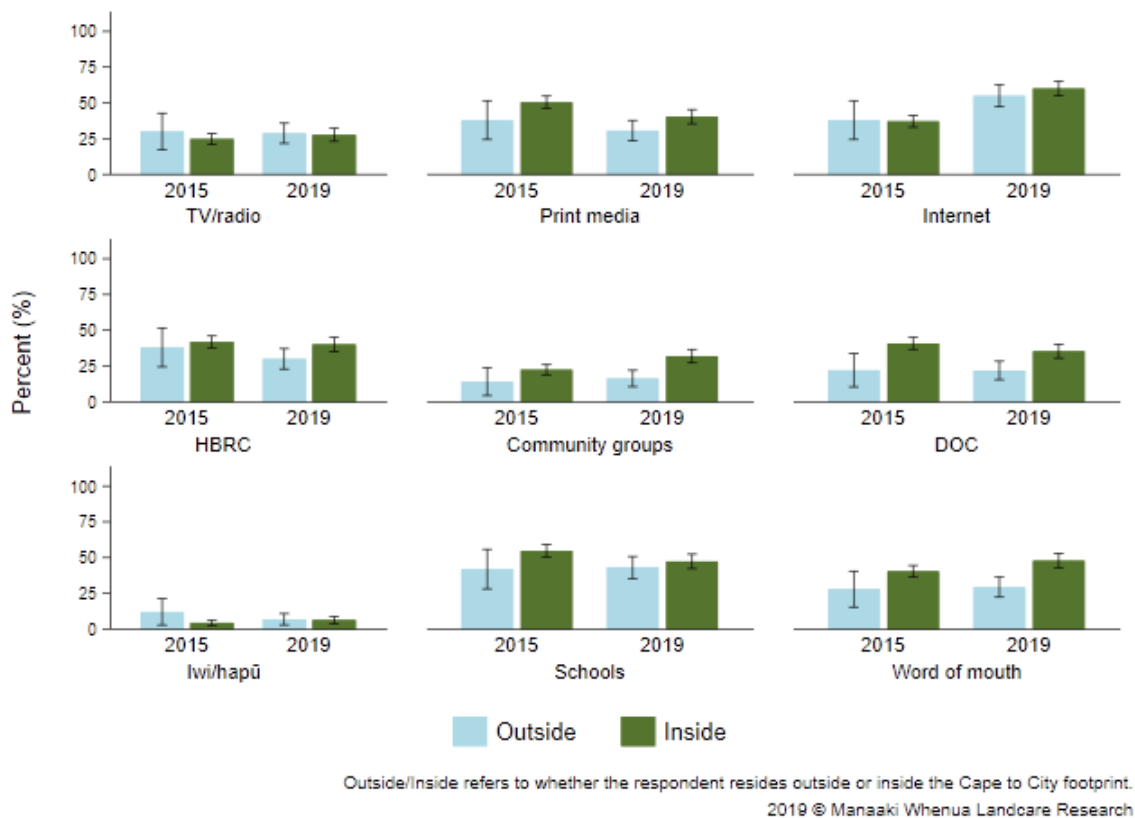
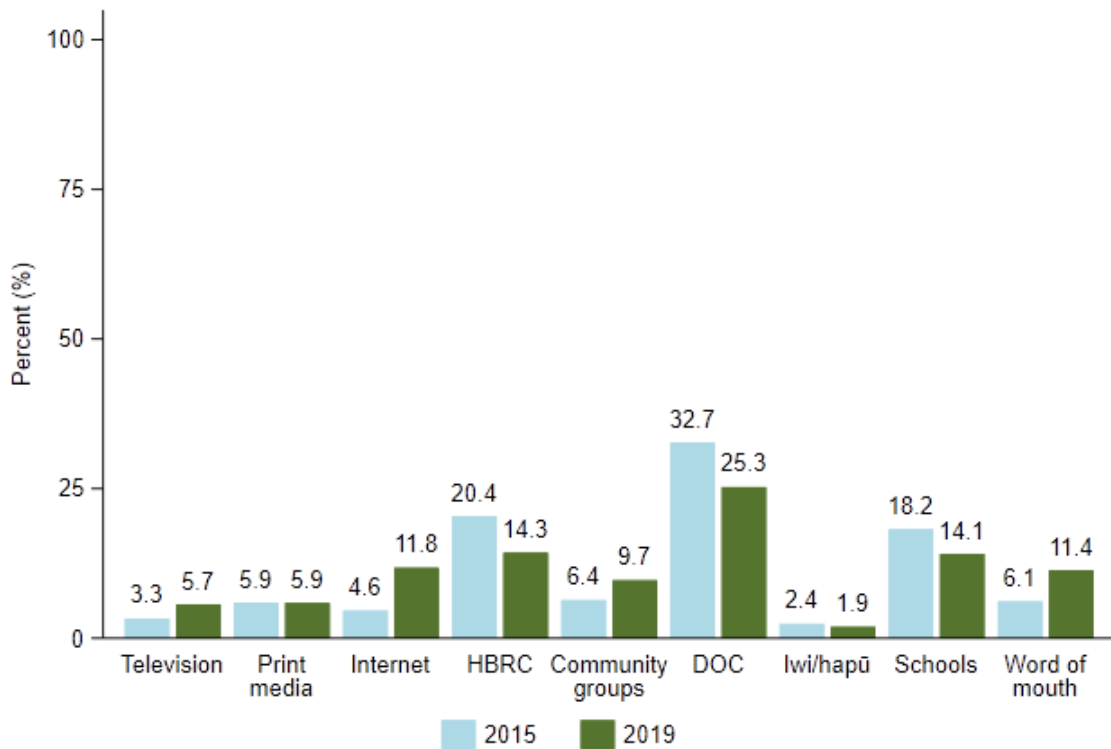


Figure 42. Sources that respondents in 2015 and 2019 used for information about biodiversity protection and habitat restoration. Note: Error bars are 95% confidence intervals.



2019 © Manaaki Whenua Landcare Research

Figure 43. Most trusted source of information about biodiversity protection and habitat restoration used by respondents in 2015 and 2019.

3.9 Sources of information about predator control programmes in Hawke’s Bay

Respondents were most familiar with the Cape to City programme (8.6%), followed by Predator Free Hawke’s Bay (6.2%), then Poutiri Ao ō Tāne (1.7%) and Whakatipu Māhia (1.3%) (Figure 44). The majority of respondents outside the footprint were ‘not at all’ familiar with any of the programmes. However, out of the four programmes, respondents outside the footprint were most familiar (i.e. somewhat familiar or very familiar) with the Predator Free Hawke’s Bay programme (35%). Most respondents inside the footprint were ‘not at all’ familiar with the Cape to City, Poutiri Ao ō Tāne, and Whakatipu Māhia programmes. Roughly one-half of the respondents inside the footprint were ‘somewhat familiar’ or ‘very familiar’ with the Predator Free Hawke’s bay programme, while 42% of respondents inside the footprint were ‘somewhat familiar’ or ‘very familiar’ with the Cape to City programme. Also, a higher proportion of respondents inside the Cape to City footprint were ‘somewhat’ or ‘very’ familiar with the Cape to City and Predator Free Hawke’s Bay programmes compared with respondents outside the footprint.

