

# Who will be New Zealand's Community Conservationists by 2050? Using Open-Source Aggregated Data to Understand Future Community-Led Conservation

HELEN OUGH DEALY,\* MICHAEL PETTERSON†  
AND REBECCA JARVIS‡

## Abstract

Introduced mammalian predators threaten New Zealand's endemic species. Predator Free 2050 (PF2050) espouses a rat-, mustelid- and possum-free New Zealand (NZ) by 2050, achieved in part through community-led conservation (CLC). This paper examines conservation volunteer participation in New Zealand at different life stages based on national open-source demographic data and national and regional attitudinal and conservation action data. The projected data suggest an ageing, more diverse population; changing urban/rural population ratios; and increased financial debt extending to later ages, extended time in employment, and for some, work insecurity. These factors all potentially reduce future active regular conservation volunteering, thus limiting CLC group sustainability. We challenge PF2050's promotion of existing CLC to support its aims and submit, saying that to remain relevant and resilient, New Zealand's current 'hands-on' CLC group model and associated funding may need to evolve. We make suggestions to help with this policy evolution.

**Keywords:** community-led conservation, future, Predator Free 2050, PF2050, aggregated data, attitude, lifespan, resilience, demographics

---

\* Helen Ough Dealy is a community ranger at the Bay of Islands/ Pēwhairangi Office, Department of Conservation, and a doctoral candidate at Auckland University of Technology (AUT). Email/Īmēra: [words that work@xtra.co.nz](mailto:words_that_work@xtra.co.nz)

† Michael Petterson is a professor in the Department of Environmental Science, AUT.

‡ Dr Rebecca Jarvis is an environmental social scientist who is a research fellow and lecturer in the Department of Environmental Science, AUT.

## Whakarāpopotonga

E noho whakaraerae ana ngā momo taketake o Aotearoa ki ngā kaikonihī rāwaho. Ko tā te kaupapa Kaikonihī Kore 2050 (PF250) e kī taurangi ai kua kore he kiore, tētahi o te whānau tori, he paihama rānei i Aotearoa hei te tau 2050, ā, ka tutuki tērā mā te whāomoomo e arahina ana e te hapori (CLC). E mātai ana tēnei pepa i te whai wāhitanga mai o ngā kaitūao i ngā mahi whāomoomo i Aotearoa i ngā wā rerekē o te oranga, e whakamahi ana i ngā raraunga hangapori herekore me ngā raraunga mahi whāomoomo me te waiaro ā-rohe, ā-motu hoki hei puna. E matapae ana ngā raraunga i te taupori taipakeke haere, kanorau ake; ngā ōwehenga taupori tāone/taiwhenua e panoni ana; te tautoro nui ake o te noho nama ki roto i te pēperekōutanga, te wā roa atu e mahi ana te tangata, ā, mō ētahi, te pānekeneke o te mahi, tērā pea ka whakaheke i te maha o ngā mahi tūao whāomoomo ka mahia, otirā e whakatiki ana i te noho toitū tonu o te hunga CLC. E wero ana mātou i tā te PF2050 whakatairanga i ngā rōpū CLC o nāianeī ki te tautoko i ana whāinga, me te whakapuaki me kukuwha haere tonu pea te tauira rōpū CLC "mahi ā-ringa" o nāianeī o Aotearoa me ōna pūtea pātahi. E tuku huatau ana mātou hei āwhina i taua kukuwhatanga ā-kaupapahere.

**Ngā kupu matua:** whāomomo e arahina ana e te hapori; anamata; Kaikonihī Kore 2050; PF2050; raraunga whakahiato; waiaro; tauoranga; aumangea; hangapori

**N**ew Zealand is a nation of volunteers. One in two New Zealanders is involved in formal or informal non-paid work (Stats NZ, 2018b). In 2018, more than 20 per cent of the population volunteered their time, effort and skills to 115,770 voluntary and community sector organisations (Volunteering New Zealand, 2020). In the same year, New Zealanders contributed 159 million volunteer hours valued at \$4 billion, or 2.8 per cent of the national GDP (Stats NZ, 2018b; Volunteering New Zealand, 2020).

However, volunteering in New Zealand is changing. Between 2013 and 2018, volunteer numbers decreased from 1,229,054 to 1,008,000 and hours volunteered increased from 157 million to 159 million, indicating fewer people are volunteering more time (Stats NZ, 2018b). During the same period, not-for-profit employee numbers increased by 10 per cent, from 136,750 to 150,630 (Stats NZ, 2018b). While these data suggest increasing professionalisation in the voluntary sector, more than 85 per cent of not-for-profit environmental institutions, for example, remain solely reliant on

volunteers, with only 4 per cent employing six or more people (Stats NZ, 2018b).

Volunteer-involving organisations are concerned for their future. More than 35 per cent of volunteer-involving organisations responding to the annual Volunteering New Zealand (2020) survey identified the potentially negative impacts of an ageing volunteer workforce on their future operations. Other concerns included the “ongoing challenge of making the volunteering landscape more diverse and inclusive” (Volunteering New Zealand, 2020, p. 9) and the lack of younger people volunteering. Community-led conservation (CLC) biodiversity restoration groups are similarly uneasy (Peters et al., 2015). This apprehension is well-founded as New Zealand biodiversity faces a precarious present and uncertain future.

### **New Zealand’s vulnerable biodiversity**

More than 4000 of New Zealand’s critically endangered or naturally uncommon native species are threatened with extinction by introduced predators, climate change and habitat loss (Department of Conservation, 2019a, 2020b; Parliamentary Commissioner for the Environment, 2017). In response, in 2019, the New Zealand government mandated the Predator Free 2050 (PF2050) vision of a predator-free country by 2050. This vision is expected to be achieved through deliberate eradication of the common brushtail possum (*Trichosurus vulpecula*), mustelids (*Mustela ermine*, *M. nivalis*, *M. furo*), and three species of rat (*Rattus exulans*, *R. norvegicus* and *R. rattus*) (Department of Conservation, 2019b).

PF2050 has assumed that the predator-free vision will be attained, in part, through existing and future community-led conservation (Department of Conservation, 2019c). In this paper, *community-led conservation* (CLC) is defined as any community conservation project, initiative, group or trust that focuses on community actions towards predator species management and ecological restoration.

This paper considers the potential impact of a changing human population on future New Zealand CLC (Department of Conservation, 2020c). Investigating current and projected national and regional New Zealand demographic and non-demographic aggregated data sets might assist policy and investment decision-making (Cook, 2018), thus contributing to a more resilient CLC.

### **Demographic data and data sources**

Increasingly, New Zealand's CLC group efforts contribute to landscape-scale conservation (Peltzer et al., 2019; Towns et al., 2019). National and regional aggregated data set projections may suggest possible population scenarios having an impact on future conservation volunteering. Such projections could develop ways of supporting volunteering to achieve conservation outcomes, including predator control. Relevant demographic data considered in this paper include projected age and diversity profiles, environmental attitude and conservation action commitment information, employment and debt status, and urban/rural residency (Table 1). These data sources are inexpensive, accessible, transparent, utilise large sample sets and adhere to randomised survey participant sampling methodology (Johnston, 2014; O'Leary, 2017). A Google keyword search including 'world population statistics', 'New Zealand population statistics', 'Predator Free 2050', 'Department of Conservation' and 'volunteers' highlighted potential data sets. Data sources included the United Nations (UN), Stats NZ; New Zealand's Department of Conservation (DOC); Volunteering New Zealand (VNZ), and Waikato Regional Council (WRC), supported researcher credibility, data authenticity and relevance to the research questions, and information currency limitations (Johnston, 2014; O'Leary, 2017). Trends with a 95 per cent probability ("the most likely trend of population change"; United Nations, 2017) were adopted (Stats NZ, 2017a).

The identified aggregated data sets provide a snapshot in time. While these projections are updated regularly (Table 1), this paper is limited by using backwards-looking data to predict future

age-related behaviour. Such data may not, for example, reflect the impact that non-demographic factors, including pandemics or natural disasters and significant government or business decisions related to such incidents, might have on data projections. It is also important to note that between 2013 and 2018, some data sources changed; for example, the *Time Use Survey 2009/10* was used in 2013 while the *General Social Survey (GSS) 2016* supplied the 2018 data (Stats NZ, 2018b). Changes in DOC survey methodology between 2016 and 2019 also make direct comparisons between those years inadvisable (Department of Conservation, 2019d).

