

Attitudes and motivations of New Zealand conservation volunteers

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Abstract: Biodiversity conservation in Aotearoa New Zealand is of high importance, and efforts to protect vulnerable populations from decline has garnered broad public support. Conservation efforts have been further highlighted with the 2016 announcement of Predator Free 2050, a nationwide goal to eliminate key invasive mammalian predators from New Zealand by the year 2050. Hands-on labour is often needed to complete conservation initiatives, and New Zealand conservation volunteers have shown themselves to be an abundant, effective, and oft-used workforce. However, there is limited knowledge of conservation volunteers on a national scale. This exploratory research aimed to determine what motivates conservation volunteers in New Zealand, gauge their attitudes toward modern-day conservation, and summarise their demographic information. Through a nationwide survey of 986 New Zealand conservation volunteers in 2018, we found that they have a higher than median age, income, education, and are predominantly Pākehā/NZ European and likely retired. The median conservation volunteer has volunteered within 10 km of home for 10 hours a month for 6 years. The conservation and cultural context in New Zealand could be reflected in volunteer motivations and attitudes. New Zealand conservation volunteers are motivated by a feeling of responsibility, with some referencing the Māori concept of kaitiakitanga. There were elements of wanting to right past wrongs and volunteers' perceived role as stewards of their local environment. Conservation volunteers overwhelmingly agree with the stated goals of Predator Free 2050 and are in favour of current and potential future methods of pest control. They are, however, significantly less confident that Predator Free 2050 goals will be achieved. Conservation volunteers contribute to goals like Predator Free 2050 through their significant voluntary labour. We hope this research contributes to a better understanding of conservation volunteers in New Zealand and leads to strengthening the support for these volunteers and the many community groups they represent.

Keywords: attitude, conservation, motivation, New Zealand, Predator Free 2050, volunteer

Introduction

In New Zealand over 8.7 million hectares of public and private land is under legal protection of some kind in the effort to conserve biodiversity. This is nearly one-third of the total land area, with most (c. 8.5 million hectares) being managed by the Department of Conservation (DOC), and the remainder being private conservation land protected by the Queen Elizabeth II Trust or Ngā Whenua Rāhui (Ministry for the Environment 2010). However, while New Zealand boasts an impressively large conservation portfolio in terms of land area, many of its endemic plant and animal species are at risk of extinction (Department of Conservation 2017a). The level of endemism and extinction risk has contributed to New Zealand being labelled a globally significant biodiversity hotspot for conservation of species (Myers et al. 2000), and, in part, led to the ambitious conservation goal of Predator Free 2050.

Announced in 2016, Predator Free 2050 has the long-term goal of ridding New Zealand of all invasive rats (Norway rat *Rattus norvegicus*; Ship rat *Rattus rattus*; Pacific rat/kiore *Rattus exulans*), stoats (*Mustela erminea*), and Australian

brush tail possums (*Trichosurus vulpecula*) by the year 2050 as invasive mammals brought to New Zealand are the leading threat to the native biodiversity (Department of Conservation 2017b). Realising this conservation goal, as well as other, broader environmental goals, will require a dedicated national effort from many parties, among them being an army of conservation volunteers. Volunteers are the “boots on the ground” engaged in conservation activities such as habitat restoration or pest control. These volunteers are also direct links to the communities in which they live, and can be conduits through which to engage more New Zealanders in conservation issues.

There are a lack of studies detailing of the state of New Zealand conservation volunteering. Ross (2009) estimated 600 community groups working in New Zealand conservation. Most of those involved in local groups are volunteers and they play a critical role in conservation in New Zealand (Hardie-Boys 2010; Norton et al. 2016). Handford (2011) estimated that between 25 000 and 45 000 volunteers actively participate in New Zealand conservation activities (as cited in Peters et al. 2015). In their annual report, DOC quantifies the number of

workday equivalencies accrued by volunteers (Department of Conservation 2013; Department of Conservation 2019) and there is an increasing trend of workday equivalencies (Fig. 1). The return on investment from government contracts and grants has been assessed by Hardie-Boys (2010) at \$3–4 for every dollar put toward community conservation groups. Similarly, Cowie (2010) reported a 4.5-fold return on funding received by 13 coastal restoration groups in the Wellington region. Although the above figures and estimates are the most recent available, they may be too dated to accurately reflect the current state of volunteering in New Zealand conservation. Looking broadly at New Zealand environmental non-profit institutions in 2018, which would include some conservation organisations, 87% relied solely on volunteers to function (Statistics New Zealand 2020).

Conservation efforts in New Zealand such as predator trapping and habitat restoration occur across the nation and vary in scope, and increasingly volunteers are relied upon for localised conservation tasks by government agencies and conservation organisations (Peters et al. 2015). The demographics, motivations, and attitudes of New Zealand conservation volunteers are not well known, yet are important to consider if volunteers are intended to be relied upon in New Zealand's efforts to restore biodiversity, protect or enhance native habitats, and recent aspirations such as Predator Free 2050.

There have been nationwide reviews of conservation volunteer groups (e.g. Peters et al. 2015) and regional studies of the motivations of New Zealand conservation volunteers (e.g. Cowie 2010), but there are no known nationwide studies on the motivations and attitudes of conservation volunteers themselves in New Zealand. Importantly, there has been no direct study of volunteers since the introduction of the Predator Free 2050 goal. It is this gap in our understanding of conservation volunteering that this study addresses. As Ryan et al. (2001) have noted, “[Volunteers] are not free labour, but individuals who will keep coming if their needs are fulfilled.” Before we can better serve and support this group of people

who are doing valuable work for New Zealand, we need to know more about them, their needs, and their motivations. This research aims to answer three main questions: (1) who are New Zealand's conservation volunteers, (2) what motivates them to do what they do, and (3) what are their attitudes towards conservation in New Zealand and towards Predator Free 2050?

People who volunteer do so for a variety of reasons. Learning what motivates them to volunteer can help groups, organisations, and governments better assist them in their efforts. Clary et al.'s (1998) seminal research into volunteer motivations identified six factors that motivate people to volunteer, called the volunteer functions inventory (VFI). Due to its ease-of-use and verified reliability (Allison et al. 2002), VFI has become the dominant quantifying methodology in volunteer motivation studies, including in conservation settings. The six motivating factors identified by Clary et al. (1998) are:

- (1) **Values:** opportunity for individuals to express their “altruistic and humanitarian concerns for others”,
- (2) **Understanding:** opportunity to learn new things, use knowledge, or practice skills,
- (3) **Social:** concerning relationships with others,
- (4) **Career:** possibility for career-related benefits,
- (5) **Protective:** reduce guilt over being more fortunate than others,
- (6) **Enhancement:** chance for personal growth and development.

Bruyere and Rappe (2007), using a variation of the VFI, found there may be a dominant function specific to volunteers in conservation: ‘Help the environment.’ Their results corroborated with prior research by Ryan et al. (2001) who used VFI to predict volunteer commitment in environmental stewardship programs.