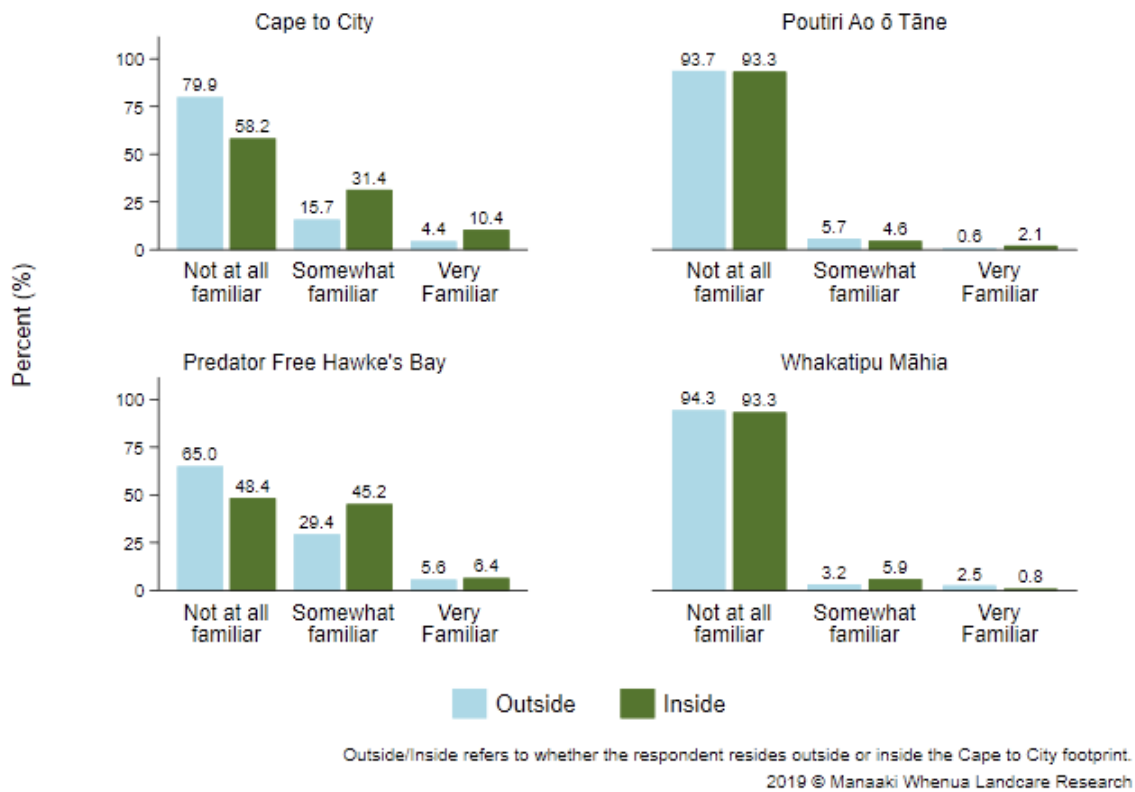


Figure 44. Familiarity with predator control programmes by respondents in 2015 and 2019.

Respondents who were somewhat or very familiar with Cape to City received their information about the programme primarily from word of mouth (45%), the internet (39.9%), HBRC (33.9%) and/or schools (32.2%) (Figure 45). Respondents also received their information about Cape to City from TV/radio (7.7%), print media (27.3%), community groups (18%), DOC (17.5%), and/or iwi/hapū (1.7%). A higher proportion of respondents inside the footprint received their information about the programme from community groups, DOC, and/or friends / word of mouth than respondents outside the footprint. A higher proportion of respondents in 2019 received their information from the internet and/or community groups, while a smaller proportion of respondents received their information from DOC and/or schools, compared with respondents in 2015 (Table 15, Appendix A).

Respondents who were somewhat or very familiar with the Poutiri Ao ō Tāne programme received their information about the programme primarily from the internet (34.4%) and/or HBRC (31.3%) (Figure 46). Respondents also received their information about Poutiri Ao ō Tāne from TV/radio (9.4%), print media (21.9%), community groups (28.1%), DOC (25%), iwi/hapū (18.8%), schools (21.9%) and/or word of mouth (28.1%). A higher proportion of respondents inside the footprint received their information about the programme from DOC than respondents outside the footprint. A higher proportion of respondents received their information from community groups compared with respondents in 2015 (Table 15), Appendix A.

Respondents who were somewhat or very familiar with Predator Free Hawke's Bay received their information about the programme primarily from the internet (42.4%), word of mouth (38.7%), HBRC (33.5%) and/or print media (30%) (Figure 47). Respondents also

received their information about Predator Free Hawke’s Bay from TV/radio (10.7%), community groups (16.9%), DOC (23.5%), iwi/hapū (1.6%), and/or schools (19.3%). Respondents who were somewhat or very familiar with Whakatipu Māhia received their information about the programme primarily from word of mouth (45.2%) and the internet (35.5%). Respondents also received their information about Whakatipu Māhia from TV/radio (3.2%), print media (22.5%), HBRC (19.4%), community groups (3.2%), DOC (22.6%), iwi/hapū (12.9%), and/or schools (6.5%) (Figure 48).

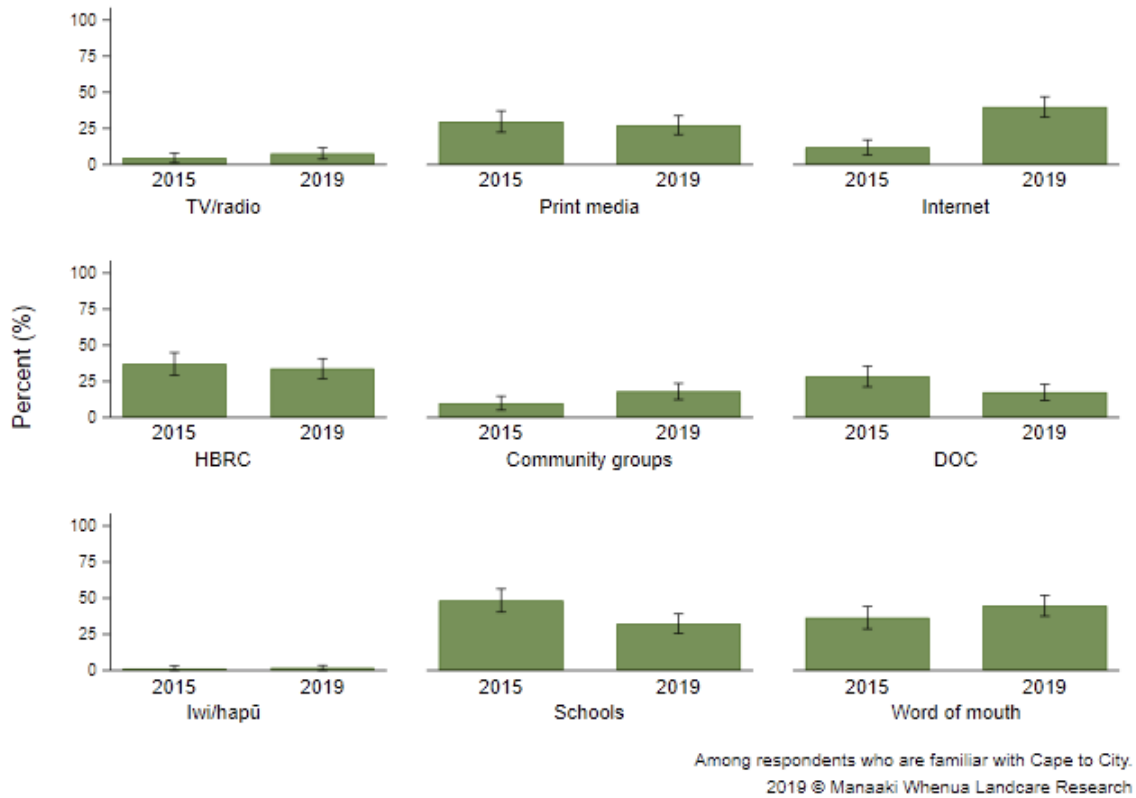


Figure 45. Sources that respondents in 2015 and 2019 used for information about the Cape to City programme. Note: Error bars are 95% confidence intervals.

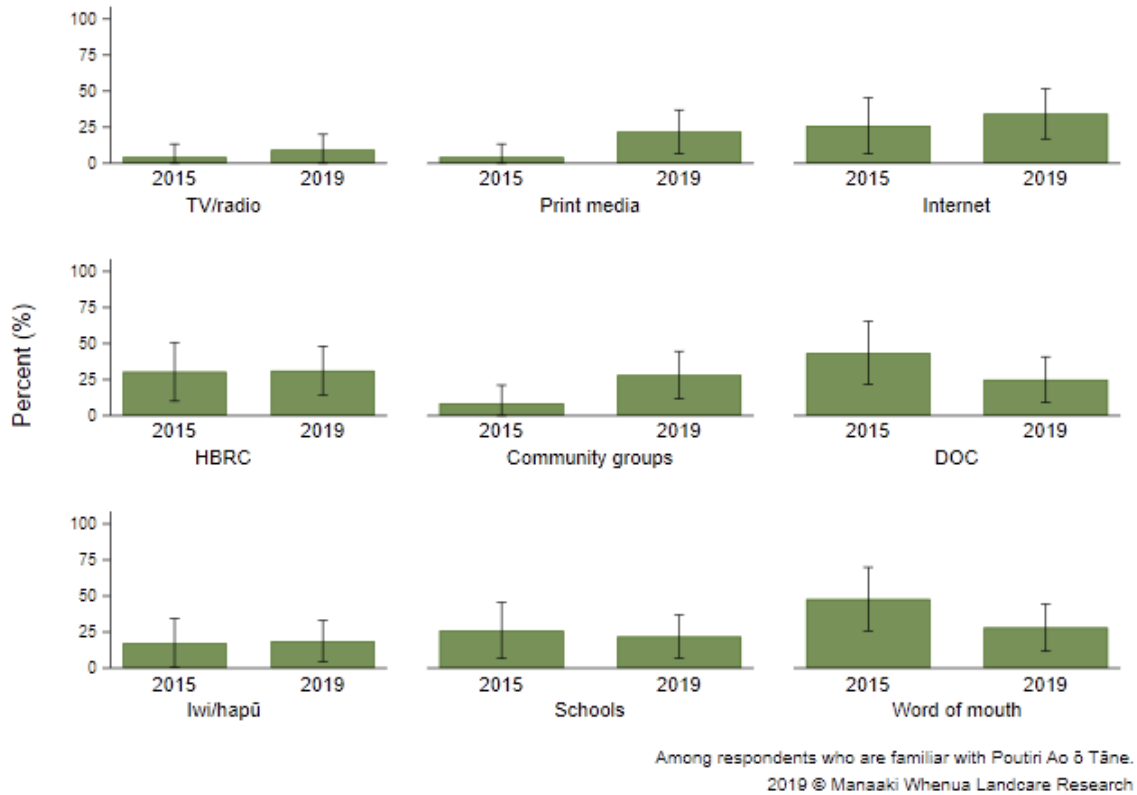


Figure 46. Sources that respondents in 2015 and 2019 used for information about the Poutiri Ao ō Tāne programme. Note: Error bars are 95% confidence intervals.