Table 1: Aggregated data set source, focus, sample size, representativeness and limitations

Data set name, year, focus and source, N = national R = regional	Sample size ( <i>n</i> ) I = individual H = household O = organisation	Representativeness Update frequency	Data limitations P = pre-COVID-19 M = mid-COVID-19
<i>New Zealand Census</i> (2013 and 2018) (N) (Statistics New Zealand, 2014; Stats NZ, 2020a)	2013: 4,353,198 (I) 2018: 4,699,755 (I)	All in New Zealand Five-yearly	2013: field-interviewer led 2018: self-administered (Stats NZ, 2021a)
National ethnic population projections, characteristics, 2013 (base)–2038 update. (N) (Stats NZ, 2017b)	2013: 4,442,100 (I) 2018: 4,900,600 (I)	Resident population as at 30 June of the reference year	Adjusted for undercount, residents temporarily overseas and natural increase between census and 30 June. (Stats NZ, 2020c)
<i>Time Use Survey</i> (2009/10) (N) (Stats NZ, 2011)	9159: (I)	Primary sampling unit design No update	Diary and personal questionnaire; face-to-face computer-assisted interviewing; self-administered questionnaires; 12 years and over. (P)
<i>New Zealand General Social Survey</i> (2016 and 2018) (N) (Stats NZ, 2017e, 2018a)	Approx. 12,000 (H)	15 years and over, in private dwellings in the North and South islands and Waiheke Island (Stats NZ, 2018a) Two-yearly	April–Nov 2016, Jan–April 2017: due to Kaikōura earthquake. (P)

Data set name, year, focus and source, N = national R = regional	Sample size ( <i>n</i> ) I = individual H = household O = organisation	Representativeness Update frequency	Data limitations P = pre-COVID-19 M = mid-COVID-19
<i>Te Kupenga (2018)</i> (N) (Stats NZ, 2020d)	Approx. 8500 (I)	Post-censal survey of those identifying as Māori in 2018 census 2013, 2018, next to be held in 2028	A lower proportion of Māori completed the 2018 Census, which resulted in some bias; most bias effects removed through statistical weighting. (P)
<i>Survey of New Zealanders (2016 and 2019)</i> (N) (Department of Conservation, 2016, 2019d)	2016 survey: 4131 (I) 2019 survey: 2803 (I)	Random selection from electoral roll; weighted adjusted sampling from regional council population distribution Annual	2016: online and paper-based self-completion; March–May; 18 years and over. (P) 2019: self-completed, opt-in panels; May–June; 18 years and over. (P)

Data set name, year, focus and source, N = national R = regional	Sample size ( <i>n</i> ) I = individual H = household O = organisation	Representativeness Update frequency	Data limitations P = pre-COVID-19 M = mid-COVID-19
<i>State of Volunteering 2020</i> (N) (Volunteering New Zealand, 2020)	More than 3000 (I and O)	Online survey to volunteering-involving organisations and volunteers Annual	Online; mid-Dec 2019–end Feb 2020. (P), (M)
<i>Quality of Life Survey (2016 and 2018)</i> (R) (Waikato component) (Waikato Regional Council, 2017, 2019b)	2016 survey: 1280 (I) 2018 survey: 1416 (I)	Weighted adjusted sampling of regional and city council population by distribution, population size by gender, ethnicity, and ward/local board. Two-yearly	2016: Mar–June; 18 years and over. (P) 2018: Apr–June 2018; 18 years and over. (P)
<i>Your Environment – What Matters?</i> (R) (Waikato Regional Council, 2019c)	1250 (I)	Electoral roll ( <i>n</i> = 59); online survey ( <i>n</i> = 217); intercept interviewing ( <i>n</i> = 48); telephone interviewing ( <i>n</i> = 26) Annual	March–April; reduced landline ownership; 18 years and over. (P)

*Age or stage?*

New Zealand's CLC groups and their volunteer members are active across the country (Nature Space, n.d.). However, while New Zealand has a good understanding of what constitutes current CLC (Heimann, 2019; Peters et al., 2015), future CLC is less well understood. Most present-day active conservation volunteers are 50 years old and over (Peters et al., 2015). By 2050, those volunteers still alive will be potentially less active as 'hands-on' predator controllers, cutting trap lines, setting and maintaining traps and bait stations, and laying bait. Irrespective of whether younger volunteers engage in practical biodiversity restoration volunteering, increasing age will affect their future volunteer capacity. Consequently, negative impacts on future predator control and the PF2050 biodiversity restoration vision can be anticipated.

The PF2050 strategy anticipates these life course concerns, stating that "our society is changing – we're ageing, becoming more urbanised and more culturally diverse", and acknowledging that PF2050 will need to be sufficiently socially flexible to accommodate these shifts (Department of Conservation, 2020c, p. 33). Practical solutions are needed that will determine who, other than those currently carrying out predator control, will maintain, extend and potentially deliver a predator-free New Zealand. This paper builds on future volunteering capacity concerns, framed by Norton et al. (2016) as the need for "investment in the next generations of restoration practitioners".

Volunteering appears to be a relatively stable behaviour over the life of an individual, where "the majority of those who were volunteering at the beginning did not stop, and most of those who did not volunteer initially did not start later" (Lancee & Radl, 2014, p. 833); Niebuur et al., 2018). As Volunteering New Zealand (2020) survey results indicate, 82.3 per cent of volunteers have a long-term commitment to their current volunteering role – once New Zealand

volunteers have committed to that activity, they are likely to continue, irrespective of age.

### *Conservation attitudes and volunteer motivations*

Understanding volunteer attitudes towards and motivations for the environment may suggest ways of encouraging people to volunteer (Ganzevoort & van den Born, 2020; Guiney, 2009; Kragh, 2017). New Zealanders hold predominantly positive attitudes towards the environment, rating natural scenery and the environment 9.1 out of 10, equalling attitudes towards freedom, rights and peace (Stats NZ, 2016). These findings are supported, in general, by the upward trend in personal importance of conservation reported nationally, from 68 per cent to 76 per cent between 2007 and 2019 (Department of Conservation, 2016, 2019d). More than 80 per cent of New Zealanders felt nature improved their lives personally, irrespective of where they lived (rural, 88 per cent; provincial town dwellers, 81 per cent) (Department of Conservation, 2016). Meanwhile, regional New Zealanders' pro-ecological attitudes, based on the New Ecological Paradigm Scale (Anderson, 2012), have remained high and relatively stable between 90 per cent (2000) and 87 per cent (2019) (Waikato Regional Council, 2020).

However, volunteer motivation differs with culture, age, retirement and health status (Grönlund et al., 2011; Komp et al., 2012; Sloane & Pröbstl-Haider, 2019). People volunteer for many reasons, including connecting with and helping the community, social contact, accessing novel nature-based experiences, leaving a legacy and altruism. Other motivations include developing skills, access to career opportunities and learning experiences, and gaining others' admiration (Caissie & Halpenny, 2003; Sloane & Pröbstl-Haider, 2019; Volunteering New Zealand, 2020). Further motivations among New Zealand conservation volunteers include having a volunteer role identity (Heimann, 2019), feeling connected to nature, and having a sense of community (Ough Dealy et al., 2021).

Motivations supportive of conservation do not necessarily express themselves as actions for the environment. Between 2013 and 2016, about 44 per cent of national respondents were not active in conservation (Department of Conservation, 2016); by 2019, the inactivity level had increased to 60 per cent (Department of Conservation, 2019d). In terms of hands-on biodiversity restoration activities, in particular predator control, only 1 in 4 national survey participants in 2016 was active (Department of Conservation, 2016). By 2019, the percentage of those controlling predators (not including mice at home) had continued to fall, to 14 per cent (Department of Conservation, 2019d). Regional data for 1998 and 2019 supports the national picture, with only 4–6 per cent of all age groups actively involved in predator control (Waikato Regional Council, 2019a).

The challenge for PF2050 is two-fold: first to encourage potential volunteers to channel their concern for the environment into activities supportive of a predator-free New Zealand, and then to sustain these actions long term (Department of Conservation, 2016). While current conservation volunteers somewhat or strongly agree with the concept of predator control (92.2 per cent), they are less confident (54.3 per cent) that PF2050 goals will be achieved (Heimann, 2019). Research by Dickie (2018) is more encouraging, indicating that young adults, while not directly engaged in predator control, express strong interest (79.8 per cent) in the PF2050 goal.