Locally, in both the DOC-commissioned *Survey of New Zealanders* (Ipsos 2016) and *The Public Perceptions of New Zealand's Environment* survey (Hughey et al. 2016),

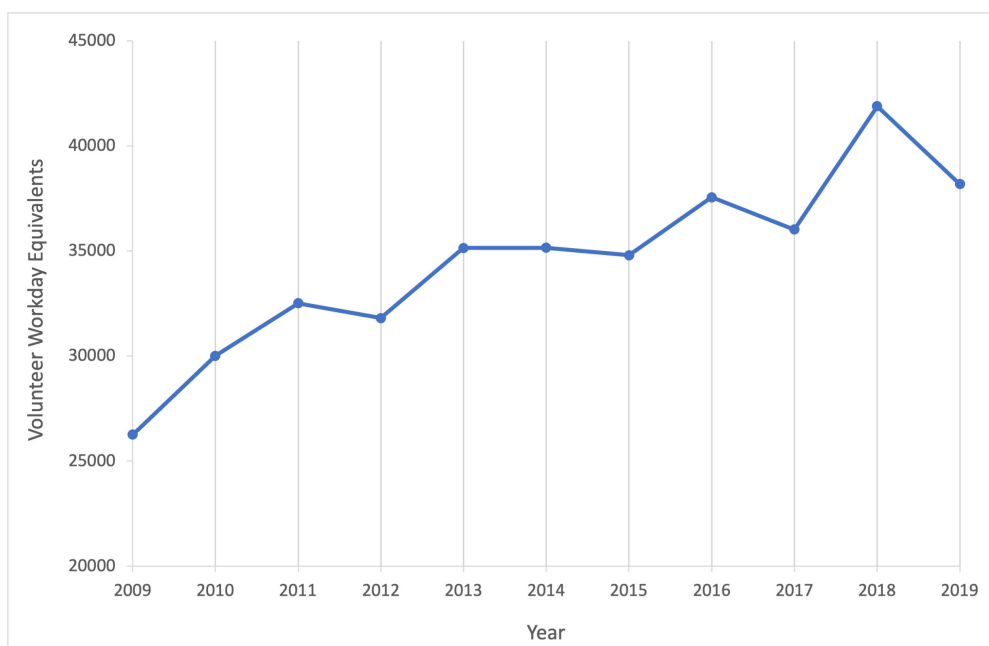


Figure 1. Yearly workday equivalents of volunteers for DOC since 2009 (Department of Conservation 2013; Department of Conservation 2019).

conservation participants were asked to choose the most important reasons or motivations for engaging in hands-on conservation. Of the 12% of respondents of the Survey of New Zealanders (approximately 495 people) who actively helped in conservation projects, most chose ‘protecting and enhancing the environment’ (80%) and ‘looking after my local area’ (72%) as key motivators (Ipsos 2016). The results of *The Public Perceptions of New Zealand’s Environment* survey align with the findings of the DOC-commissioned survey. The 13.1% of survey respondents that had ‘been an active member of a club or group that restores and/or replants natural environments’ in the past year chose ‘protect and enhance’ (76%) and ‘care for local area’ (65%) as prime reasons for involvement (Hughey et al. 2016). Cowie (2010) found the motivations of 105 ecological restoration volunteers in the Wellington region to fall into 15 environmental and social subcategories. Her findings, based on qualitative data, complement the more quantitative results of the DOC Ipsos survey and Hughey et al. (2016). This suggests conservation volunteers in New Zealand seem motivated by similar factors to conservation volunteers elsewhere in the world, though the uniqueness of New Zealand’s social and environmental landscape means there may be local differences of importance.

Methods

Data were collected via an online questionnaire drawing on a combination of existing survey instruments such as VFI as well as some open-ended questions to provide a well-rounded picture of the motivations, attitudes, and demographics of New Zealand’s conservation volunteers. Recruitment for the survey was carried out using both targeted and snowball approaches to sampling (Crabtree & Miller 1999). Volunteers were reached by emailing 758 conservation contacts listed in online volunteer directories (naturespace.org.nz and weedbusters.org.nz). These were contacts for community conservation organisations, national conservation organisations like Forest & Bird, and government conservation volunteer opportunities through DOC. Regional office contacts were emailed using staff directories for Forest & Bird (forestandbird.co.nz/volunteer) and DOC (doc.govt.nz/volunteer). Initial recruitment emails were sent on 18 June 2018, reminder emails sent on 18 July 2018, and the survey closed on 1 August 2018. Recipients of the email were encouraged to share the survey link broadly to fellow conservation volunteers. The study had 1038 complete responses of which 986 met the inclusion criteria, representing 571 conservation volunteer groups.

The online questionnaire was created and administered using Qualtrics™ (qualtrics.com). Only respondents 18 years or older were surveyed, respondents had to be volunteering in New Zealand conservation, and were not compensated for their time and labour. Respondents’ volunteering must have been associated in some way with New Zealand flora, fauna, or ecosystems. Volunteers in New Zealand zoos who dealt with exotic species, for example, were excluded from the sample. In addition, responses to the survey that indicated volunteers worked solely on conservation projects on their own land were not considered to be volunteer labour as their efforts were primarily enhancing their own property.

The survey consisted of 38 questions divided into four sections: volunteering details, motivations for volunteering, attitudes toward conservation, and demographics. Most of the questions on motivations were adapted directly from the

Bruyere and Rappe (2007) modified VFI. Slight alterations to their framework were made based on the literature. Specifically, an additional two factors were added: ‘Get outside’ and ‘community.’ ‘Get outside’ was reported in 18% of open responses to the Bruyere and Rappe (2007) survey and they suggested it as an additional factor. ‘Community’ as a motivational factor in environment-based volunteering has been found both domestically and abroad and was therefore also added as a motivational factor (Asah & Blahna 2012; Cowie 2010). The question on attitudes toward conservation in New Zealand is adapted from two nationwide surveys: DOC’s annual *Survey of New Zealanders* (Ipsos 2016) and Lincoln University’s biennial *The Public Perceptions of New Zealand’s Environment* (Hughey et al. 2016). At the time of this survey, the most recent iteration of each survey was from 2016, although both surveys are based on large samples across the country and do not focus specifically on conservation volunteers. Whenever possible, questions were used verbatim to enable robust comparison (see Appendix S1 in Supplementary Materials for complete survey).

Analyses

The aims of this study are to provide a descriptive analysis of who conservation volunteers are, what motivates them, and their attitudes towards conservation. When possible, the results were compared with New Zealand Census data and other existing related studies. In a few cases, further statistical analyses using two-sided *t*-tests and Fisher’s exact tests were carried out to assess the relationship between variables. Means were calculated of the sums of numbers assigned to categorical Likert scale data, omitting “Don’t know” responses, and the means were then compared using two-sided *t*-tests. Fisher’s exact test was used to analyse proportions among binary Yes–No data. As a measure of internal consistency among the items of each motivational function in the VFI, Cronbach’s alpha was calculated. All statistical analysis was done in SPSS™ version 24. The response to open questions were analysed using grounded theory to identify common themes and sub-themes (Glaser & Strauss 1967). This systematic methodology is exploratory in nature and was chosen to code the qualitative data into emergent themes. Sub-themes were compiled manually into main themes but were noted individually for further discussion. In the case of an open response representing more than one theme, the response was coded with each theme that was present. Depending on the length of the open response, some answers were coded with as many as four individually identified themes or subthemes. Themes present in responses were also quantified and reported as percentages of the total responses.