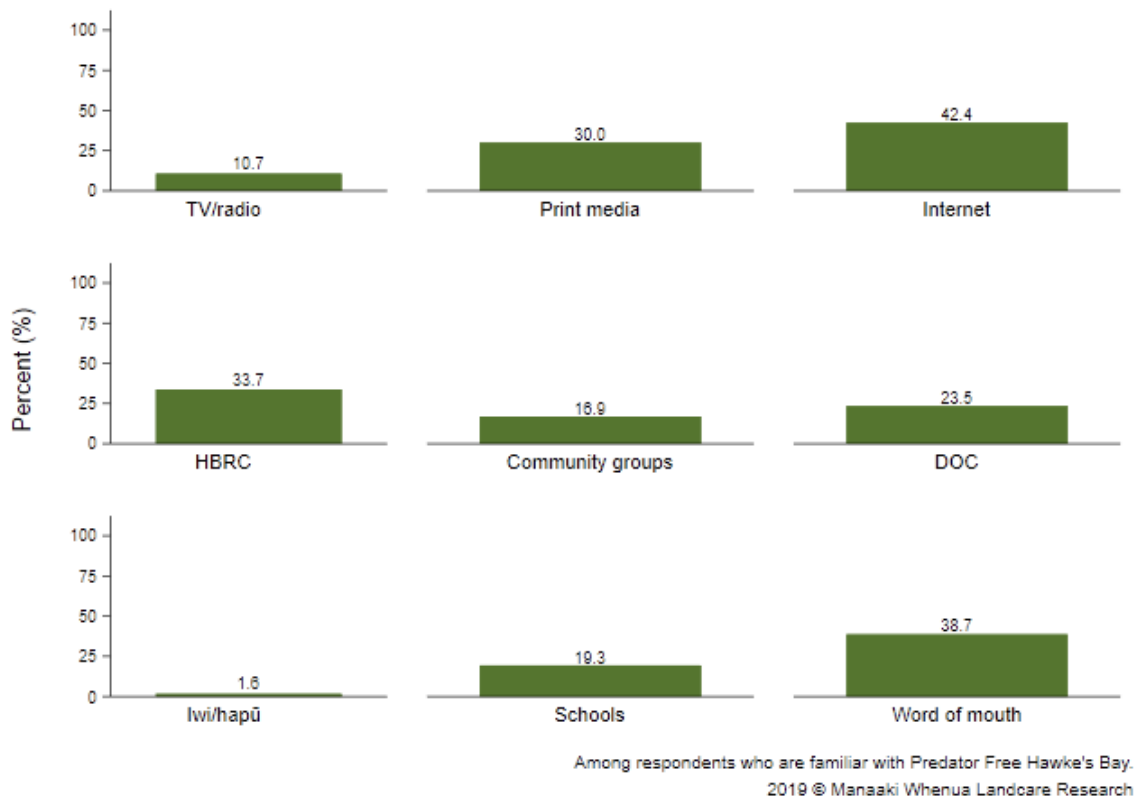


Figure 47. Sources that respondents in 2019 used for information about the Predator Free Hawke's Bay programme.

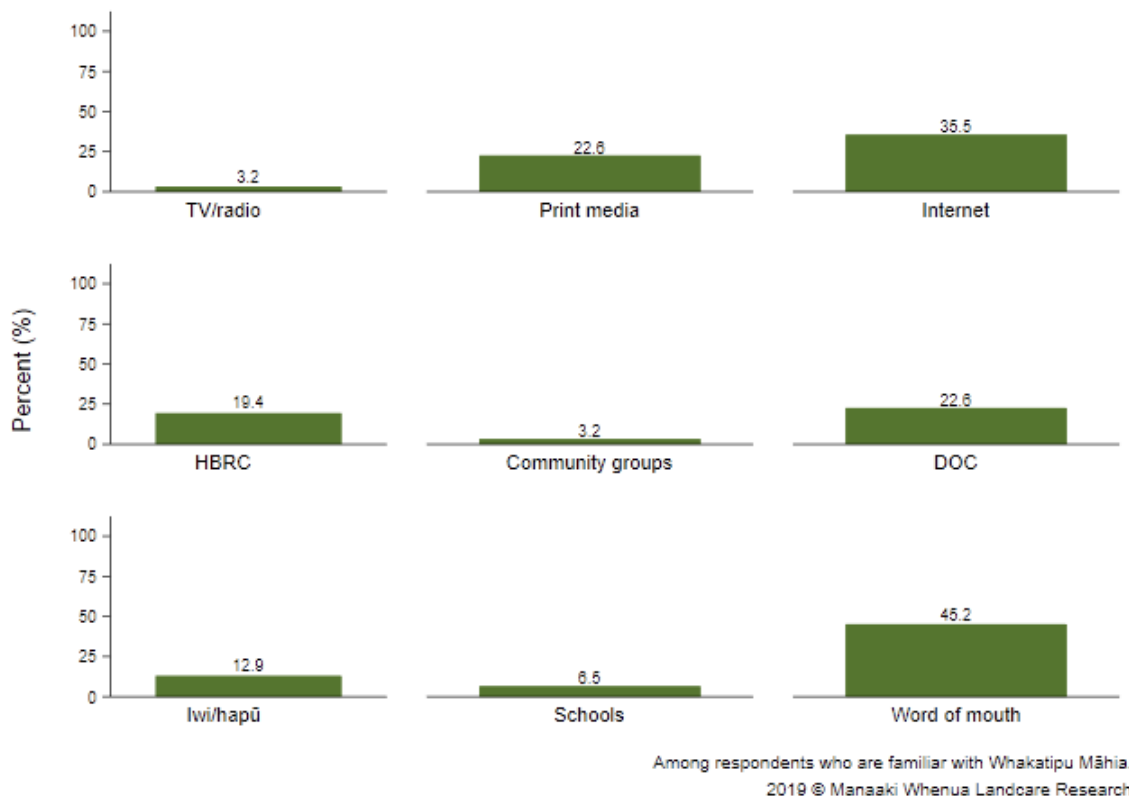


Figure 48. Sources that respondents in 2019 used for information about the Whakatipu Māhia programme.

4 Conclusion

An online survey to measure behaviours and awareness of the general public resulting from the Cape to City project in Hawke’s Bay was conducted by MWLR in late 2015 for HBRC. MWLR conducted an updated version of this survey in August 2019 for HBRC to measure changes in behaviours and awareness of the general public in relation to the Cape to City project since 2015.

Encounters with native and non-native species by respondents inside the Cape to City footprint differed from those of respondents outside the footprint. Respondents inside the footprint recalled hearing or seeing more non-native (e.g. quails, thrushes and starlings) and native (e.g. tūī, moreporks and dotterels) birds than respondents outside the footprint. However, respondents inside the footprint were also more likely to have gone bird watching over the previous 12 months (i.e. may have seen more birds because they were looking for birds) and to have been motivated to do so by a desire to protect resources for the future. This higher participation also led to an increase in the proportion of respondents who recalled hearing or seeing starlings since the 2015 survey.

There was a difference in which restored areas respondents inside the footprint visited over the previous 12 months compared with respondents outside the footprint. Respondents inside the footprint visited Pekapeka Wetlands, Karituwhenua Stream and Waitangi Regional Park more, but Ahuriri Estuary, Dolbel Reserve and Sturms Gully less

than respondents outside the footprint. One possible explanation for this difference is the distance to these areas from schools inside vs. outside the footprint (i.e. Dolbel Reserve is closer to Napier, while Karituwhenua Stream is closer to Hastings). Also, the finding that fewer respondents in 2019 visited Dolbel Reserve than in 2015 could also be partially explained by distance, as several of the other restored areas are closer to urban zones and may require less travel time.