### *New Zealand's changing population*

New Zealand's population is ageing. By 2053, 25 per cent of the New Zealand population is projected to be 65 years or older (Stats NZ, 2020a). New Zealand's median age is also likely to trend upward, from 37 years in 2018 to 44 years in 2048 (Stats NZ, 2021b). New Zealand's ageing population and rising median age might imply a secure future for CLC as current New Zealand conservation volunteers tend to be older (Peters et al., 2015). However, the Commission for Financial Capability has recommended that the current (2021) New Zealand Superannuation (pension) age of 65

years continues through to mid-century due to “increasing numbers of New Zealanders who are vulnerable to poorer outcomes in their future retirement” (Commission for Financial Capability, 2020, p. 4). This recommendation is in line with the projected 15–29 per cent rise (by 2068) of those working beyond pension age (Stats NZ, 2017d). However, older disability-free individuals, who may be financially available and willing to volunteer, cannot be considered a homogenous group. Some may be transitioning from full-time work to part-time work to retirement (Boyd & Dixon, 2009; Choi, 2003) or exercising episodic task-specific activity (Brayley et al., 2014). In short, an extended working life may negatively affect volunteer availability and, consequently, the volunteering choices they can make (Chambré & Netting, 2018).

New Zealand age-related conservation action data is minimal (Table 1), thus potentially affecting interpretation. Despite this limitation, the data do reveal patterns: for example, ageing influencing the likelihood of volunteering, thus suggesting that conservation action modes may differ throughout the human life course (Table 2).

**Table 2: Physical and non-physical conservation actions in the previous 12 months by age group (%)**

Conservation activity	18 to 24 (%)	35 to 49 (%)	65 years or older (%)
<b>Non-physical</b>			
Expressed opinion online	24*	17	7*
Encouraged others to contribute to conservation activity, group, or issue	23*	14	12*
Sought conservation information	23*	18	15*
<b>Physical</b>			
Predator/weed control, hunting, setting traps	1	1	0
Tree/native planting	0	0	1
Nothing	42	46	49*

Note:  $n = 4073$ ; \* $p > 95\%$ .

Source: Department of Conservation (2016).

Expressing conservation actions through non-physical means, including online views, encouraging others to participate in conservation activities, and proactively seeking out conservation information, declines with age (Department of Conservation, 2016) (Table 2). This trend is unrelated to more physical actions that directly benefit the environment, such as predator control (Table 2). Volunteers of different ages may spend similar amounts of time in conservation activities (predator/weed control and tree planting) yet express their actions differently. Older volunteers tend to carry out regular localised hands-on behaviours, whereas younger volunteers concentrate more on 'virtual' activities, sharing conservation-related information, opinions and petitions online and supporting larger-scale actions through worldwide climate change protest marches (Achieve, 2018; O'Brien et al., 2018; Turns, 2020).

New Zealand's population diversity is also changing (Stats NZ, 2017c). Between 2013 and 2038, projected European New Zealander numbers are likely to increase more slowly than other ethnicities' (3,312,000 to 3,781,000). Over the same period, the Māori population is projected to increase from 692,000 to 1,059,000. Pasifika populations, including Samoan, Tongan and Fijian (Statistics New Zealand, 2015b), will also potentially increase from 344,000 to 590,000, and Asian populations, including Chinese, Indian and Korean (Statistics New Zealand, 2015a), are likely to more than double from 541,000 to 1,272,000. Thus, by 2038, those in New Zealand identifying as Asian are projected to outnumber Māori by 213,000. Regional projections are that ethnic diversity will increase faster in less-diverse regions (Cameron & Poot, 2019). We acknowledge that interactions between migrant and New Zealand-born populations, and trends exhibited by multi-ethnic populations, including age-sex profiles, inter-ethnic partnering and different fertility patterns, also exist; however, commenting on such complexity in relation to CLC volunteering is beyond the scope of the current paper.

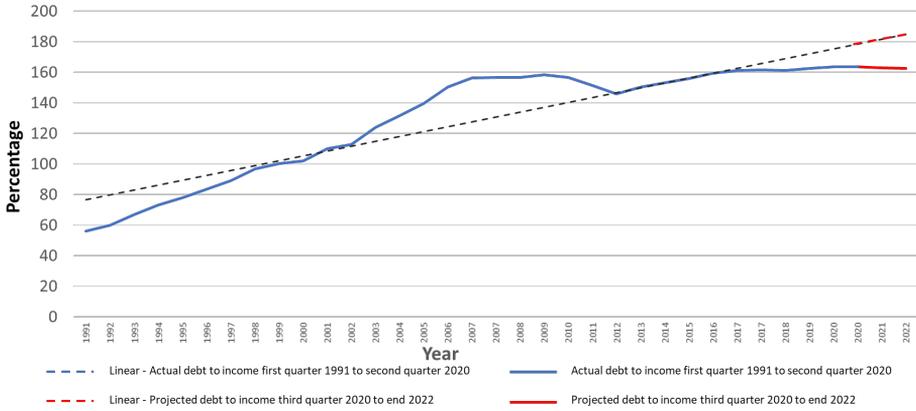
As ethnicity population numbers change, so too do their age profiles. New Zealand's current age profile reflects an older European and more youthful Māori, Pasifika and Chinese populations. By 2038, the country's projected population is likely to have increasing proportions of younger Māori, Pasifika and Chinese (as well as groups of other Asian ethnicities) (Stats NZ, 2017b). Currently, the DOC Community Fund (Department of Conservation, n.d.-b) supports Māori-led hapū/iwi and takiwā (district) conservation initiatives, as well as funding the Chinese Conservation Education Trust (Chinese Conservation Education Trust, n.d.).

### *Limiting factors, time and financial*

Volunteers may provide their time and labour for free, but there are other factors that may limit effective involvement. For example, competing vocational, social, educational and caring commitments are given as the most significant time constraints on volunteering (Volunteering New Zealand, 2020). Volunteering can also be limited by and incur personal costs including transport, training and personal protective equipment. Internationally, these financial costs have proved barriers to active conservation participation (Hansen & Slagsvold, 2020; Higgins & Shackleton, 2015; Hobbs & White, 2012).

While limited in period and not including the as-yet-unknown economic impacts of COVID-19 on household debt status, the upward trend in New Zealand's actual and projected household debt to income between 1991 and 2022 (Figure 1) suggests reduced financial capacity, which may have a negative impact on individual volunteering.

**Figure 1: New Zealand households percentage of actual debt to income 1991 to second quarter 2020 and percentage of projected debt to income from the third quarter 2020 to end 2022.**



Source: Trading Economics (2020).

Community conservation could also benefit by understanding and addressing the barriers to volunteering experienced by the *precariat*, a currently under-engaged group. In 2017, one in six New Zealanders were part of this group, experiencing persistently insecure employment or income (Dictionary.com, 2021; Groot et al., 2017; McCarthy, 2015). In 2018, 21 per cent of New Zealanders were in part-time, although not necessarily insecure, work (Rosenberg, 2018). There is some evidence that labour precarity can lead to volunteering opportunities (Sandiford & Green, 2020). However, it is unclear whether precariat members can sustain those volunteer efforts as they may also experience ‘precarity of place’ (Banki, 2013; Bates et al., 2020). Frequent location changes due to uncertain labour and accommodation opportunities may reduce commitment to long-term place-based volunteer projects. The corollary for place-based voluntary community conservation groups may be a reluctance to invest time, effort and training in those unable to settle in a community long enough to form stable volunteering relationships (Standing, 2011). As Thompson (1993) comments about firefighting volunteers, “Recent arrivals and individuals who intend to move away soon are not a fertile group to cultivate for new members, since

they generally are not willing to make the substantial commitment required for this activity” (p. 160).

CLC might learn from successful precariat groups exceptions such as student peer group volunteering (Student Volunteer Army, n.d.), expatriates experiencing shorter-term in-country placements (F. Smith, 2009), and physically distanced volunteering continuing during COVID-19 lockdown (Biddle & Gray, 2020; Tierney & Mahtani, 2020).

However, the potential impact of current events such as COVID-19 on future CLC volunteer availability is unknown. Recent Australian research (Biddle & Gray, 2020) suggests that, at least in the short term (February and April 2020), 65.9 per cent of volunteers stopped volunteering. Those over 65 years of age, the most virus-vulnerable group, were more likely to cease volunteering than other age groups. New Zealand’s CLC groups and their future efforts may be similarly affected.