Results

Demographics of New Zealand conservation volunteers

There were 986 complete surveys returned that met the inclusion criteria. Volunteers from age 18 through to age 88 responded to the survey; age 49 was the 25th percentile, age 60 was the 50th percentile, and age 69 was the 75th percentile. 54% identified as female and 45% as male. The largest cohort of conservation volunteers came from Wellington/Wairarapa (20.9%), followed by Auckland (14.9%), Waikato/Coromandel (12.3%), Otago (11.1%), and Bay of Plenty (10.1%). The proportions of regional responses reflect the distribution of

conservation organisations contacted, with Waikato (20.8%), Auckland (20.2%), and Wellington (15.3%) topping the list for most community conservation organisations with an online presence. Conservation volunteers predominantly live in ‘a rural area/settlement/village’ (42%), followed closely by ‘a main city’ (40%), and then by ‘a provincial town’ (18%).

An overwhelming majority identified as ‘Pākehā/NZ European’ (89.2%), followed by ‘other’ (6.3%), and by a tie between ‘Māori’ and ‘prefer not to say’ at 1.9%. Respondents originally from New Zealand comprised 72.2% and 27.0% of respondents were originally from overseas. Over half of the participants from overseas were originally from the United Kingdom (15.4%) followed by the United States of America (2.5%), Australia (1.6%), South Africa (1.4%), and Germany (1.0%).

The largest single group of respondents are retired (38.5%), followed by paid employment of 30 or more hours per week (28.2%), then those working less than 30 hours per week (16.5%), and finally those who were self-employed (5.1%) and contractors (0.8%). Most respondents hold university-level qualifications. The largest group of respondents had completed postgraduate education (31.6%) followed by Bachelor’s degree (30.0%) and non-university qualifications (26.0%). The median income range for all respondents was \$40 001–50 000, while the median income range for respondents who worked 30+ hours a week was \$70 001–100 000.

Volunteering details

Respondents had volunteered in conservation for as little as one month to as much as 60 years, with a median time volunteering of six years. On average, volunteers spent 10 hours a month volunteering, ranging from 0.5 to 200 hours. Most conservation volunteering was done locally, with a median distance travelled of 10 kilometres. Many respondents first found out about their conservation volunteering opportunity

through social interaction rather than recruitment by means of advertising: 42.2% heard about the opportunity through personal contacts, 22.4% were actively recruited by a member, and 21.0% were a founding member of the group. Respondents performed a variety of tasks as conservation volunteers, with 74.5% identifying two or more primary duties. The most cited primary task was ‘invasive mammal monitoring/control’ (59.5%), followed by ‘planting’ (49.6%), ‘invasive plant removal/control’ (46.0%), and ‘administrative or committee work’ (41.8%).

While volunteering beyond conservation was common in all cohorts, retired participants were especially likely to engage in additional volunteering outside conservation. Likewise, a larger proportion of those working less than 30 hours per week engage in volunteering activities outside of conservation. By contrast, the group of volunteers working 30+ hours were found to be significantly less likely to volunteer elsewhere than those working < 30 hours ($p = 0.001$, two-tailed Fisher’s exact test), and those retired ($p = 0.014$, two-tailed Fisher’s exact test). The groups working more than 30 hours per week and those who were retired were not significantly different from one another in terms of their volunteering outside of conservation ($p = 0.218$, two-tailed Fisher’s exact test; Fig. 2).

Motivations

Means of the Likert scale responses of the adapted VFI allowed a ranking of motivational factors. After averaging the Likert scale answers ranging from 1 (strongly unimportant) to 7 (strongly important) of each item, the items were clustered into their predetermined motivational factor and the average of the means was calculated. ‘Help the environment’ was the strongest motivation, while ‘career’ was the weakest. Means for each factor and items within each factor, as well as internal reliability scores can be found in Table 1.

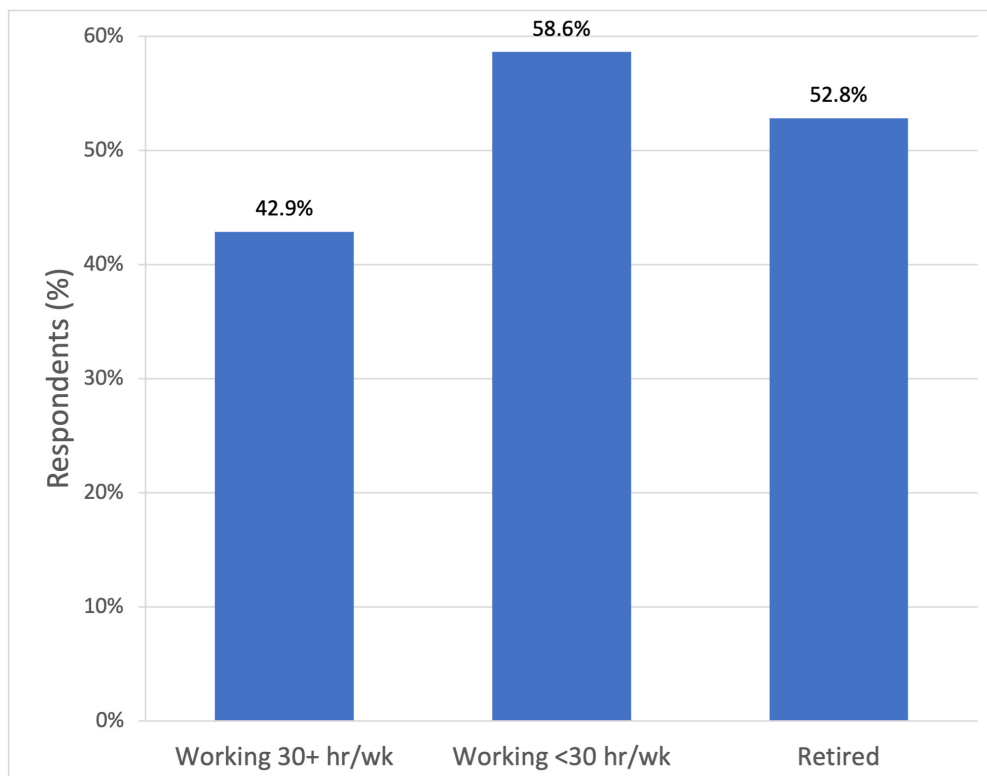


Figure 2. Proportion of respondents who volunteer for causes other than conservation depending on the amount of time they spend working.

Table 1. Motivation factors and items' mean scores (1 = strongly unimportant to 7 = strongly important) and reliability test for each factor.