Perceptions of the impact of pests on the environment by respondents inside the footprint also differed from the perceptions of respondents outside the footprint. A higher proportion of respondents inside the footprint believed that feral cats, mustelids, possums and rats negatively affect biodiversity than respondents outside the footprint. This is unsurprising given that a higher proportion of respondents inside the footprint were motivated to participate in pest control by kaitiakitanga/stewardship and a desire to protect resources for the future than respondents outside the footprint. However, this higher affiliation didn't translate into higher overall participation in pest control, as there was no discernible change in participation from 2015.

Participation in environmental activities differed among respondents inside vs. outside the footprint. A higher proportion of respondents inside the footprint planted native trees in the garden, attended community planting events and/or permanently protected private land compared with respondents outside the footprint. This is unsurprising given that respondents inside the footprint were more environmentally affiliated and were more motivated to participate in these activities (and a few others) by kaitiakitanga/stewardship than respondents outside the footprint. Respondents inside the footprint also shared information about the environment with others more than respondents outside the footprint and received their information about biodiversity and the Cape to City project (which defined the footprint) from friends/word of mouth more than respondents outside the footprint, suggesting emphasis on the personal connection for information sharing and gathering.

Motivation for participating in environmental activities also differed from 2015. More respondents in 2019 were motivated to participate in some environmental activities by the media/news, kaitiakitanga/stewardship, their own interest, and/or a desire to protect resources for the future. However, fewer respondents in 2019 were motivated to participate in community plantings and/or donating to environmental causes by the interest of children than in 2015. Cost continues to be a barrier for respondents to become involved with pest control, and knowledge of where to look is a barrier for respondents to get involved with insect and lizard spotting.

One possible way of increasing participation in some environmental activities is through information dispersal. In particular, while a higher proportion of respondents inside the footprint receive/received their information from newspapers, HBRC, community groups, DOC, or friends/word of mouth, trust in information from the internet, HBRC, or another source was lower compared with that of respondents outside the footprint. Also, a higher proportion of respondents in 2019 received their information about the Cape to City and the Poutiri Ao ō Tāne programmes from community groups, while a smaller proportion of respondents received their information from DOC and/or schools, compared with respondents in 2015. These findings suggest that not only do respondents inside vs.

outside the footprint receive information differently, but also that those methods are evolving over time.

5 Acknowledgements

I gratefully acknowledge Melissa Brignall-Theyer and Natalie de Burgh for help with the sample and Grant Norbury for commenting on the report. I also acknowledge the staff and parents of Haumoana School, St Matthews Primary School, Taikura Rudolf Steiner School, Te Mata School, Napier Central School, Nelson Park School, Te Awa School, Arthur Miller School and Bledisloe School for their support.

6 References

Brown P. 2015. Cape to City project community survey short report. Landcare Research. Unpublished report.

Appendix A – Difference-in-difference regression tables

Table 1. Change in proportion of respondents who recall hearing or seeing non-native bird species

Dependent variable	Inside the footprint (=1)	Respondent in 2019 (=1)	Difference-in-difference estimate	Observations	R-squared	F-statistic
Rock dove	0.023 (0.074)	-0.024 (0.080)	0.061 (0.087)	1,117	0.006	1.43
Goldfinch	0.098 (0.061)	0.043 (0.068)	-0.066 (0.075)	1,117	0.022	5.29
Thrush	0.087 (0.068)	-0.070 (0.076)	0.024 (0.081)	1,117	0.032	7.46
Chaffinch	0.11 (0.059)*	-0.045 (0.063)	-0.024 (0.070)	1,117	0.056	14.4
House sparrow	0.017 (0.053)	0.059 (0.056)	-0.0056 (0.060)	1,117	0.013	2.87
Greenfinch	0.066 (0.064)	-0.10 (0.066)	0.032 (0.073)	1,117	0.021	5.68
Starling	-0.0082 (0.071)	-0.16 (0.075)**	0.16 (0.082)**	1,117	0.058	15.6
Blackbird	-0.032 (0.052)	-0.073 (0.059)	0.080 (0.064)	1,117	0.006	1.47
Quail	0.30 (0.065)***	0.0089 (0.070)	-0.039 (0.078)	1,117	0.061	17

Notes: Regressions for each species were run separately and included variables for age and gender. Robust standard errors are reported in parentheses. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$

Table 2. Change in proportion of respondents who recall hearing or seeing native bird species

Dependent variable	Inside the footprint (=1)	Respondent in 2019 (=1)	Difference-in-difference estimate	Observations	R-squared	F-statistic
NZ robin	0.022 (0.037)	-0.0034 (0.039)	-0.014 (0.043)	1,117	0.003	0.65
Grey warbler	0.022 (0.036)	-0.011 (0.038)	0.051 (0.044)	1,117	0.015	3.23
Pāteke	0.100 (0.066)	0.044 (0.072)	-0.084 (0.079)	1,117	0.016	3.70
Fernbird	-0.015 (0.034)	-0.014 (0.037)	-0.0036 (0.039)	1,117	0.0054	0.91
Tomtit	0.020 (0.022)	0.013 (0.024)	-0.0032 (0.029)	1,117	0.0090	1.92
Silvereye	0.16 (0.066)**	0.062 (0.074)	-0.092 (0.081)	1,117	0.029	7.20
Kākāriki	-0.028 (0.041)	-0.041 (0.042)	0.064 (0.046)	1,117	0.004	1.09
Whitehead	0.018 (0.006)***	0.013 (0.0089)	-0.022 (0.011)*	1,117	0.002	2.81
Tūi	0.074 (0.056)	0.020 (0.062)	0.0054 (0.065)	1,117	0.026	5.38
Fantail	0.0099 (0.052)	0.00022 (0.057)	0.031 (0.060)	1,117	0.017	3.64
Morepork	0.21 (0.044)***	0.19 (0.052)***	-0.014 (0.062)	1,117	0.048	15.8
Dotterel	0.023 (0.046)	-0.021 (0.048)	0.079 (0.054)	1,117	0.014	3.22
Kererū	0.11 (0.073)	-0.067 (0.080)	0.13 (0.086)	1,117	0.033	7.29
Bellbird	0.10 (0.061)	-0.014 (0.066)	0.013 (0.074)	1,117	0.046	11.8
Falcon	0.099 (0.062)	0.015 (0.067)	0.062 (0.074)	1,117	0.022	5.29
Oystercatcher	-0.024 (0.054)	-0.043 (0.058)	0.092 (0.064)	1,117	0.012	2.49

Notes: Regressions for each species were run separately and included variables for age and gender. Robust standard errors are reported in parentheses. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$

Table 3. Change in proportion of respondents who recall hearing or seeing native insect and lizard species

Dependent variable	Inside the footprint (=1)	Respondent in 2019 (=1)	Difference-in-difference estimate	Observations	R-squared	F-statistic
Cave wētā	-0.011 (0.029)	-0.028 (0.029)	0.022 (0.031)	1,117	0.0050	1.07
Tree wētā	0.047 (0.049)	-0.051 (0.050)	-0.011 (0.055)	1,117	0.013	3.49
Peripatus	0.0025 (0.002)	0.00034 (0.00031)	0.00042 (0.003)	1,117	0.001	-
Common gecko	0.0013 (0.030)	-0.012 (0.031)	0.028 (0.035)	1,117	0.004	0.99
Forest gecko	-0.013 (0.021)	-0.0044 (0.022)	0.00031 (0.023)	1,117	0.012	1.08
Common skink	0.064 (0.011)***	0.038 (0.017)**	-0.044 (0.024)*	1,117	0.012	14.1
Speckled skink	0.018 (0.022)	0.023 (0.026)	-0.033 (0.029)	1,117	0.008	1.47
Wellington green gecko	0.0054 (0.005)	0.0051 (0.005)	-0.0041 (0.008)	1,117	0.0026	1.55

Notes: Regressions for each species were run separately and included variables for age and gender. Robust standard errors are reported in parentheses. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Table 4. Change in proportion of respondents who have visited restored areas within the last 12 months

Dependent variable	Inside the footprint (=1)	Respondent in 2019 (=1)	Difference-in-difference estimate	Observations	R-squared	F-statistic
Pekapeka Wetlands	0.12 (0.068)*	-0.081 (0.071)	0.031 (0.079)	1,115	0.031	8.52
Ahuriri Estuary	-0.23 (0.064)***	0.029 (0.068)	0.027 (0.076)	1,115	0.040	11.6
Roy's Hill Reserve	-0.046 (0.054)	-0.056 (0.058)	0.049 (0.061)	1,115	0.0078	1.38
Dolbel Reserve	-0.28 (0.070)***	0.27 (0.079)***	-0.20 (0.082)**	1,115	0.22	40.9
Sturms Gully	-0.21 (0.065)***	0.019 (0.073)	0.008 (0.076)	1,115	0.060	9.09
Karituwhenua Stream Reserve	0.26 (0.040)***	-0.031 (0.036)	-0.058 (0.047)	1,115	0.064	37.3