### *Access to conservation projects*

By 2050, the United Nations Department of Economic and Social Affairs Population Division (2014) projects that 66 per cent of the world population will live in cities. New Zealand is ahead of this world trend, with more than 85 per cent of its population currently living in urban areas (Central Intelligence Agency, n.d.; Leeson, 2018; Stats NZ, 2017a). Between 2009 and 2019, this urban dweller percentage has been relatively stable (O’Neill, 2021). However, by 2048, about half of New Zealand’s population growth will likely be Auckland based (Stats NZ, 2021b), potentially providing urban-based conservation opportunities in this specific part of the country.

Current urban/rural CLC location data are limited. Of the 288 groups responding to the Peters et al. (2015) survey, 54 per cent self-identified as rural and 18 per cent as urban. More recent data from Nature Space, “a website for groups, individuals and landowners undertaking ecological restoration in New Zealand”, describes 14 per

cent of its groups, their administration, membership and activities as based in urban areas (Nature Space, n.d.). Of those who volunteer for the environment, rural residents (30 per cent) are more than twice as environmentally active as urban dwellers (13 per cent) (Waikato Regional Council, 2019d).

Volunteers appear more likely to volunteer for places they live near to and identify with. Willingness to volunteer thus appears to be affected by the distance volunteers travel to a conservation project. The greater the distance potential volunteers live from voluntary conservation opportunities, the fewer people will volunteer (Seymour & Haklay, 2017). The Predator Free New Zealand Trust community group location map (Figure 2) provides a visual representation of the national distribution of predator-free volunteers (Gooch, 2003; Predator Free New Zealand, n.d.).

Transportation availability and costs can also affect conservation volunteering outputs. Easier access to volunteering opportunities, for example, increases the decision to volunteer as well as the amount of time devoted to volunteering (Deri-Armstrong et al., 2016). Access to public transport differs between urban and rural dwellers. Fewer city dwellers (6.3 per cent) found public transport difficult or very difficult to use than those living in rural areas (75.2 per cent) (Stats NZ, 2019). Difficulty accessing public transport data imply that rural CLC volunteers are more dependent on access to private vehicles. Thus, the fixed and flexible running costs associated with owning a vehicle may further impede active rural conservation engagement (Automobile Association, 2021).

New Zealand's rural population is also projected to age and reduce in number (Table 3), which will have a detrimental impact on the conservation action capacity of rural community-led conservation groups, comprising 86 per cent of New Zealand's CLC volunteers (Nature Space, n.d.) servicing the majority of New Zealand's landmass.

**Figure 2: Map of Predator Free New Zealand community predator control**



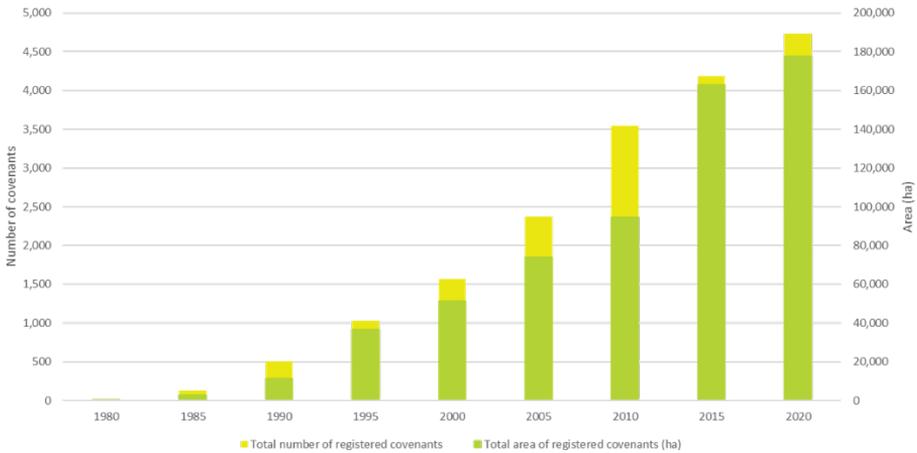
Source: Map reproduced with permission (Predator Free New Zealand, n.d.).

New Zealand's urban population is increasing, as is rural hectareage under QEII National Trust covenants (Figure 3). Between 1980 and 2019, this upward trend suggests an increasing citizen commitment to conservation on privately owned and Crown leasehold property (Queen Elizabeth II National Trust, 2019).

*Adapting community-led conservation approaches*

Nearly 80 per cent of New Zealand community groups surveyed in 2015 had been operating for six or more years (Peters et al., 2015). Some current community conservation projects have had decades of time and effort invested; for example, Waimate North Landcare Trust (WNLT), 12 years; Russell Landcare Trust (RLT), 18 years; and Supporters of Tiritiri Matangi (SoTM), 32 years (Russell Landcare Trust, n.d.; Supporters of Tiritiri Matangi Inc., 2010; Waimate North Landcare Trust, n.d.). Anecdotal reporting confirms that RLT and WNLT founding members are still active. Current CLC appears to attract and sustain long-term volunteering rather than irregular volunteer activity. More general volunteering data supports this view, with 82.3 per cent of Volunteering New Zealand survey (2020) respondents intending to continue their current volunteering role long term. Such commitment, however, may contribute to exclusive 'in' groups (Masson & Fritsche, 2014; White et al., 2011). Unless CLC groups specifically attract younger volunteers (Winch et al., 2020), they may not only risk group extinction but the loss of past and current biodiversity restoration achievements (Klein, 2017).

**Figure 3: Total area and number of QEII National Trust registered covenants, 1980-2020**



Source: Reproduced with permission (Queen Elizabeth II National Trust, 2019).

In a bid to survive, some New Zealand community conservation groups are already adapting to their ageing volunteer base and decreasing appetite for physical conservation action by adopting a more professional operating model (Table 4). Northland groups Russell Landcare Trust (RLT), Mahinepua Radar Hill Landcare Trust (MRHLT) and Kiwi Coast Trust (KCT), for example, have moved from being predominantly volunteer-based to contactor-based operations. RLT and KCT have contract project managers, while RLT and MRHLT are also employing predator-control specialists. KCT has employed predator-control advisers, funded by the Northern Regional Council targeted predator management rate (14c/\$1) (Northland Regional Council, 2021). Increased CLC professionalisation may benefit both current and future community conservation and PF2050 aspirations (Figures 4a and 4b).

**Table 3: Percentage of New Zealand national, Auckland, Southland, and Northland regional populations by age cohort, 2018 (base) to 2048 (projection) (%)**

	National	Auckland	Southland	Northland
<b>15 to 39</b>				
2018	34	38	31	27
2048	30	33	27	25
<b>40 to 64</b>				
2018	32	30	33	33
2048	32	33	31	30
<b>65 and over</b>				
2018	15	12	17	19
2048	23	19	27	29

Source: Stats NZ (2021b).

**Table 4: Examples of Northland New Zealand community-led conservation group approaches**

Group type	Contract positions	Success
<b>Kiwi Coast trust</b>		
Umbrella group helping individual CLC groups	Administrative and technical assistance for Northland conservation groups based in Whangarei, Mid North, and Far North New Zealand	Increase in projects and groups contributing predator control data from 31 (2013) to 115 (2018) (Kiwi Coast Trust, 2018)
<b>Mahinepua Radar Hill Landcare Trust</b>		
Individual community group carrying out kiwi protection through predator control	Predator controller	Significant recovery of pōhutukawa trees from foliage browsing by possums (see Figures 4a, 4b)
<b>Russell Landcare Trust</b>		
Individual community group carrying out kiwi protection through predator control	Project manager, predator controller, treasurer	Intensive rat control over 220 ha (Harwood, 2019; Russell Kiwi Protection, 2019)

**Figure 4. The impact of Mahinepua Radar Hill Landcare Trust contractor common brushtail possum (*Trichosurus vulpecula*) control on pōhutukawa foliage on the Mahinepua Peninsula, Northland**



(a) pre-2005

(b) post-2008

Photo credit: Mahinepua Radar Hill Landcare Trust.

### **Steps towards a sustainable community-lead conservation**

A more comprehensive picture of future CLC can be gained by addressing a number of data limitations and research gaps. These include addressing under-reporting of emergent urban PF2050 and other CLC groups; improving consistency in survey methodology, which, in this paper, made direct year-on-year comparisons inadvisable; and developing a more nuanced environment volunteering definition (Stats NZ, 2018b) that categorises CLC volunteers separately – for example, from those volunteering for Greenpeace. However, despite these limitations, this paper provides important insights into future CLC group sustainability, potential volunteer availability and the supporting role that government policy and investment could play. Practical ways of building CLC sustainability through utilising interest in, and overcoming barriers

to, group professionalisation, population diversity and predator control volunteering, are described.