Motivation Factor / Item	Factor/ Question Mean	(S.D.)	Cronbach's alpha
<i>Help the environment</i>	6.43		
Concern for the environment	6.69	0.92	
Help restore natural areas	6.61	0.99	
Help preserve natural areas for future generations	6.60	1.01	0.91
See improvements to the environment	6.45	0.99	
Do something for a cause that is important to me	6.37	1.01	
Protect natural areas from disappearing	6.48	1.06	
Ensure future of natural areas for my enjoyment	5.78	1.39	
<i>Get Outside</i>	5.73		
To be out in the fresh air	5.92	1.29	0.90
To work in the outdoors	5.76	1.28	
To get outside	5.51	1.38	
<i>Community</i>	5.57		
Give back to my community	5.87	1.40	0.76
Connect to my community	5.28	1.39	
<i>Learning</i>	5.15		
Learn about environment	5.69	1.31	0.77
Learn about specific plants	4.91	1.48	
Learn about specific animals	4.83	1.59	
<i>Values & Esteem</i>	5.06		
Feel better about myself	5.34	1.50	
Feel needed	4.09	1.73	0.64
To live closely to my values	5.91	1.24	
To express my values through my work	4.90	1.82	
<i>User</i>	5.01		
Enhance the activities I enjoy doing	5.61	1.34	0.68
Enrich my future recreational experiences	4.80	1.56	
Allow me to work at an area where I visit	4.63	1.79	
<i>Social</i>	4.81		
Work with friends	4.73	1.61	
Meet new people	4.61	1.46	0.77
Have fun	5.51	1.29	
See familiar faces	4.38	1.54	
<i>Project Organisation</i>	4.42		
Work with a good leader	4.39	1.67	0.67
Be part of a well organised project	5.33	1.36	
Know what is expected of me	3.55	1.82	
<i>Career</i>	2.51		
Make contacts that may help career	2.65	1.86	
Get a foot in the door at a place I would like to work	2.44	1.81	0.96
Help me succeed in chosen profession	2.58	1.81	
Explore possible career options	2.46	1.80	
Experience will look good on resume/C.V.	2.44	1.80	

There were 977 responses to the open question “(w)hat do you feel is the most important reason you volunteer in conservation?” Grounded theory analysis identified 13 main themes (Fig. 3). The five dominant themes and their 9 sub-themes were as follows:

Help the Environment

This theme encompassed sentiments of protecting and enhancing the plants, animals, physical environment, and the aesthetic of a certain New Zealand locale.

Responsibility

This theme is of personal responsibility to volunteer in conservation, and has four key components:

(1) Global conscience: Linking their personal actions with the health of the larger ecosystem, these volunteers feel responsible to better the world or to do their part to combat global issues like climate change.

(2) Right past wrongs: Responsibility to make up for the mistakes of those who came before them, especially with regards to invasive pest animals and plants. Possible expression of intergenerational guilt.

(3) Inadequate support: Responsibility to volunteer as a reaction to what they see as a failing of current or past governments or inaction from the rest of society. In this way, respondents seemed to use their personal actions as a way of expressing their politics.

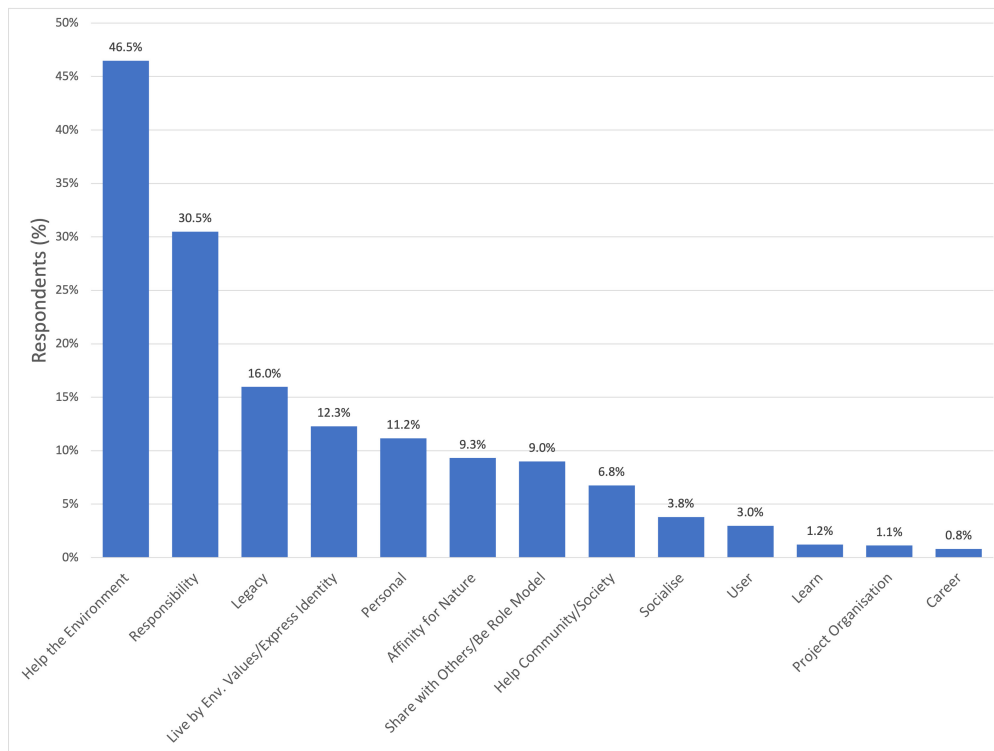


Figure 3. Motivations of respondents based on open-responses.

(4) Stewardship/kaitiakitanga: Responsibility to volunteer in conservation because they saw the environment as theirs' to look after; they reflected a protective relationship to a place. Some directly referenced the Māori concept of kaitiakitanga, or guardianship, which in this context seemed to fit closely with environmental stewardship.

Legacy

This theme encompasses a concern of the state of the natural environment left to future generations and seeing the positive results of their actions.

(1) Future generations: Volunteer for the benefit of future generations and want to leave them with a natural world as good, if not better, than what they experienced.

(2) Fruits of labour: Want to leave a positive impact on the natural world and are motivated by seeing the progress made.

Live by Environmental Values/Express Identity

Want to do something they feel is worthwhile based on their personal environmental values and build part of their personal identity around being a conservation volunteer.

Personal

Although volunteering is often seen as a selfless, altruistic activity, it in fact satisfies some personal, egotistical needs and respondents falling into this theme derive motivation from the benefits they receive.

(1) Fulfilment/satisfaction: Getting enjoyment or a feeling of contentment from volunteering in conservation.

(2) Health/fitness: Personal health and fitness benefits of volunteering in conservation.

(3) Novel experience: Being able to participate in unique experiences in special parts of the country.

The remaining six motivational themes were referred to in less than 10% of responses (Table 2).

Attitudes of New Zealand conservation volunteers

A vast majority (96%) of conservation volunteers considered conservation either 'very important' or 'extremely important' to them. New Zealand conservation volunteers are more pessimistic about the state of the country's environment than the general population as surveyed in *The Public Perceptions of New Zealanders* (Hughey et al. 2019; Fig. 4). Participants ranked the overall state of New Zealand's environment significantly worse ($t(2915) = 15.8, p < 0.0001$, two-tailed t -test). They also perceived the condition of New Zealand's environment compared to other countries to be significantly worse ($t(2781) = 10.4, p < 0.0001$, two-tailed t -test).