Notes: Regressions for each species were run separately and included variables for age and gender. Robust standard errors are reported in parentheses. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Table 5. Change in proportion of respondents who believe non-native mammals negatively affect biodiversity, habitat for native plants and/or farm production

Dependent variable: mammal impacts biodiversity/habitat/farm production = 1										
Non-native mammal	Biodiversity			Farm production			Native habitat			Observations
	(1) Inside (=1)	(2) 2019 (=1)	(3) D-in-D	(4) Inside (=1)	(5) 2019 (=1)	(6) D-in-D	(7) Inside (=1)	(8) 2019 (=1)	(9) D-in-D	
Possums	-0.0016 (0.070)	-0.062 (0.078)	0.13 (0.083)	0.031 (0.082)	0.034 (0.090)	-0.037 (0.097)	0.020 (0.053)	-0.027 (0.060)	-0.00084 (0.065)	958
Rats	0.021 (0.072)	-0.063 (0.080)	0.11 (0.085)	-0.037 (0.082)	-0.098 (0.090)	0.047 (0.097)	0.050 (0.074)	0.065 (0.080)	-0.091 (0.086)	919
Mustelids	-0.017 (0.074)	-0.033 (0.081)	0.11 (0.085)	-0.086 (0.10)	-0.058 (0.11)	0.051 (0.12)	-0.074 (0.075)	-0.068 (0.083)	0.059 (0.089)	786
Mice	-0.14 (0.091)	-0.13 (0.100)	0.14 (0.12)	-0.080 (0.10)	-0.21 (0.11)*	0.056 (0.10)	-0.11 (0.086)	-0.045 (0.093)	0.024 (0.11)	611
Rabbits	0.0065 (0.089)	0.0010 (0.099)	0.024 (0.11)	0.085 (0.077)	-0.014 (0.087)	0.0027 (0.092)	0.059 (0.083)	0.038 (0.092)	-0.081 (0.098)	824
Hedgehogs	0.048 (0.13)	0.072 (0.14)	0.050 (0.15)	0.021 (0.11)	0.037 (0.12)	-0.099 (0.13)	0.11 (0.13)	0.083 (0.15)	-0.12 (0.16)	326
Feral cats	- -	-0.12 (0.018)***	- -	- -	0.100 (0.075)	- -	- -	0.061 (0.087)	- -	411

Notes: Regressions for each species and impact area were run separately and included variables for age and gender. The difference-in-difference estimates are reported in columns 3, 6 and 9. Robust standard errors are reported in parentheses. Regressions for 'Feral cats' did not include the variable for respondent being inside the Cape to City footprint due to too few observations. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Table 6. Change in the extent to which respondents agree with statements on the environment

Dependent variable	Inside the footprint (=1)	Respondent in 2019 (=1)	Difference-in-difference estimate	Observations	R-squared	F-statistic
Actions I take directly affect the natural environment	0.71 (0.33)**	0.54 (0.38)	-0.0030 (0.40)	1,117	0.030	5.91
The natural environment directly affects my quality of life	0.79 (0.38)**	0.65 (0.42)	0.088 (0.44)	1,115	0.045	9.56
It is not possible to grow the economy while protecting native plants and animals	-1.37 (0.44)***	-1.28 (0.48)***	0.97 (0.50)*	1,116	0.019	3.29

Notes: Regressions for each statement were run separately and included variables for age and gender. Each statement was on a scale of 0 (strongly disagree) to 10 (strongly agree). Robust standard errors are reporting in parentheses. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Table 7. Change in proportion of respondents who believe that different groups are very or the most responsible for protecting biodiversity in Hawke's Bay

Group	Dependent variable: group is the most responsible = 1					
	Inside the footprint (=1)	Respondent in 2019 (=1)	Difference-in-difference estimate	Observations	R-squared	F-statistic
Volunteers	0.0100 (0.056)	-0.049 (0.060)	-0.033 (0.064)	1,099	0.015	3.46
Hawke's Bay Regional Council	0.078 (0.072)	-0.020 (0.078)	-0.052 (0.085)	1,098	0.0072	1.58
Individual	-0.15 (0.070)**	-0.17 (0.074)**	0.17 (0.079)**	1,098	0.0076	1.23
Iwi/hapū	-0.053 (0.061)	-0.050 (0.066)	0.051 (0.070)	1,090	0.003	0.58
Central government incl. DOC	0.093 (0.072)	-0.029 (0.079)	-0.11 (0.085)	1,098	0.022	4.99

Notes: Regressions for each group were run separately. Dependent variable was equal to 1 if respondent believed that a group was the most responsible and equal to 0 if not. Regression included variables for age and gender. Robust standard errors are reported in parentheses. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Table 8. Change in proportion of respondents who are involved with environmental activities

Dependent variable	Inside the footprint (=1)	Respondent in 2019 (=1)	Difference-in-difference estimate	Observations	R-squared	F-statistic
Bird watching	0.069 (0.065)	-0.017 (0.070)	0.043 (0.077)	1,117	0.020	4.61
Community planting	0.096 (0.058)*	-0.012 (0.062)	0.015 (0.069)	1,117	0.011	3.06
Donating to environmental causes	0.13 (0.063)**	0.051 (0.069)	-0.10 (0.076)	1,117	0.0080	1.88
Insect spotting	0.045 (0.042)	0.055 (0.048)	0.018 (0.054)	1,117	0.017	3.70
Lizard spotting	-0.044 (0.034)	-0.055 (0.034)	0.053 (0.036)	1,117	0.0070	0.90
Permanently setting aside native habitat	0.090 (0.013)***	0.040 (0.017)**	-0.0052 (0.027)	1,117	0.016	22.9
Control pests	0.086 (0.071)	-0.033 (0.076)	-0.028 (0.083)	1,117	0.026	6.26
Plant native trees in garden	0.15 (0.074)**	-0.055 (0.081)	0.033 (0.087)	1,117	0.035	8
Recycle	0.047 (0.044)	0.045 (0.046)	-0.017 (0.048)	1,117	0.008	1.61

Notes: Regressions for each activity were run separately and included variables for age and gender. Robust standard errors are reported in parentheses. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Table 9. Change in motivations for respondents to participate in environmental activities

Dependent variable: motivation for participation in environmental activity = 1									
Environmental activities	Outdoor activities: Response in 2019 (=1)	Interest of children: Response in 2019 (=1)	Media/news: Response in 2019 (=1)	Protecting for the future: Response in 2019 (=1)	Friends/ neighbours: Response in 2019 (=1)	Own interest: Response in 2019 (=1)	Kaitiakitanga/ stewardship: Response in 2019 (=1)	Provide food for birds & insects: Response in 2019 (=1)	Observations
Community planting	-0.11 (0.096)	-0.20 (0.095)**	0.098 (0.039)**	-0.051 (0.097)	0.095 (0.060)	0.084 (0.10)	0.23 (0.086)***	-	97
Permanently setting aside native habitat	-0.24 (0.086)***	-0.22 (0.086)**	0.041 (0.046)	-0.0099 (0.060)	-0.016 (0.034)	-0.092 (0.088)	0.16 (0.073)**	-	153
Donating to environmental causes	-0.16 (0.13)	-0.29 (0.16)*	0.13 (0.100)	0.12 (0.15)	0.011 (0.085)	0.078 (0.15)	0.091 (0.15)	-	49
Planting natives in your garden	-0.033 (0.041)	-0.086 (0.059)	0.026 (0.018)	0.12 (0.062)*	0.030 (0.020)	0.17 (0.055)***	0.18 (0.052)***	-0.072 (0.056)	258
Recycling	-0.046 (0.044)	0.067 (0.032)**	-0.022 (0.035)	0.034 (0.031)	0.038 (0.045)	0.057 (0.040)	-0 (0)	-	468
Control pests	0.091 (0.037)**	0.073 (0.056)	0.038 (0.026)	0.024 (0.068)	0.081 (0.042)*	0.17 (0.069)**	0.12 (0.049)**	-	267
Bird watching	-0.096 (0.094)	-0.091 (0.089)	0.042 (0.021)**	-0.16 (0.095)	-0.020 (0.041)	0.043 (0.079)	0.033 (0.073)	-	132
Insect spotting	0.11 (0.13)	-0.11 (0.11)	-0.056 (0.12)	0.25 (0.12)**	0.039 (0.029)	0.11 (0.15)	0.065 (0.12)	-	59

Notes: Regressions for each activity and motivation were run separately and included variables for age and gender. Estimate reported is the coefficient for year of response, where response in 2019 equals 1. No variable for respondents being inside the Cape to City footprint was included due to too few observations. 'Lizard spotting' was excluded because of too few observations. Robust standard errors are reported in parentheses. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Table 10. Reasons for respondents not to participate in environmental activities