### *Utilising interest in predator control volunteering*

Given the low levels of current hands-on predator control, PF2050 may need to capitalise on non-physical actions supporting its aims, including fundraising, acquiring conservation information, raising awareness and promoting activities about conservation issues, and expressing a conservation-related opinion through online forums (Department of Conservation, 2019d).

Another approach may be considering the preferential interest displayed in restoration (planting) over protection (weed or predator control), which may suggest a CLC effort hierarchy (Conservation Volunteers, n.d.; Seek Volunteer, 2021). A snapshot of volunteer opportunities advertised by Seek Volunteer (2021) showed that planting attracted 19 adverts – 16 included weeding and four included predator control. Future research may identify planting as a social, regular, life-creating, immediate, visible and emotionally engaging activity.

In contrast, predator control may be a conceptually challenging activity necessitating visualising the indirect effects of control at an ecosystem scale. Predator control is generally a solitary task, dealing with death. Effective long-term predator control is repetitive and entails updating relevant skills associated with changing predator control technology. Predator control results are subtle and incremental, often difficult to recognise without recording techniques such as photo plots (Handford, 2002). Success, measured in diminishing predator numbers, may prove demotivating. Research identifying the underlying rationales for preferring one conservation activity (e.g. planting) over another (e.g. predator control) is needed.

*Overcoming barriers to predator control volunteering*

CLC could benefit from identifying and addressing barriers preventing volunteering, including time constraints, competing vocational, social, educational and caring commitments, impact on future commitments, disinterest and undervalued competencies (Hansen & Slagsvold, 2020; Heimann, 2019; Volunteering New Zealand, 2020). CLC projects may need to adapt by providing “more self-interested and flexible forms of involvement” (Hansen & Slagsvold, 2020).

Within the context of individual actions contributing to systemic change (Singh, 2020), virtual volunteering presents PF2050 with both a challenge and an opportunity. While realising PF2050 aspirations necessitates converting individual conservation concerns into actions that further existing local community predator control efforts, the effectiveness of the following approaches needs to be independently assessed. CLC groups could develop younger volunteer engagement in a stepwise fashion by identifying then building on their areas of interest (Winch et al., 2020). For example, young volunteers might lead online predator control workshop communications and share these skills with older volunteers, who in turn may provide predator control mentoring to younger and non-volunteers. Such cross-age mentoring may also support pro-social behaviour development (Deane et al, 2018; Raposa et al., 2017).

Currently, only 33 per cent of volunteering organisations reimburse volunteers for out-of-pocket expenses (Volunteering New Zealand, 2020). Agencies such as PF2050 may need to subsidise volunteer expenses, including travelling times to the volunteering site, PPE and specialised weed and predator control training and equipment. CLC groups, particularly in rural areas, for example, may consider subsidising private transportation or providing group transport to conservation sites.

CLC groups and volunteers could also benefit from better awareness of and access to expense reimbursement and honoraria

payment exemption provisions (Inland Revenue, 2021). Currently, volunteer labour in New Zealand is not tax-deductible, while charitable donations are. According to Toran (2014), tax incentives can encourage volunteer labour supply. Changes to New Zealand's taxation policy could incentivise current and future volunteers.

### *Predator control volunteering over the lifespan*

Dávila and Díaz-Morales (2009) suggest volunteering “can be an activity that...satisfy[ies] very different motives over the life course” (p. 92), thus potentially engaging non-volunteers later in life. Life course volunteering motivations could help to shape multi-staged long-term biodiversity restoration and conservation projects (Leyshon et al., 2021; New Zealand Plant Conservation Network, 2014). Other opportunities could include specific one-off ‘taster’ conservation actions providing hands-on experience to current and intending volunteers (Leyshon et al., 2021). In contrast, CLC–tertiary educational institution partnerships may enable students and volunteer groups to build ongoing conservation-based connections.

### *Population diversity and diversification*

It is unknown how projected national diversity changes will affect CLC volunteering. However, increasing conservation action by accessing population diversity is an opportunity that CLC and PF2050 should not dismiss. Conservation funding of a wider range of ethnic groups, for example, may be warranted.

Future CLC opportunities will need to recognise and acknowledge the varied interests, capabilities and availability of the broader, more diverse population. Widening the definition and lived experience of volunteering, as understood by other ethnicities resident in New Zealand (Norton et al., 2016; Volunteering New Zealand, 2020), may benefit volunteering efforts. Joint CLC volunteering projects may emerge from this more informed view. Identifying actions that appeal to particular communities and

deliberately harnessing those actions may further increase conservation action (Gould et al., 2018; Norton et al., 2016). Deliberate establishment of collaborative multi-agency, inter-organisation projects, particularly in ethnically diverse urban areas, may involve a broader range of potential volunteers (Auckland Council, 2020) and provide a more sustainably flexible approach to future population diversity.

It is important to acknowledge that these multi-ethnic opportunities would parallel existing Māori-led efforts both on their land and in their communities (Department of Conservation, n.d.-a). As Norton et al. (2016) state, “Māori are critical to the restoration vision for 2050 with partnerships, policy and legislation that recognise an iwi’s mana, values and mana motu-hake (self-determination) in relation to the environment becoming fundamental elements” (p. 178).

Changes in rural populations will also contribute to increasing pressure on rural community conservation groups as their source populations age and reduce in number. Partnering urban with rural groups may benefit both parties, resulting “in thousands of small projects that will together merge eradication and control concepts on [a] landscape scale” (Russell et al., 2015). Urban CLC groups may be able to provide some of the hands-on assistance that the mainly rural QEII Trust covenanted properties need. The Sister City movement may provide a helpful model (Sister Cities International, 2020).

### *Community-led conservation professionalisation*

Some CLC groups are already embarking on pathways to professionalisation. Supportive actions by regional and national government might include funding for or access to executive member training, reimbursement and recognition. Such professionalisation may simultaneously develop career pathways that increase work opportunities and conservation outcomes (Heimann, 2019). However, there may be issues associated with group professionalisation that

will need addressing. These include fewer opportunities for hands-on volunteering, the potential for member disengagement, and employee/contractor costs demanding consistent, ongoing funding (Table 5).

Successful succession planning may partly relate to adapting current CLC models through, for example, urban-rural collaboration and group professionalisation. We propose various professionalisation models, agency-led CLC paid positions, and independent consultancy (Table 5). Group professionalisation is a realistic approach that can align with the 5-year PF2050 Action Plan statement: “Predator Free 2050 will only be achieved if everyone takes responsibility for it, requiring collaborative effort [regional and national] across the country” (Department of Conservation, 2020a, p. 10). In line with this collaborative approach, we propose that funding CLC group professionalisation is central to any PF2050 investment discussions (Department of Conservation, 2020a, p. 14). Professionalisation may also improve existing CLC group resilience by providing the time and expertise necessary for specialist contract design and administration, health and safety legislation compliance, and sourcing insurance funding (Sakofsky & Cooney, 2017; Volunteering New Zealand, 2020).

To be successful, PF2050 needs to bring communities with them and “support existing community effort” (Department of Conservation, 2020a, p. 21). Consequently, any changes made, including supporting group professionalisation, should be over the long term and developed in partnership with current and future conservation volunteers, thus ensuring their input and ownership (Table 5).

**Table 5: Pros and cons associated with proposed New Zealand community-led conservation professionalisation models**

<b>Pros</b>	<b>Cons</b>	<b>Mitigation</b>
<b>Agency-led model (e.g. DOC, regional council)</b>		
Project independent of temporary nature of volunteering	Possible volunteer disempowerment	Involve communities in early decision-making and model development
Appropriate financial, management, and communication skill	Dependent on agency prioritising community conservation	Community conservation outputs valued appropriately by agency
<b>Paid positions in CLC groups</b>		
Enables skills retention	Uncertainty associated with ongoing funding to support positions	Establish funding opportunities specifically for paid positions
Potential for shared roles across community groups	Fundraising needed to support position may reduce conservation capacity	
<b>Independent government-funded consultancy</b>		
Maintain appropriate levels of professional skills	Possible volunteer disempowerment	Involve communities in early decision-making and model development
Expertise and independent audit function	Reduce local engagement with project	Upskilling opportunities for local people

Furthermore, CLC resilience strategies could include alliance development by combining executive functions across NGOs (Bertacchini & Goberna, 2020), honoraria for officeholders, and funding agencies working with CLC groups to streamline funding applications and reporting requirements.