Pest Control

A large proportion of volunteers (88.9%) engaged in mammalian predator control in some capacity while only 11.1% did not. More specifically, 60.4% controlled mammalian pests both through their conservation volunteering and at home or elsewhere, 17.1% controlled mammal pests only during volunteering, and 11.4% only at home or elsewhere besides volunteering.

Following DOC's *Survey of New Zealanders* (Ipsos 2016), a net positive code that combined the two positive responses of "have no concerns at all about this method" and "I'm reasonably comfortable with this method as long as appropriate controls are in place" was used to compare how volunteers felt about different predator control methods. Respondents viewed 'trapping' most favourably (98.9%), followed by 'hunting' (95.3%), 'poison bait laid by hand' (91.6%), 'herbicide sprayed from ground' (78.2%), 'poison bait spread by aircraft' (74.9%), and 'herbicide sprayed from aircraft' (45.0%; Fig. 5).

In a similar question about potential future methods of pest control based on recent research (MacDonald et al. 2020), conservation volunteers viewed 'species specific toxin' most favourably (76.5%), followed by 'Trojan female' (60.1%),

Table 2. Ranked motivations that garnered less than 10% of respondents to an open-response question. Included is a brief description of the motivation.

Motivation	Description
Affinity for Nature	Love of nature
Share with Others/Be Role Model	Share knowledge, skills, expertise, or values with others. Desire to lead by example and be a conservation role model
Help Community/Society	In some way helping local community or people
Socialise	Interact with other people
User	Desire to improve areas that the volunteer uses for recreation
Learn	Desire to learn more about the natural world
Project Organisation	Opportunity to volunteer with a program that has conservation prestige or leaders with valuable expertise
Career	Hoping that the experience will lead to or assist in securing future employment

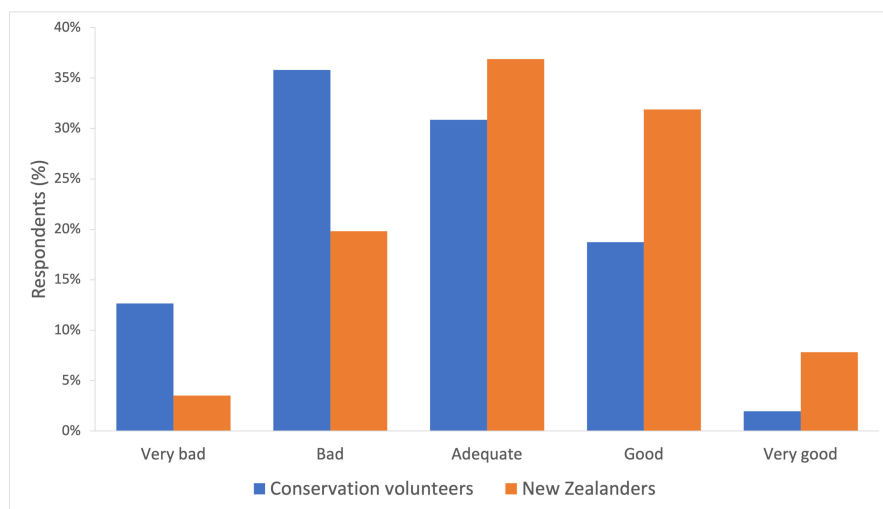


Figure 4. Comparing the responses of conservation volunteers and New Zealanders (Hughey et al. 2019) regarding the overall state of New Zealand's environment.

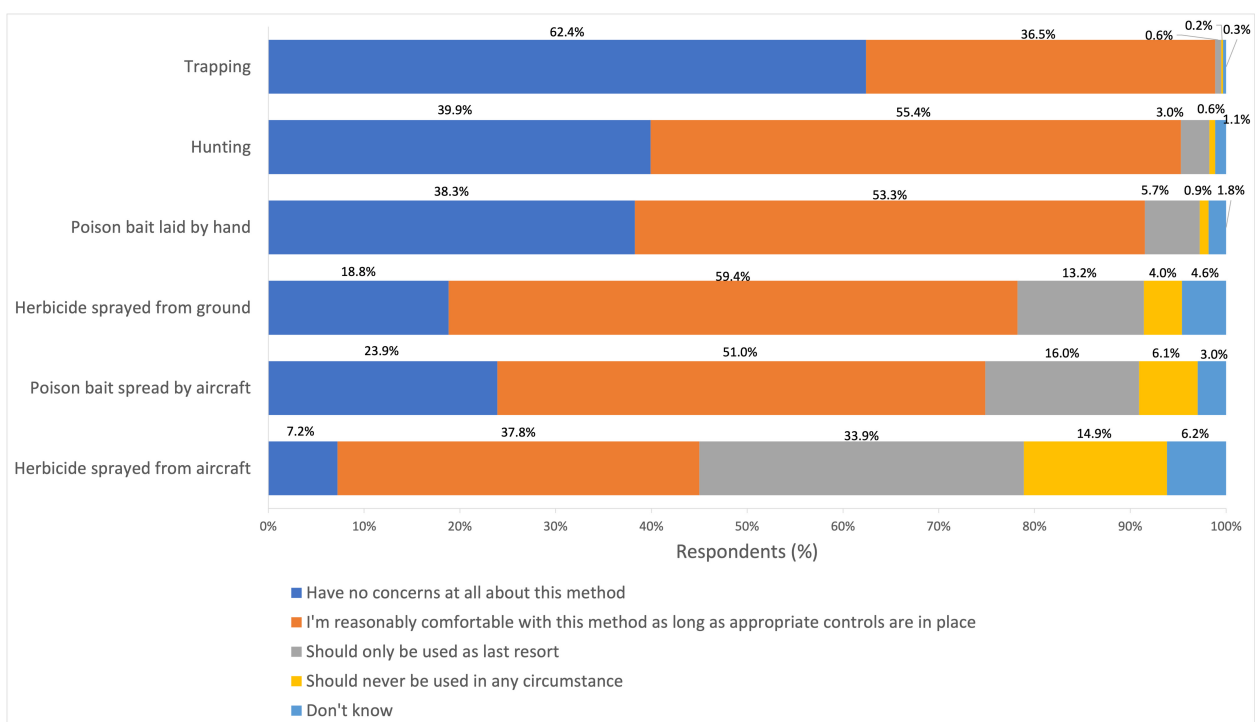


Figure 5. Level of concern among conservation volunteers about existing methods of pest control in New Zealand.

Table 3. Comparison of higher educational achievement among different age groups of all New Zealanders (Statistics New Zealand 2018b) and conservation volunteers.

Age (years)		Bachelor’s degree	Post-graduate*
30-59	New Zealanders	16.9%	13.1%
	Conservation volunteers	34.2%	36.3%
60+	New Zealanders	8.5%	6.8%
	Conservation volunteers	25.5%	28.1%

*Includes postgraduate and honours, Master’s, and Doctorate degrees

and ‘gene drive’ (59.7%). Almost a quarter of respondents had not heard of ‘Trojan female’ whereas 17.6% hadn’t heard of ‘gene drive’ and only 7.7% had not heard of ‘species-specific toxin’ (Fig. 6).