Dependent variable: reason not to participate in environmental activity = 1										
Environmental activity	Not interested: Response in 2019 (=1)	Too busy: Response in 2019 (=1)	Lack of information: Response in 2019 (=1)	Not convenient: Response in 2019 (=1)	Too expensive: Response in 2019 (=1)	Transport difficult: Response in 2019 (=1)	Physical limitation: Response in 2019 (=1)	Dislike killing: Response in 2019 (=1)	Don't know where to look: Response in 2019 (=1)	Observations
Community planting	0.0037 (0.025)	0.0067 (0.057)	-0.093 (0.057)	0.020 (0.023)	-0.0034 (0.0099)	-0.0070 (0.017)	0.017 (0.033)	- -	- -	326
Planting natives in your garden	-0.020 (0.038)	-0.078 (0.077)	0.0090 (0.069)	-0.017 (0.028)	-0.027 (0.069)	- -	0.097 (0.061)	- -	- -	144
Recycling	- -	-0.69 (0.29)**	-0.24 (0.39)	-0.12 (0.29)	0.15 (0.17)	- -	- -	- -	- -	13
Control pests	-0.033 (0.040)	0.078 (0.060)	0.096 (0.065)	0.031 (0.024)	0.040 (0.011)***	0.00085 (0.014)	-0.033 (0.042)	-0.016 (0.039)	- -	399
Bird watching	-0.038 (0.066)	-0.15 (0.067)**	-0.054 (0.062)	0.0096 (0.0069)	0.0048 (0.0048)	-0.017 (0.018)	0.0016 (0.015)	- -	- -	261
Lizard spotting	0.11 (0.043)***	-0.058 (0.044)	-0.19 (0.052)***	0.0015 (0.018)	-0.0070 (0.0070)	-0.017 (0.015)	-0.0036 (0.015)	- -	0.39 (0.031)***	396
Insect spotting	0.12 (0.054)**	-0.086 (0.050)*	-0.18 (0.056)***	-0.0061 (0.013)	-0.0031 (0.0093)	0.0049 (0.0049)	-0.027 (0.016)*	- -	0.17 (0.027)***	332

Notes: Regressions for each activity and reason were run separately and included variables for age and gender. Estimate reported is the coefficient for year of response where response in 2019 equals 1. No variable for respondents being inside the Cape to City footprint was included due to too few observations. Robust standard errors are reported in parentheses. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Table 11. Change in targeting of non-native mammals for pest control

Dependent variable	Inside the footprint (=1)	Respondent in 2019 (=1)	Difference-in-difference estimate	Observations	R-squared	F-statistic
Feral cats	0.017 (0.0076)**	0.087 (0.039)**	0.026 (0.048)	453	0.066	4.84
Hedgehogs	0.048 (0.015)***	-0.0056 (0.0077)	0.0076 (0.026)	455	0.022	4.43
Mice	-0.045 (0.097)	-0.29 (0.12)**	0.13 (0.13)	455	0.046	4.01
Mustelids	0.090 (0.022)***	0.10 (0.047)**	0.0097 (0.062)	455	0.050	12.1
Possoms	0.20 (0.084)**	-0.0098 (0.092)	-0.019 (0.10)	455	0.031	4.24
Rabbits	0.19 (0.081)**	-0.068 (0.082)	-0.088 (0.092)	455	0.082	9.96
Rats	-0.15 (0.093)	0.011 (0.10)	0.18 (0.11)	455	0.073	7.16

Notes: Regressions for each species were run separately and included variables for age and gender. Robust standard errors are reported in parentheses. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Table 12. Change in where pest species are targeted.

Dependent variable	Inside the footprint (=1)	Respondent in 2019 (=1)	Difference-in-difference estimate	Observations	R-squared	F-statistic
Own property	-0.043 (0.013)***	-0.041 (0.028)	0.012 (0.037)	462	0.009	4.33
Elsewhere in Hawke's Bay	0.098 (0.062)	0.053 (0.075)	-0.068 (0.083)	462	0.019	1.49
Outside Hawke's Bay	0.052 (0.019)***	0.077 (0.036)**	-0.067 (0.044)	462	0.044	3.78

Notes: Regressions for each location were run separately and included variables for age and gender. Robust standard errors are reported in parentheses. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Table 13. Changes in sources that respondents use for information about biodiversity protection and habitat restoration

Dependent variable	Inside the footprint (=1)	Respondent in 2019 (=1)	Difference-in-difference estimate	Observations	R-squared	F-statistic
Television/radio	-0.087 (0.068)	-0.033 (0.074)	0.069 (0.080)	1,117	0.025	5.15
Newspapers/magazines	0.084 (0.071)	-0.097 (0.076)	0.0052 (0.083)	1,117	0.048	11.9
Internet/social media	-0.0016 (0.073)	0.17 (0.080)**	0.055 (0.087)	1,117	0.049	11.6
Hawke's Bay Regional Council	0.019 (0.072)	-0.094 (0.077)	0.078 (0.084)	1,117	0.018	4.37
Community groups	0.089 (0.053)*	0.026 (0.058)	0.070 (0.065)	1,117	0.020	4.68
DOC	0.17 (0.063)***	-0.012 (0.067)	-0.039 (0.075)	1,117	0.027	7.27
Iwi/hapū	-0.075 (0.047)	-0.051 (0.050)	0.069 (0.053)	1,117	0.0052	0.85
Schools	0.15 (0.075)**	0.023 (0.081)	-0.100 (0.088)	1,117	0.016	3.63
Friends/word of mouth	0.11 (0.067)*	0.0072 (0.073)	0.072 (0.080)	1,117	0.021	5.09

Notes: Regressions for each source were run separately and included variables for age and gender. Robust standard errors are reported in parentheses. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Table 14. Change in most trusted source of information about biodiversity used by respondents

Dependent variable: most trusted source = 1						
Source	Inside the footprint (=1)	Respondent in 2019 (=1)	Difference-in-difference estimate	Observations	R-squared	F-statistic
Television/ radio	-0.12 (0.11)	0.014 (0.13)	0.058 (0.14)	287	0.021	1.15
Newspapers/ magazines	0.048 (0.056)	0.12 (0.076)	-0.081 (0.083)	468	0.0069	0.70
Internet/ social media	-0.075 (0.090)	0.11 (0.10)	-0.060 (0.11)	506	0.034	2.78
Hawke's Bay Regional Council	-0.067 (0.13)	0.00013 (0.14)	-0.088 (0.15)	425	0.019	1.71
Community groups	0.080 (0.16)	0.13 (0.18)	-0.046 (0.19)	263	0.016	0.95
DOC	0.16 (0.15)	0.22 (0.17)	-0.18 (0.18)	382	0.016	1.07
Iwi/hapū	-0.21 (0.27)	-0.36 (0.28)	0.31 (0.32)	60	0.043	0.51
Schools	-0.056 (0.12)	-0.026 (0.13)	0.026 (0.13)	522	0.001	0.092
Friends/ word of mouth	-0.020 (0.097)	0.24 (0.12)**	-0.16 (0.13)	433	0.042	2.90

Notes: Regressions for each source were run separately. Dependent variable was equal to 1 if respondent trusted that source the most and equal to 0 if not. Regression included variables age and gender. Robust standard errors are reported in parentheses. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Table 15. Change in sources of information about Cape to City programme and Poutiri Ao ō Tāne programme

Dependent variable: source of information about programme = 1										
Programme	Television/ radio: Response in 2019 (=1)	Newspapers/ magazines: Response in 2019 (=1)	Internet/ social media: Response in 2019 (=1)	Hawke's Bay Regional Council: Response in 2019 (=1)	Community groups: Response in 2019 (=1)	DOC: Response in 2019 (=1)	Iwi/hapū: Response in 2019 (=1)	Schools: Response in 2019 (=1)	Friends/ word of mouth: Response in 2019 (=1)	Observations
Cape to City	0.032 (0.026)	-0.021 (0.049)	0.28 (0.045)***	-0.014 (0.052)	0.089 (0.037)**	-0.11 (0.047)**	0.0045 (0.013)	-0.17 (0.053)***	0.080 (0.054)	332
Poutiri Ao ō Tāne	0.048 (0.069)	0.17 (0.085)*	0.088 (0.12)	0.011 (0.12)	0.20 (0.097)**	-0.18 (0.13)	0.019 (0.11)	-0.028 (0.12)	-0.19 (0.13)	55

Notes: Regressions for each programme and source were run separately. Dependent variable was equal to 1 if respondent used that source for information about that programme and equal to 0 if not. Regression included variables for age and gender. Estimate reported is the coefficient for year of response where response in 2019 is equal to 1. . No variable for respondents being inside the Cape to City footprint was included due to too few observations. Robust standard errors are reported in parentheses. Stars represent significant p values of * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Appendix B – Hawke's Bay Community Survey 2019

This survey focuses on pest management and environmental restoration in the Hawke's Bay region. It is conducted by Manaaki Whenua – Landcare Research. We are a New Zealand Crown Research Institute that was established in 1992.