### *Education for community-led conservation sustainability*

Continued project-building between school-based environmental education and CLC is needed to enable today's school children to

become tomorrow's active conservation volunteers (Department of Conservation, 2020c; Dove, 2019).

CLC needs to be further developed as a recognised and valued part of New Zealand's Education for Sustainability Curriculum (Ministry of Education, 2020). Supporting mechanisms could include secondary school and tertiary education credits for active volunteering with community conservation groups, and tertiary student interns working alongside CLC groups (Enviroschools, n.d.; Papa Taio Earthcare, n.d.). Enviroschools can continue encouraging links between global Friday for Future school strike activism (Wahlström et al., 2019) and local hands-on community conservation actions (Dove, 2019), thus developing practical means of ameliorating the ecological grief associated with climate change loss (Cunsolo & Ellis, 2018).

### *Predator Free New Zealand community predator control*

The PF2050 vision has rallied new community predator-control groups (Fenwick, 2017; Predator Free New Zealand, 2017). However, their current status and anticipated trajectories are under-researched. Analysis of and extrapolation from relevant data may help to track and improve PF2050 group effectiveness, both current and future. While the longer-term impacts on volunteering are unknown, emerging from the uncertainty of current COVID-19 restrictions may in fact boost New Zealand's outdoors-based CLC volunteering in the short term. Consequently, CLC groups may be able to take advantage of this as the country returns to a more normal situation.

### *Benefitting from others*

Many voluntary groups face similar volunteer shortages (Volunteering New Zealand, 2020). Non-CLC groups may find some of the group resilience strategies discussed in this paper of interest. CLC groups could also benefit from considering non-CLC group

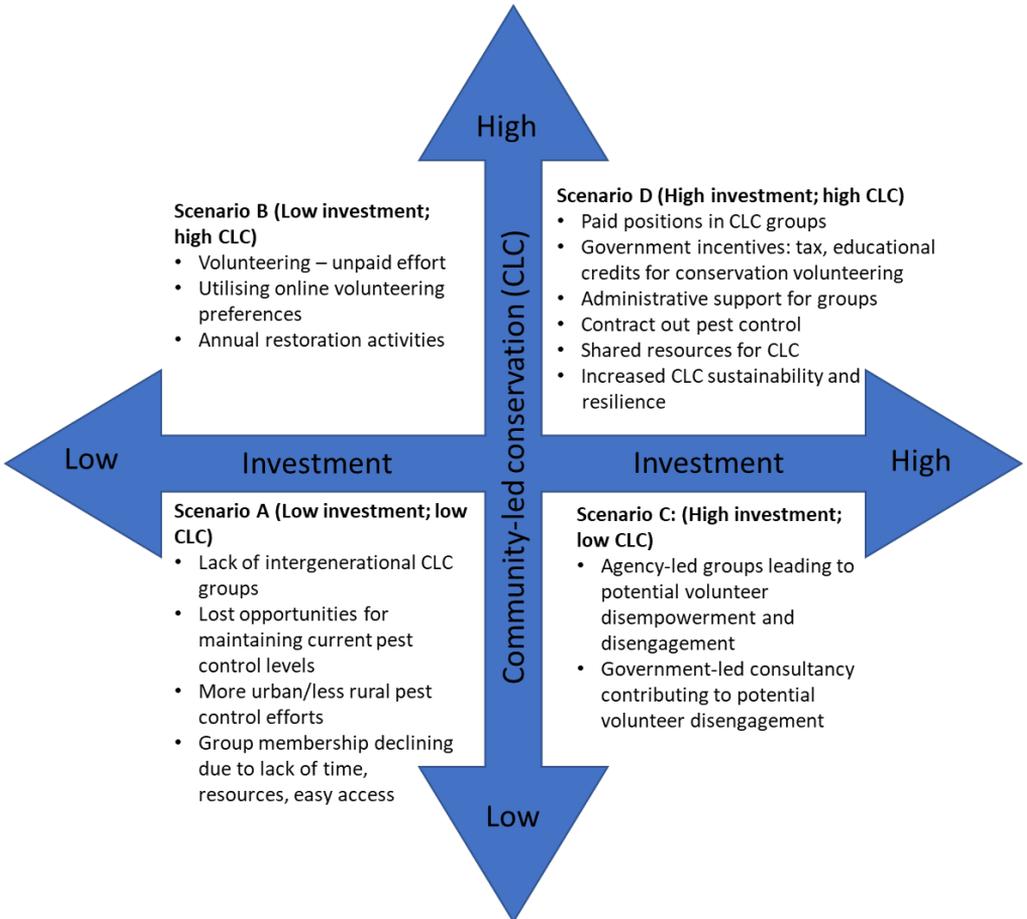
resilience development measures. For example, the New Zealand Red Cross offers retail work experience leading to a nationally recognised Certificate in Retail (New Zealand Red Cross, n.d.) while the Fire and Emergency Services designate personnel as active champions and supporters of volunteers and volunteerism within the service (Fire and Emergency NZ, n.d., p. 7).

## **Summary**

In order to survive, CLC groups cannot stay as they are. Current and projected demographic, economic and attitudinal data illustrating present-day and near-future societal trends and pressures suggest barriers to active community participation in conservation. However, understanding population change and applying demographic analysis to current and future community conservation may help community conservation resilience.

CLC group resilience may be promoted by moving from Scenarios A and C (Figure 5) to Scenarios B and D – two complementary scenarios necessitating different strategies. In Scenario B, volunteers continue working for free, possibly relying on non-financial inducements, including community recognition, to encourage volunteering. In Scenario D, paid positions, foreshadowed by Stats NZ (2020b), and tax and educational incentives could sustain volunteering efforts over time.

**Figure 5: Potential impacts of investment on current and future New Zealand community-led conservation**



## Conclusion

One of PF2050's underlying assumptions is a resilient CLC. Achieving a predator-free New Zealand by 2050, and maintaining this state into an indefinite, possibly uncertain future, necessitates an improved understanding and fostering of New Zealand volunteer motivation and associated CLC/PF2050 infrastructures. For PF2050 to be successful, government action and policy regarding future conservation volunteers need to develop in parallel with predator control tools (K. Smith & Cordery, 2011). This paper's authors believe

that CLC based on “demographic insight and analysis for sound policy development and analysis” (Kukutai & Hohmann-Marriott, 2018, p. 1) will contribute to achieving New Zealand’s predator-free vision.

We suggest that regional and national government policy should be proactive and include: 1) tax incentive and/or expense allowance support for current and future conservation volunteers; 2) infrastructural resources for existing community conservation groups, particularly rural; 3) identification of and transition to future appropriately funded fit-for-purpose conservation group models; 4) environmental education development aligned with current and future community conservation needs; 5) opportunities for conservation education credits; 6) increasing the voluntary conservation sector level and variety of professionalisation, including funding paid positions; 7) longitudinal research identifying volunteer CLC motivations, enabling current and future conservation projects to be designed to embrace differing conservation volunteering preferences, attitudes, motivations and actions; and 8) a showcasing of areas where successful conservation has led to outstanding outcomes with greatly enhanced New Zealand indigenous wildlife biodiversity increases.

In short, resilient, enabling and sustainable CLC is vital to move New Zealand’s vision of a predator-free nation by 2050 from wish to fulfilment.

### **Acknowledgements**

We acknowledge the New Zealand Department of Conservation, Mahinepua Radar Hill Landcare and Russell Landcare Trusts, Kiwi Coast, Dave Towns and two anonymous reviewers for their contributions which have greatly improved this paper.