Of the 109 respondents who did not control mammalian pests at all, 38.5% were either ‘very unlikely’ or ‘unlikely’ to engage in mammalian predator control in the future compared to 37.5% who were ‘likely’ or ‘very likely.’ The main reasons offered were not having enough time or having other conservation commitments (25.3%), followed by a concern for pest welfare or a general dislike of dead animals (21.8%), not having a local opportunity to control pests (17.2%), and not believing there was a pest problem where they lived (13.8%).

Welfare concern

Respondents generally have a high level of concern about the welfare of pest animals being controlled. Over half (51.7%) were either ‘concerned’ or ‘extremely concerned’ about a pest species’ welfare, while 22.9% were ‘unconcerned’ or ‘extremely unconcerned.’ Pest animal welfare concern was not significantly different ($t(955) = 1.1, p = 0.2796$, two-tailed t -test) between volunteers engaged in predator control and

those who did not participate in predator control.

Predator Free 2050

Most respondents had heard of Predator Free 2050 (97.2%) and 92.2% either ‘somewhat agree’ or ‘strongly agree’ with the goals associated with the policy. Meanwhile, 54.3% of respondents either somewhat or strongly agreed with the statement ‘I am confident that the Predator Free 2050 goals will be reached.’ The level of agreement differs significantly between the two statements ($t(1917) = 27.8, p < 0.0001$, two-tailed t -test), so while a majority of volunteers agreed with Predator Free 2050 goals, their confidence in reaching those goals was not as strong (Fig. 7).

Discussion

Conservation Volunteer Demographics and Volunteer Details

The demographics of New Zealand conservation volunteers differ from the broader New Zealand population in some important ways. The median age of volunteers in New Zealand

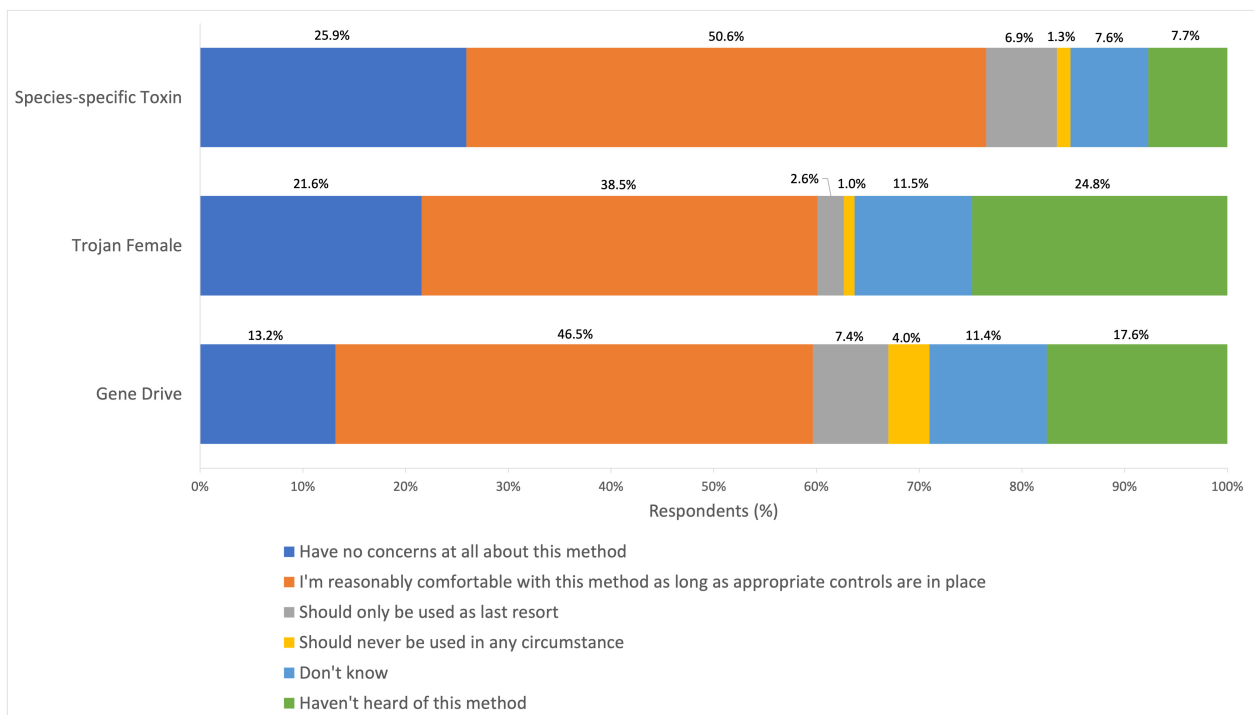


Figure 6. Level of concern among conservation volunteers about potential future methods of pest control in New Zealand.

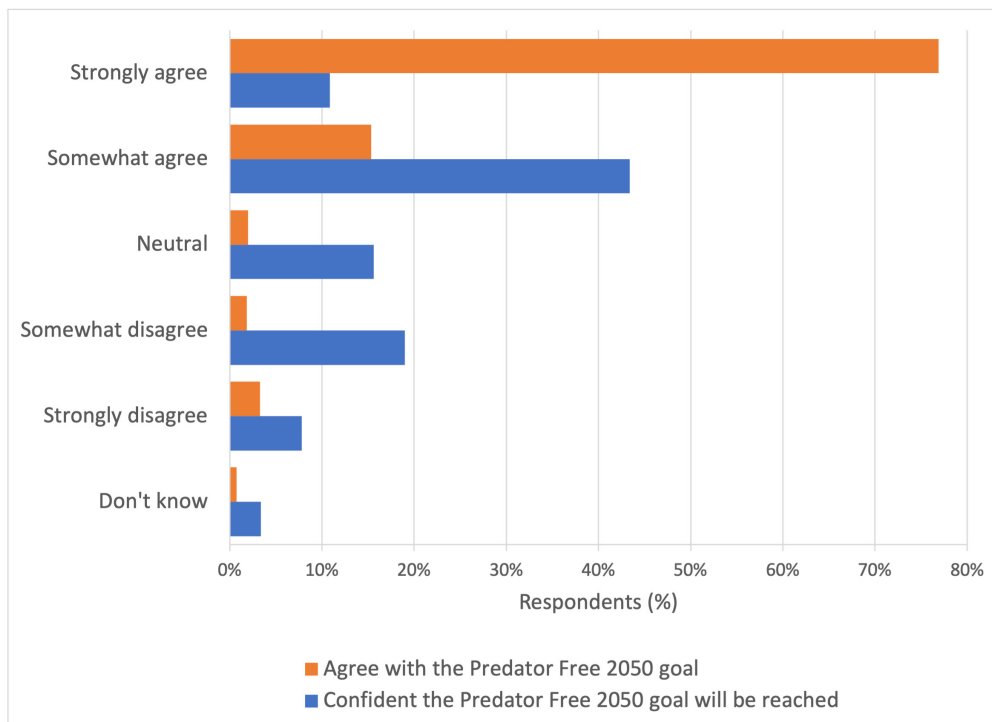


Figure 7. Comparison of New Zealand conservation volunteers' level of agreement with the Predator Free 2050 goal and their agreement with the statement 'I am confident that the Predator Free 2050 goals will be reached.'

conservation is 60 years, much older than the national median age of 37 years (Statistics New Zealand 2018a) but consistent with the median age of volunteers of 60.5 years reported by Cowie (2010). The largest proportion of respondents (42%) indicate they live rurally. This contrasts with the high urbanisation of New Zealand overall, where 86% of residents live in urban areas and the remaining 14% live rurally (Statistics New Zealand 2006).