The survey is completely anonymous. It does not collect any identifying information about you apart from general demographic information, and you may skip any question that you do not wish to answer. [Click here to read Manaaki Whenua – Landcare Research's statement on survey privacy and ethics.](#)

The survey is designed to take 15 minutes to complete.

At the end of the survey, you can select one of nine participating schools, and a \$10 donation will be made to that school (for each of the first 1,000 responses).

A few tips:

- 1 The survey can be taken on a computer, a tablet, or a smart phone.
- 2 Please click the right arrow to move forward. If you don't see the right arrow, please scroll down.
- 3 You cannot always move backward, so please click carefully.

Participate Please click YES, take me to the survey to begin.

- YES, Take me to the survey (1)
- No, I don't want to do the survey (2)

birds Do you recall seeing or hearing any of the following non-native birds in Hawke's Bay during the past 12 months? Select all that apply.

- Pigeon/rock dove (1)
- European goldfinch (2)
- Thrush (3)
- Chaffinch (4)
- House Sparrow (5)
- Greenfinch (6)
- European starling (7)
- Blackbird (8)
- California quail (9)

birds Do you recall seeing or hearing any of the following native birds in Hawke's Bay during the past 12 months? Select all that apply.

- NZ Robin/ toutouwai (1)
- Grey warbler/ riroriro (2)
- Brown teal/ pāteke (3)
- Fernbird/ mātātā (4)
- NZ tomtit/ miromiro (5)
- Silvereye/ tauhou (6)
- Parakeet/ kākārīki (7)
- Whitehead/ pōpokote (8)
- Tui/ tūi (9)
- Fantail/ piwakawaka (10)
- Morepork/ ruru (11)
- NZ Dotterel/ tūturiwhatu (12)

- NZ wood pigeon/ kererū (13)
- Bellbird/ korimako (14)
- NZ falcon/ kārearea (15)
- Oystercatcher/ torepango (16)

Insect/lizard Do you recall seeing any of the following native insects or lizards in Hawke's Bay during the past 12 months?

- Common gecko (1)
- Cave weta (2)
- Forest gecko (3)
- Tree weta (4)
- Common skink (5)
- Speckled skink (6)
- Peripatus (7)
- Wellington green gecko (8)

pest In your opinion, do any of the following non-native mammals negatively affect biodiversity, habitat for native plants and animals, or farm production in Hawke's Bay?

- Possums (possum)
- Rats (rat)
- Weasels, ferrets, stoats (mustelid)
- Mice (mouse)
- Rabbits, hares (rabbit)
- Hedgehogs (hedgehog)
- Feral cats (feral_cat)
- Other (other)

pest_other_other Please specify which non-native mammals negatively affect biodiversity, habitat for native plants and animals, or farm production in Hawke's Bay.

- _____

Q7 Do these non-native mammals negatively affect biodiversity, habitat for native plants and animals, and/or farm production? Select all that apply.

	<i>Biodiversity (biodiversity)</i>	<i>Habitat (habitat)</i>	<i>Farm production (farm_production)</i>
<i>Hedgehogs (hedgehog)</i>			
<i>Mice (mouse)</i>			
<i>Rabbits, hares (rabbit)</i>			
<i>Rats (rat)</i>			
<i>Weasels, ferrets, stoats (stoat)</i>			
<i>Possums (possum)</i>			
<i>Feral cats (feral_cat)</i>			
<i>\${q://QID5/ChoiceTextEntryValue} (other)</i>			

habitat Which of the following areas that have undergone environmental restoration have you visited at least once during the past 12 months? Select all that apply.

- Pekapeka Wetlands (1)
- Ahuriri Estuary (2)
- Roy's Hill Reserve (3)
- Dolbel Reserve (4)
- Sturms Gully (5)
- Karituwhenua Stream Reserve (6)
- Waitangi Regional Park (7)
- Other (please specify) (8) _____
- None of the above (9)

values To what extent do you agree with each of the following statements?

<i>Actions that I take directly affect the natural environment. (direct_effect_1)</i>	▼ 0 Strongly disagree (1) ... 10 Strongly agree (2)
<i>The natural environment directly affects my quality of life. (direct_effect_2)</i>	▼ 0 Strongly disagree (1) ... 10 Strongly agree (2)
<i>It is not possible to grow the economy while protecting native plants and animals. (economy)</i>	▼ 0 Strongly disagree (1) ... 10 Strongly agree (2)

responsible In your opinion, who is responsible for protecting biodiversity and restoration of habitat for native plants and animals in Hawke's Bay?

	<i>Not at all responsible (1)</i>	<i>Somewhat responsible (2)</i>	<i>Very responsible (3)</i>	<i>Most responsible (4)</i>
<i>Volunteer groups, conservation organisation (volunteers)</i>				
<i>Hawke's Bay Regional Council (hbrc)</i>				
<i>Individuals like me (individuals)</i>				
<i>Iwi/hapū (iwi)</i>				
<i>Central government (including DOC) (central)</i>				

involve With which of the following activities are you currently involved or have you been involved in the past 12 months? Select all that apply.

- Community planting days (plant_community)
- Donating to environmental causes (donate)
- Permanently setting aside land to protect native plants and animals (conserve)
- Planting native trees in your garden (plant_garden)
- Recycling (recycle)
- Pest control with bait or traps (including around your home) (control_pest)
- Bird watching (watch_birds)
- Lizard spotting (spot_lizards)
- Insect spotting (spot_insects)
- Sharing information about the environment with others (teaching)
- Other environmental activity (other)
- None of these (none)

control_pest What motivated you to become involved in pest control with bait stations or traps? Select all that apply.

- Outdoor activities (tramping, boating, hunting, etc.) (1)
- Children's interest (2)
- Media/news articles (3)
- Protecting what we have for the future (4)
- My friends and neighbours do it (5)
- Personal interest (6)
- Kaitiakitanga/stewardship (7)
- Other (please specify) (8) _____

control_pest_when When did you become involved in pest control with bait stations or traps?

- Before 2000 (1)
- 2000-2009 (2)
- 2010-2014 (3)
- 2015-2016 (4)
- 2017-now (5)

pest_control Which pest species have you targeted for control with bait stations or traps in the past 12 months? Select all that apply.

- Possums (1)
- Weasels, ferrets, stoats (2)
- Rats (3)
- Mice (4)
- Hedgehogs (5)
- Rabbits/hares (6)
- Feral cats (7)
- $\{q://QID5/ChoiceTextEntryValue\}$ (8)

control_pest_where Where have you undertaken pest control with bait stations or traps in the past 12 months? Select all that apply.

- On my own property (1)
- Elsewhere in the Hawke's Bay region (2)
- Outside Hawke's Bay (3)

control_pest_no What are the main reasons that you do not participate in pest control? Select all that apply.

- Not interested (1)
- Too busy/don't have the time (2)
- Lack of information (3)
- Too inconvenient (4)
- Too expensive (5)
- Transport is difficult (6)
- Physical limitations (7)
- Don't agree with killing animals (8)
- Other (please specify) (9) _____

plant_community What motivated you to become involved in community planting days?
Select all that apply.

- Outdoor activities (tramping, boating, hunting, etc.) (1)
- Children's interest (2)
- Media/news articles (3)
- Protecting what we have for the future (4)
- My friends and neighbours do it (5)
- Personal interest (6)
- Kaitiakitanga/stewardship (7)
- Other (please specify) (8) _____

plant_community_when When did you become involved in community planting days?

- Before 2000 (1)
- 2000-2009 (2)
- 2010-2014 (3)
- 2015-2016 (4)
- 2017-now (5)

plant_community_no What are the main reasons that you have not participated in community planting days? Select all that apply.

- Not interested (1)
- Too busy/don't have the time (2)
- Lack of information (3)
- Too inconvenient (4)
- Too expensive (5)
- Transport is difficult (6)
- Physical limitations (7)
- Other (please specify) (8) _____

plant_garden What motivated you to plant native trees in your garden? Select all that apply.

- Outdoor activities (tramping, boating, hunting, etc.) (1)
- Children's interest (2)
- Media/news articles (3)
- Protecting what we have for the future (4)
- My friends and neighbours do it (5)
- Personal interest (6)
- Kaitiakitanga/stewardship (7)
- Provide food for birds and insects (8)
- Other (please specify) (9) _____

plant_garden_when When did you begin to plant native trees in your garden?

- Before 2000 (1)
- 2000-2009 (2)
- 2010-2014 (3)
- 2015-2016 (4)
- 2017-now (5)

plant_garden_no What are the main reasons that you have not planted native trees in your garden? Select all that apply.

- Not interested (1)
- Too busy/don't have the time (2)
- Lack of information (3)
- Too inconvenient (4)
- Too expensive (5)
- Physical limitations (6)
- Other (please specify) (7) _____

recycle What motivated you to begin recycling? Select all that apply.