## References

- Achieve. (2018). *Millennial impact report: 10 Years looking back*: Achieve. <http://www.themillennialimpact.com/sites/default/files/images/2018/MIR-10-Years-Looking-Back.pdf>
- Anderson, M. (2012). *New Ecological Paradigm (NEP) Scale*. [https://www.researchgate.net/publication/264858463\\_New\\_Ecological\\_Paradigm\\_NEP\\_Scale](https://www.researchgate.net/publication/264858463_New_Ecological_Paradigm_NEP_Scale)
- Auckland Council. (2020, 17 August ). *Conservation website launched to connect communities*. <https://ourauckland.aucklandcouncil.govt.nz/articles/news/2020/08/conservation-website-launched-to-connect-communities/>
- Automobile Association. (2021, 17 December 2018). *Vehicle ownership costs – more than just the purchase price*. <https://www.aa.co.nz/cars/motoring-blog/vehicle-ownership-costs-more-than-just-the-purchase-price/>
- Banki, S. (2013). Precarity of place: A complement to the growing precariat literature. *Global Discourse*, 3(3–4), 450–463. <https://doi.org/10.1080/23269995.2014.881139>
- Bates, L., Kearns, R., Coleman, T., & Wiles, J. (2020). ‘You can’t put your roots down’: Housing pathways, rental tenure and precarity in older age. *Housing Studies*, 35(8), 1442–1467. <https://doi.org/10.1080/02673037.2019.1673323>
- Bertacchini, F., & Goberna, L. (2020). *How will Covid-19 affect the role of NGOs?* <https://www.dianova.org/opinion/how-will-covid-19-affect-the-role-of-ngos/>
- Biddle, N., & Gray, M. (2020). *The experience of volunteers during the early stages of the COVID-19 pandemic*. ANU Centre for Social Research and Methods. [https://csrcm.cass.anu.edu.au/sites/default/files/docs/2020/6/The\\_experience\\_of\\_volunteers\\_during\\_the\\_early\\_stages\\_of\\_the\\_COVID-19\\_pandemic\\_0.pdf](https://csrcm.cass.anu.edu.au/sites/default/files/docs/2020/6/The_experience_of_volunteers_during_the_early_stages_of_the_COVID-19_pandemic_0.pdf)
- Boyd, S., & Dixon, S. (2009). *The working patterns of older workers*. Department of Labour. <https://www.mbie.govt.nz/dmsdocument/1012-working-patterns-older-workers-full-pdf>
- Brayley, N., Obst, P., White, K. M., Lewis, I. M., Warburton, J., & Spencer, N. M. (2014). Exploring the validity and predictive power of an extended volunteer functions inventory within the context of episodic skilled volunteering by retirees. *Journal of Community Psychology*, 42(1), 1–18. <https://doi.org/10.1002/jcop.21583>
- Caissie, L. T., & Halpenny, E. A. (2003). Volunteering for nature: Motivations for participating in a biodiversity conservation volunteer program. *World Leisure Journal*, 45(2), 38–50. <https://doi.org/10.1080/04419057.2003.9674315>
- Cameron, M. P., & Poot, J. (2019). Towards superdiverse Aotearoa: Dimensions of past and future ethnic diversity in New Zealand and its regions. *New Zealand Population Review*, 45, 18–45. [https://population.org.nz/wp-content/uploads/2019/12/NZPR-45\\_whole-doc-final.pdf](https://population.org.nz/wp-content/uploads/2019/12/NZPR-45_whole-doc-final.pdf)
- Central Intelligence Agency. (n.d.). *The World Factbook*. <https://www.cia.gov/library/publications/the-world-factbook/geos/nz.html>

- Chambré, S. M., & Netting, F. E. (2018). Baby Boomers and the long-term transformation of retirement and volunteering: Evidence for a policy paradigm shift. *Journal of Applied Gerontology, 37*(10), 1295–1320. <https://doi.org/10.1177/0733464816663552>
- Chinese Conservation Education Trust. (n.d.). *About us at CCET*. Retrieved 9 April 2021, from <https://www.ccet.org.nz/home/about-us/>
- Choi, L. H. (2003). Factors affecting volunteerism among older adults. *Journal of Applied Gerontology, 22*(2), 179–196. <https://doi.org/10.1177%2F0733464803022002001>
- Commission for Financial Capability. (2020). *Review of retirement income policies 2019: Summary of recommendations*. <https://cffc-assets-prod.s3.ap-southeast-2.amazonaws.com/public/Uploads/Retirement-Income-Policy-Review/2019-RRIP/CFFC-RRIP2019-SUMMARY.pdf>
- Conservation Volunteers. (n.d.). *What we do*. Retrieved 5 May 2021, from <https://conservationvolunteers.co.nz/>
- Cook, L. (2018). Enriching public policy with a population perspective *New Zealand Population Review, 44*, 3–20. [https://population.org.nz/wp-content/uploads/2019/02/NZPR-Vol-44\\_Cook.pdf](https://population.org.nz/wp-content/uploads/2019/02/NZPR-Vol-44_Cook.pdf)
- Cunsolo, A., & Ellis, N. R. (2018). Ecological grief as a mental health response to climate change-related loss. *Nature Climate Change, 8*(4), 275–281. <https://doi.org/10.1038/s41558-018-0092-2>
- Dávila, M. C., & Díaz-Morales, J. F. (2009). Age and motives for volunteering: Further evidence. *Europe's Journal of Psychology, 2*, 82–95. <https://doi.org/10.5964/ejop.v5i2.268>
- Deane, K. L., Meissel, K., Moore, J., & Gillham, B. (2018). Positive youth development profiles of cross-age peer mentors. *Applied Developmental Science, 22*(4), 301–315. <https://doi.org/10.1080/10888691.2017.1295810>
- Department of Conservation. (2016). *Full report: Survey of New Zealanders*. <https://www.doc.govt.nz/Documents/about-doc/role/visitor-research/survey-of-new-zealanders-2016.pdf>
- . (2019a). *New Zealand's sixth national report to the United Nations Convention on Biological Diversity. Reporting period: 2014–2018*. <https://www.doc.govt.nz/globalassets/documents/about-doc/role/international/nz-6th-national-report-convention-biological-diversity.pdf>
- . (2019b). *Predator Free 2050*. Retrieved 8 July 2019, from <https://www.doc.govt.nz/predator-free-2050>
- . (2019c). *Goal, tactics and new technology for Predator Free 2050*. Retrieved 11 November 2019, from <https://www.doc.govt.nz/nature/pests-and-threats/predator-free-2050/goal-tactics-and-new-technology/>
- . (2019d). *Survey of New Zealanders 2019*. <https://www.doc.govt.nz/globalassets/documents/about-doc/role/visitor-research/survey-of-new-zealanders-2019.pdf>
- . (2020a). *He Māhere Rautaki Whakakore Konihi: Predator Free 2050 5-year action plan*. <https://www.doc.govt.nz/globalassets/documents/conservation/threats-and-impacts/pf2050/pf2050-action-plan.pdf>

- . (2020b). *Te Mana o Te Taiao – Aotearoa New Zealand biodiversity strategy 2020*.  
<https://www.doc.govt.nz/globalassets/documents/conservation/biodiversity/anzbs-2020.pdf>
- . (2020c). *Towards a predator free New Zealand: Predator Free 2050 strategy*.  
<https://www.doc.govt.nz/globalassets/documents/conservation/threats-and-impacts/pf2050/pf2050-towards-predator-freedom-strategy.pdf>
- . (n.d.-a). *Our work – Ngā Whenua Rāhui*. Retrieved 23 April 2021, from <https://www.doc.govt.nz/get-involved/funding/nga-whenua-rahui/our-work/>
- . (n.d.-b). *Successful applications list*. Retrieved 10 April 2021, from <https://www.doc.govt.nz/get-involved/funding/doc-community-fund/successful-applications/>
- Deri-Armstrong, C., Devlin, R. A., & Seifi, F. (2016). *Build it and they will come: Volunteer opportunities and volunteering* [Economics Working Paper].  
<http://sciencessociales.uottawa.ca/economics/sites/socialsciences.uottawa.ca/economics/files/1615e.pdf>
- Dickie, L. (2018). *To what extent are young people engaged with the Predator Free 2050 goal?* [Master's thesis, University of Otago]. HandleNet.  
<http://hdl.handle.net/10523/8203>
- Dictionary.com. (2021). *Precarity*. <https://www.dictionary.com/browse/precarity>
- Dove, B. (2019, October 3). *Shared learning between students and community fosters empowerment*. <https://enviroschools.org.nz/creating-change/stories/shared-learning-between-students-and-community-fosters-empowerment/>
- Enviroschools. (n.d.). *Hands-on possum control programme*. Retrieved 21 January 2019, from [http://enviroschools.org.nz/in\\_your\\_region/northland/featured-projects/possum-project](http://enviroschools.org.nz/in_your_region/northland/featured-projects/possum-project)
- Fenwick, R. (2017, December 5). *Predator-free movement uniting communities and organisations*. <https://www.stuff.co.nz/environment/99443957/predatorfree-movement-uniting-communities-and-organisations>
- Fire and Emergency NZ. (n.d.). *Enabling sustainable volunteerism: Te whakatoitū i te tūaotanga*. <https://fireandemergency.nz/assets/Documents/About-FENZ/Key-documents/Volunteerism-strategy-2019-2029.pdf>
- Ganzevoort, W., & van den Born, R. J. G. (2020). Understanding citizens' action for nature: The profile, motivations and experiences of Dutch nature volunteers. *Journal for Nature Conservation*, 125824.  
<https://doi.org/10.1016/j.jnc.2020.125824>
- Gooch, M. (2003). A sense of place: Ecological identity as a driver for catchment volunteering. *Australian Journal on Volunteering*, 8(2), 23–32.  
[https://www.researchgate.net/publication/253377492\\_A\\_sense\\_of\\_place\\_Ecological\\_identity\\_as\\_a\\_driver\\_for\\_catchment\\_volunteering](https://www.researchgate.net/publication/253377492_A_sense_of_place_Ecological_identity_as_a_driver_for_catchment_volunteering)
- Gould, R. K., Phukan, I., Mendoza, M. E., Ardoin, N. M., & Panikka, B. (2018). Seizing opportunities to diversify conservation. *Conservation Letters*, 11.  
<https://doi.org/10.1111/conl.12431>
- Grönlund, H., Holmes, K., Kang, C., Cnaan, R. A., Handy, F., Brudney, J. L., Haski-Leventhal, D., Hustinx, L., Kassam, M., Meijs, L. C. P. M., Pessi, A.