The most recent New Zealand census data places European ethnicity representing 70.2% of the population, with Māori at 16.5%, Asian at 15.1%, Pacific at 8.1%, Middle East, Latin American, and African a combined 1.5%, and Other at 1.2% (Statistics New Zealand 2018a). Based on these survey results, Pākehā/NZ Europeans are vastly overrepresented in conservation volunteering (89.2%) and Māori, Asian, and Pacific ethnicities are vastly underrepresented. This bias was also found to be the case in the Greater Wellington region by Cowie (2010). Our survey question did not allow for reporting of multiple ethnicities, however, and this oversight and the online-only survey method may have affected results. Pākehā/NZ Europeans being overrepresented in volunteering generally has been highlighted recently in a large national survey (over 85%; Volunteering New Zealand 2020). Limited Māori representation in New Zealand conservation volunteering has been previously noted (Bell 2003). However, Māori is reported as the most likely ethnicity to engage in pro-environmental activities like restoration (Kerr et al. 2016; Hughey et al. 2019). Robinson and Williams (2001) suggested that cultural differences shape how Māori and Pākehā/NZ Europeans view volunteering. Māori might see volunteering as an act of sharing as a part of cultural obligation, whereas in European terms volunteering is typically an act of giving. This difference highlights the need to accommodate different cultural perspectives into the framework of volunteer research such as this to obtain a clearer picture of the state of New Zealand's community conservation.

National figures show 50.1% of New Zealanders work full

time, 14.7% work part time, and 31.3% are not in the labour force and either retired, stay-at-home caretakers, students, disabled, or not seeking work (Statistics New Zealand 2018a). Conservation volunteers are likely to be retired in New Zealand (38.5%), and only 28.2% fully employed. Cowie (2010) also reported that conservation volunteers were likely to be retired.

Conservation volunteers are highly educated, with 61.6% holding a bachelor's degree or higher. In comparison, only 24.8% of all New Zealanders hold a bachelor's degree or higher (Statistics New Zealand 2018a). This study also found a higher proportion of higher education than reported in a smaller study of conservation volunteers in the Wellington region (Cowie 2010). Nationally, postgraduate education amount to only 10.2% of the population, with 5.7% holding postgraduate and honours degrees, 3.7% Master's, and 0.8% Doctorate (Statistics New Zealand 2018a). Comparing age groups showed a similar trend toward higher education among conservation volunteers (Statistics New Zealand 2018b, Table 3).

Conservation volunteers' median earnings are \$40 001–50 000 a year, higher than New Zealand's national median income which sits at just \$31 800 (Statistics New Zealand 2018a). Those volunteers working full time (30+ hours) reported earning \$70 001–100 000 annually, which is markedly higher than New Zealand's national median income range for fulltime workers of \$50 001–60 000 (Statistics New Zealand 2018c).

In fact, one of the few demographics where volunteers reflected the broader New Zealand population is place of birth. With 72.2% of conservation volunteers originally from New Zealand and 27.0% from overseas, these findings align well with the census data which have 27.4% of all New Zealand residents being born overseas with a high proportion coming from the United Kingdom (Statistics New Zealand 2018a).

Motivations

Results of the Likert scale VFI adapted from Bruyere & Rappe (2007) indicated that 'get outside' and 'community' motivational factors were important to New Zealand

conservation volunteers, garnering the 2nd and 3rd highest average Likert scores respectively. These high scores reflect that both motivational factors have strong resonance with conservation volunteers and should be applied in any future VFI research in New Zealand. Overall, other motivations used in the VFI matched previous studies of similar volunteers that used this technique (Bruyere & Rappe 2007; Jacobson et al. 2012).

Open responses to the question “What do you feel is the most important reason you volunteer in conservation?” gave a deeper and more localised perspective on what motivates New Zealand conservation volunteers. This research identified similar top motivations as found in other New Zealand studies with a motivational component, with the equivalent of ‘help the environment’ and ‘community’ being the top motivators (Hughey et al. 2016; Ipsos 2016; Cowie 2010).

In the emergent theme, ‘responsibility,’ volunteers wrote of their feeling of a personal onus to help the environment. Interestingly, under the ‘responsibility’ motivation was the expressed feeling of volunteers wanting to right past wrongs. They referenced past or ongoing destruction of the natural environment by humans and sometimes referred to themselves as perpetrators but largely referred to society writ large. Within ‘righting past wrongs’ there were indications that guilt played a role in motivating individuals to volunteer in conservation. Colonialism and a sense of intergenerational guilt were cited. This perhaps best links to Clary et al.’s (1998) motivational function ‘protective,’ which reflects the desire to reduce personal guilt over being more fortunate than others. In this case, it would be the guilt over their role or their ancestors’ role in planetary degradation. Given New Zealand’s remote location, high level of endemism among flora and fauna, later arrival of humans, and colonial history, this motivation could be stronger among conservation volunteers here than elsewhere in the world. Also linked to the motivational theme of responsibility is the Māori concept of *kaitiakitanga*, as cited explicitly by some respondents. This motivation is significant to consider in the New Zealand context as it incorporates local cultural ideology and practices into conservation volunteering. This is especially interesting since Māori are underrepresented in the kind of volunteering studied in this research. At the same time, the presence of *kaitiakitanga* as a motivation also speaks to the presence of biculturalism in New Zealand. Overall, motivations under the ‘responsibility’ theme had sentiments of a holistic perspective on the environment. Contemporary problems, such as climate change, which are global in scale and have come to the forefront of environmental discourse, seem to be underpinning at least some motivations to volunteer in conservation in New Zealand.

Attitudes

The results of this survey showed that volunteers who work in conservation see conservation as more important to them than a representative sample of New Zealanders. Nearly all (96%) conservation volunteers ranked conservation as very important or extremely important to them, whereas national figures are 85% (Ipsos 2016) or 73% (Hughey et al. 2016) for their comparative top two positive categories.

Conservation volunteers who participated in this survey were more pessimistic about the state of New Zealand’s environment than a representative sample of New Zealanders (Hughey et al. 2019). They felt that the overall state of the environment was worse and that it was worse than that of other countries, which might indicate a better grasp of the severity

of the conservation crisis facing New Zealand. This grimmer outlook on the state of the country’s environment may have prompted their volunteering or, perhaps, been caused by their exposure to the negative aspects, such as invasive plants and animals, declining populations of native species, and habitat degradation, through their role as conservation volunteers in New Zealand.