- Children's interest (1)
- Media/news articles (2)
- Protecting what we have for the future (3)
- My friends and neighbours do it (4)
- Personal interest (5)
- Kaitiakitanga/stewardship (6)
- Other (please specify) (7) _____

Recycle_when When did you begin recycling?

- Before 2000 (1)
- 2000-2009 (2)
- 2010-2014 (3)
- 2015-2016 (4)
- 2017-now (5)

Recycle_no What are the main reasons that you do not recycle? Select all that apply.

- Not interested (1)
- Too busy/don't have the time (2)
- Lack of information (3)
- Too inconvenient (4)
- Too expensive (5)

- Transport is difficult (6)
- Physical limitations (7)
- Other (please specify) (8) _____

Watch_birds What motivated you to become involved in bird watching? Select all that apply.

- Outdoor activities (tramping, boating, hunting, etc.) (1)
- Children's interest (2)
- Media/news articles (3)
- Protecting what we have for the future (4)
- My friends and neighbours do it (5)
- Personal interest (6)
- Kaitiakitanga/stewardship (7)
- Other (please specify) (8) _____

Watch_birds_when When did you become involved with bird watching?

- Before 2000 (1)
- 2000-2009 (2)
- 2010-2014 (3)
- 2015-2016 (4)
- 2017-now (5)

Graden_bird_survey Do you participate in the NZ Garden Bird Survey?

- Yes (1)
- No (2)
- Unsure (3)

Watch_birds_no What are the main reasons that you have not participated in bird watching? Select all that apply.

- Not interested (1)
- Too busy/don't have the time (2)
- Lack of information (3)
- Too inconvenient (4)
- Too expensive (5)
- Transport is difficult (6)
- Physical limitations (7)
- Other (please specify) (8) _____

Spot_lizards What motivated you to become involved in lizard spotting? Select all that apply.

- Outdoor activities (tramping, boating, hunting, etc.) (1)
- Children's interest (2)
- Media/news articles (3)
- Protecting what we have for the future (4)
- My friends and neighbours do it (5)
- Personal interest (6)
- Kaitiakitanga/stewardship (7)
- Other (please specify) (8) _____

Spot_lizards_when When did you become involved in lizard spotting?

- Before 2000 (1)
- 2000-2009 (2)
- 2010-2014 (3)
- 2015-2016 (4)
- 2017-now (5)

Spot_lizards_no What are the main reasons that you have not participated in lizard spotting? Select all that apply.

- Not interested (1)
- Too busy/don't have the time (2)
- Lack of information (3)
- Too inconvenient (4)
- Too expensive (5)
- Transport is difficult (6)
- Physical limitations (7)
- Don't know where to look (8)
- Other (please specify) (9) _____

Spot_insects What motivated you to become involved in insect spotting? Select all that apply.

- Outdoor activities (tramping, boating, hunting, etc.) (1)
- Children's interest (2)
- Media/news articles (3)
- Protecting what we have for the future (4)
- My friends and neighbours do it (5)
- Personal interest (6)
- Kaitiakitanga/stewardship (7)
- Other (please specify) (8) _____

Spot_insects_when When did you become involved in insect spotting?

- Before 2000 (1)
- 2000-2009 (2)
- 2010-2014 (3)
- 2015-2016 (4)
- 2017-now (5)

Spot_insects_no What are the main reasons that you have not participated in insect spotting? Select all that apply.

- Not interested (1)
- Too busy/don't have the time (2)
- Lack of information (3)
- Too inconvenient (4)
- Too expensive (5)
- Transport is difficult (6)
- Physical limitations (7)
- Don't know where to look (8)
- Other (please specify) (9) _____

donate What motivated you to donate to environmental causes? Select all that apply.

- Outdoor activities (tramping, boating, hunting, etc.) (1)
- Children's interest (2)
- Media/news articles (3)
- Protecting what we have for the future (4)
- My friends and neighbours do it (5)
- Personal interest (6)
- Kaitiakitanga/stewardship (7)
- Other (please specify) (8) _____

Donate_when When did you begin donating to environmental causes?

- Before 2000 (1)
- 2000-2009 (2)
- 2010-2014 (3)
- 2015-2016 (4)
- 2017-now (5)

conserve What motivated you to permanently set aside land for protecting native plants and animals? Select all that apply.

- Outdoor activities (tramping, boating, hunting, etc.) (1)
- Children's interest (2)
- Media/news articles (3)
- Protecting what we have for the future (4)
- My friends and neighbours do it (5)
- Personal interest (6)
- Kaitiakitanga/stewardship (7)
- Other (please specify) (8) _____

Conserve_when When did you begin to permanently set aside land for protecting native plants and animals?

- Before 2000 (1)
- 2000-2009 (2)
- 2010-2014 (3)
- 2015-2016 (4)
- 2017-now (5)

teaching What motivated you to become involved sharing information about the environment with others? Select all that apply.

- Outdoor activities (tramping, boating, hunting, etc.) (1)
- Children's interest (2)
- Media/news articles (3)
- Protecting what we have for the future (4)
- My friends and neighbours do it (5)
- Personal interest (6)
- Kaitiakitanga/stewardship (7)
- Other (please specify) (8) _____

Teaching_when When did you become involved in sharing information about the environment with others?

- Before 2000 (1)
- 2000-2009 (2)
- 2010-2014 (3)
- 2015-2016 (4)
- 2017-now (5)

Info_gen From which of the following sources of information have you learned about biodiversity protection and restoration of habitat for native plants and animals in Hawke's Bay during the past 12 months? Select all that apply.

- Television/radio (1)
- Newspapers/magazines (2)
- Internet/social media (3)
- Hawke's Bay Regional Council (4)
- Community groups (5)
- Department of Conservation - DOC (6)
- Iwi/hapū (7)
- Schools (8)
- Friends/word of mouth (9)
- Other (please specify) (10) _____
- None of the above (11)

info_trust Which one of these sources of information about biodiversity protection and restoration of habitat for native plants and animals in Hawke's Bay do you trust the most?

- Television/radio (1)
- Newspapers/magazines (2)
- Internet/social media (3)
- Hawke's Bay Regional Council (4)
- Community groups (5)
- Department of Conservation - DOC (6)
- Iwi/hapū (7)
- Schools (8)
- Friends/word of mouth (9)
- $\{q://QID39/ChoiceTextEntryValue/10\}$ (10)

familiar How familiar are you with the following programmes?

	<i>Not at all familiar (1)</i>	<i>Somewhat familiar (2)</i>	<i>Very familiar (3)</i>
<i>Cape to City (c2c)</i>			
<i>Poutiri Ao ō Tāne (poutiri)</i>			
<i>Predator Free Hawke's Bay (pfhb)</i>			
<i>Whakatipu Māhia (mahia)</i>			

info From which of the following sources of information have you learned about the following programmes? Tick all that apply.

	<i>Cape to City (c2c)</i>	<i>Poutiri Ao ō Tāne (poutiri)</i>	<i>Predator Free Hawke's Bay (pfhb)</i>	<i>Whakatipu Māhia (mahia)</i>
<i>Television/radio (1)</i>				
<i>Newspapers/magazines (2)</i>				
<i>Internet/social media (3)</i>				
<i>Hawke's Bay Regional Council (4)</i>				
<i>Community groups (5)</i>				
<i>Department of Conservation - DOC (6)</i>				
<i>Iwi/hapū (7)</i>				
<i>Schools (8)</i>				
<i>Friends/word of mouth (9)</i>				
<i>None of the above (12)</i>				

gender What is your gender?

- Male (1)
- Female (2)
- Gender diverse (3)
- Prefer not to answer (4)

age What is your age?

- Younger than 20 (1)
- 20-24 (2)
- 25-29 (3)
- 30-34 (4)
- 35-39 (5)
- 40-44 (6)
- 45-49 (7)
- 50-54 (8)
- 55-59 (9)
- 60-64 (10)
- 65-69 (11)
- 70 or older (12)
- Prefer not to answer (13)

Yrs_hb_reside How many years have you lived in Hawke's Bay?

- Less than 2 years (1)
- 3-5 years (2)
- 6-10 years (3)
- 11-15 years (4)
- 16-20 years (5)
- more than 20 years (6)

iwi1 Do you affiliate with one or more iwi/hapū?

- Yes (1)
- No (2)
- Prefer not to answer (3)

School1 We will donate \$10 to a participating school for each of the first 1000 responses that we receive. Please designate a school from the list below.

- Arthur Miller School (1)
- Bledisloe School (2)
- Haumoana School (3)
- Napier Central School (4)
- Nelson Park School (5)
- St Matthew's Primary School (6)
- Taikura Rudolf Steiner School (7)
- Te Awa School (8)
- Te Mata School (9)

Survey_comments Thank you! If you have any comments or feedback on the survey, please enter it below. Please press SUBMIT when you are finished.

- _____