Conservation volunteers viewed all methods of pest control more favourably than a representative sample of New Zealanders in the DOC Ipsos survey (2016). Most notably, 74.9% of conservation volunteers were in favour of ‘poison bait spread by aircraft,’ whereas only 34% of a representative sample of New Zealanders were in favour of this method. This highlights a great divide in perceptions of the aerial dispersal of poisons, such as sodium fluoroacetate (1080), for pest control. Russell (2016) reported that while opposition to poison use has increased over time, the aerial method of delivery can be seen as indiscriminate and may affect public support. Conservation volunteers’ responses indicate that they may see these methods of control as necessary to keep invasive species’ populations in check or perhaps see the positive results for native biodiversity first-hand. Conservation volunteers are in favour of potential future methods of pest control. The survey gave no background information or definitions for the three possible methods (species-specific toxin, Trojan female, or gene drive), so responses were not impacted by anything provided. In a similar question to a representative sample of New Zealanders, providing a short technical definition of gene drive resulted in attitude polarisation and increased concern of this potential future control technique (Macdonald et al. 2020). The extent of the volunteers’ understanding of each technique was not measured in this study and cannot be determined from their responses to this question.

Pest species welfare concern

Results of the survey revealed that conservation volunteers who controlled mammalian predators were just as concerned with the welfare of target species as those volunteers who had never participated in predator control. Despite being actively involved in trying to eradicate pests, these volunteers are concerned for the wellbeing of the target species. This suggests that they would not be content with the most expedient means to an end but instead would hold themselves to the tenants of animal ethics. Whether conservation volunteers’ welfare concern overall is consistent with that of the general population of New Zealanders is an interesting follow-up question that is unfortunately beyond the scope of this research.

Time as a limiting factor for more volunteering

Survey participants who worked fulltime (30 or more hours a week) were significantly less likely to volunteer outside of conservation. Volunteers who were either retired or working less than 30 hours a week were more likely to report that they volunteered outside of their conservation volunteering. This trend suggests that time may be the limiting factor in increased volunteering for existing volunteers.

All three working capacities considered (working 30 or more hours a week, working less than 30 hours a week, or retired) demonstrated a high proportion of volunteering outside of conservation (Fig. 2), which reinforces the theory of volunteering as fulfilling an aspect of role identity. The significant difference in the group that worked 30 or more hours in a week does show an element of time constraint. We take this finding to suggest that working 30 or more hours a

week results in those who would still identify as a volunteer needing to be more selective about their chosen volunteer activity. We postulate that these time-constrained volunteers are choosing their volunteer activity based more on their environmental values and using their valuable spare time to volunteer for a cause they care most strongly about. Those volunteers working less than 30 hours a week or retired are less constrained by time and are choosing additional volunteer opportunities more so because they identify as a volunteer. As stated in the literature, some volunteers report identifying as a volunteer and this becomes a part of their self-image. It is also a motivator to maintain an outward image as a volunteer to others (Finkelstein et al. 2005).

Recruiting conservation volunteers from among the existing volunteer community might be a fruitful venture. Based on our findings, they would likely be retired or working less than full time. Their role identity as a volunteer could make it equally as likely for them to take up conservation volunteering as any other volunteering opportunity. Additional research into role identity in New Zealand conservation volunteers, as well as their willingness to continue volunteering, is recommended.

Predator Free 2050

Even if their motivation to volunteer does not stem from national conservation goals like Predator Free 2050, these conservation volunteers are deeply involved in the activities that contribute to these overarching conservation goals. There was a significant disparity between conservation volunteers' agreement with the goals laid out by Predator Free 2050 and their confidence in achieving those goals. This, combined with some insights from the open responses we received, indicates a general agreement with the vision of a Predator Free New Zealand but a real concern that either the timeline of 2050 is not feasible or eradication is not possible.

Conclusion

Our study provides a better understanding of the New Zealanders volunteering for conservation: who they are, what motivates them, and what attitudes they have toward conservation and Predator Free 2050. Our rationale is: if we learn more about these conservation volunteers, we could set them up for success which would enrich their experience as individuals, enhance their community, and increase the benefits to nature. In supporting conservation volunteers, we support the work they do as well as the spirit and community of conservation in New Zealand. Overall, volunteers play a vital role in conservation in New Zealand. They do an impressive amount of work cost-effectively. They have the potential to not only be the workforce driving New Zealand toward its conservation goals, but also the advocates for these conservation goals in their local communities.

This study offers insight into conservation volunteers in New Zealand to inform future research and practices to better serve community conservation in New Zealand. It found that volunteers here hold similar motivations to conservation volunteers abroad. Open responses shed light on more localised motivations for New Zealand volunteers, such as a sense of responsibility, including through the Māori concept of *kaitiakitanga*. This and other motivations that came through the open responses could be uniquely New Zealand motivations to volunteer in conservation.

Important findings of this research came out of questions regarding attitudes of volunteers. Conservation volunteers are significantly more pessimistic about the state of New Zealand's environment compared to New Zealanders as a whole. While conservation volunteers want to rid the country of invasive species, but they also care deeply how we go about achieving this goal. Conservation volunteers in New Zealand agree with Predator Free 2050 goals but aren't as confident in achieving those goals. Given their self-reported dedication to conservation volunteering (median 10 hours month⁻¹ over 6 years), they are heavily involved in the process to achieve any goal that may be set and want to be engaged throughout the process.

Through this research, we have found that these conservation volunteers are dedicated, passionate, and hardworking. They see the big ecological picture and want to leave Aotearoa better than how they have found it. New Zealand's natural environment and biodiversity are declining and conservation volunteers are actively working to counteract the trend. These are individuals who have come together in their local communities, often under the banner of their own organisations, to freely give their time to a cause they care deeply about in a place they love. The hope is that, with these first steps to learn more about New Zealand's conservation volunteers, future research building on what we have found can better support them in their efforts to ensure New Zealand's rich natural heritage remains a cherished part of the national identity. Specifically, we suggest research that looks at what incentivises volunteers to continue to volunteer in conservation and how the volunteering sector can better reflect the diversity of New Zealand. For larger organisations and government agencies, detailed records of volunteer numbers, their work output, and cost-savings would quantify the value conservation volunteers have to New Zealand's environment and justify future financial backing. Supporting conservation volunteers now will benefit those individuals and the nature they work to protect and improve, but also the communities they make up – now and into the future.

Author contributions

AH and FM conceptualised and designed the study. AH collected, compiled, and analysed all data. AH led the writing of the manuscript and FM reviewed and edited all drafts. AH and FM read and approved the final manuscript.

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Supplementary material

Additional supporting information may be found in the supplementary material file for this article:

Appendix S1. NZ Conservation Volunteer Survey

The New Zealand Journal of Ecology provides supporting information supplied by the authors where this may assist readers. Such materials are peer-reviewed and copy-edited but any issues relating to this information (other than missing files) should be addressed to the authors.