- B., Ranade, B., Smith, K. A., Yamauchi, N., & Zrinščak, S. (2011). Cultural values and volunteering: A cross-cultural comparison of students' motivation to volunteer in 13 countries. *Journal of Academic Ethics, 9*(2), 87–106. <https://doi.org/10.1007/s10805-011-9131-6>
- Groot, S., Tassell-Matamua, N., Van Ommen, C., & Masters-Awatere, B. (Eds.). (2017). *Precarity: Uncertain, insecure and unequal lives in Aotearoa New Zealand*. Massey University Press.
- Guiney, M. S. (2009). *Caring for nature: Motivations for and outcomes of conservation volunteer work* [PhD thesis, University of Minnesota]. University Digital Conservancy. <https://conservancy.umn.edu/handle/11299/56689>
- Handford, P. (2002). *Native forest monitoring: A guide for forest owners and managers*. FRONZ. <https://groundtruth.co.nz/wp-content/uploads/2019/09/Native-Forest-Monitoring-Guide.pdf>
- Hansen, T., & Slagsvold, B. (2020). An “Army of Volunteers”? Engagement, motivation, and barriers to volunteering among the Baby Boomers. *Journal of Gerontological Social Work, 63*(4), 335–353. <https://doi.org/10.1080/01634372.2020.1758269>
- Harwood, E. (2019). *Russell Kiwi Protection: Almost monthly report Nov–Dec 2019*. Available from the Russell Landcare Trust, <https://russellkiwi.org.nz/>
- Heimann, A. M. (2019). *Motivations and attitudes of New Zealand Conservation Volunteers* [Master's thesis, University of Otago]. HandleNet. <http://hdl.handle.net/10523/9537>
- Higgins, O., & Shackleton, C. M. (2015). The benefits from and barriers to participation in civic environmental organisations in South Africa. *Biodiversity and Conservation, 24*(8), 2031–2046. <https://doi.org/10.1007/s10531-015-0924-6>
- Hobbs, S. J., & White, P. C. L. (2012). Motivations and barriers in relation to community participation in biodiversity recording. *Journal for Nature Conservation, 20*(6), 364–373. <https://doi.org/https://doi.org/10.1016/j.jnc.2012.08.002>
- Inland Revenue. (2021). *Tax treatment of reimbursements and honoraria paid to volunteers*. Retrieved 7 April 2021, from <https://www.taxtechnical.ird.govt.nz/new-legislation/act-articles/2009-34/other-policy-matters/tax-treatment-of-reimbursements-and-honoraria-paid-to-volunteers>
- Johnston, M. P. (2014). Secondary data analysis: A method of which the time has come. *Qualitative and quantitative methods in libraries, 3*, 619–626. [http://qqml.net/papers/September 2014 Issue/336QQML Journal 2014 Johnston Sept 619-626.pdf](http://qqml.net/papers/September%202014%20Issue/336QQML%20Journal%202014%20Johnston%20Sept%20619-626.pdf)
- Kiwi Coast Trust. (2018). *Kiwi Coast first five years report 2013–2018*. <https://kiwicoast.org.nz/wp-content/uploads/2018/08/Kiwi-Coast-First-Five-Years-Report.pdf>
- Klein, A. (2017, May 5). *Menopause-causing bait is curbing rat populations in New York*. <https://www.newscientist.com/article/2130114-menopause-causing-bait-is-curbing-rat-populations-in-new->

- [vork#:~:text=A%20new%20type%20of%20bait,impairing%20sperm%20production%20in%20males](#)
- Komp, K., van Tilburg, T., & van Groenou, M. B. (2012). Age, retirement, and health as factors in volunteering in later life. *Nonprofit and Voluntary Sector Quarterly*, *41*(2), 280–299. <https://doi.org/10.1177/0899764011402697>
- Kragh, G. (2017). *A holistic approach to environmental volunteering: Connections between motivation, well-being and conservation achievement* [PhD thesis, University of Bournemouth]. OAI – Eprints. <https://core.ac.uk/display/83943397>
- Kukutai, T., & Hohmann-Marriott, B. (2018). Editors' Note. *New Zealand Population Review*, *44*, 1–2. [https://population.org.nz/wp-content/uploads/2019/02/NZPR-Vol-44\\_final.pdf](https://population.org.nz/wp-content/uploads/2019/02/NZPR-Vol-44_final.pdf)
- Lancee, B., & Radl, J. (2014). Volunteering over the life course. *Social Forces*, *93*(2), 833–862. <https://doi.org/10.1093/sf/sou090>
- Leeson, G. W. (2018). The growth, ageing and urbanisation of our world. *Journal of Population Ageing*, *11*(2), 107–115. <https://doi.org/10.1007/s12062-018-9225-7>
- Leyshon, M., Leyshon, C., Walker, T., & Fish, R. (2021). More than sweat equity: Young people as volunteers in conservation work. *Journal of Rural Studies*, *81*, 78–88. <https://doi.org/https://doi.org/10.1016/j.jrurstud.2020.08.025>
- Masson, T., & Fritsche, I. (2014). Adherence to climate change-related ingroup norms: Do dimensions of group identification matter? *European Journal of Social Psychology*, *44*(5), 455–465. <https://doi.org/https://doi.org/10.1002/ejsp.2036>
- McCarthy, D. (2015, 6 August). *The impact of precarious work on wages, productivity and economic growth* [Blog]. <https://www.nerinstitute.net/blog/impact-precarious-work-wages-productivity-and-economic-growth>
- Ministry of Education. (2020, 17 December). *Education for sustainability*. <https://nzcurriculum.tki.org.nz/Curriculum-resources/Education-for-sustainability#:~:text=Education%20for%20sustainability%20%28EfS%29%20is%20about%20learning%20to,water%2C%20land%2C%20ecosystems%2C%20energy%2C%20waste%2C%20urban%20living%2C%20transportation>
- Nature Space. (n.d.). *Creating a national picture of community conservation efforts*. Retrieved 28 August 2020, from <https://www.naturespace.org.nz/>
- New Zealand Plant Conservation Network. (2014). *DOC weeds*. <https://www.nzpcn.org.nz/threats/exotic-plants-weeds/>
- New Zealand Red Cross. (n.d.). *Red Cross shop volunteer*. Retrieved April 23, 2021, from <https://www.redcross.org.nz/get-involved/volunteer-opportunities/red-cross-shop-volunteer/>
- Northland Regional Council. (2021). *Your rates*. <https://www.nrc.govt.nz/your-council/about-us/your-rates/>
- Norton, D. A., Young, L. M., Byrom, A. E., Clarkson, B. D., Lyver, P. O. B., McGlone, M. S., & Waipara, N. W. (2016). How do we restore New

- Zealand's biological heritage by 2050? *Ecological Management & Restoration*, 17(3), 170–179. <https://doi.org/10.1111/emr.12230>
- O'Brien, K., Selboe, E., & Hayward, B. M. (2018). Exploring youth activism on climate change dutiful, disruptive, and dangerous dissent. *Ecology and Society*, 23(3), 42–55. <https://doi.org/10.2307/26799169>
- O'Leary, Z. (2017). *The essential guide to doing your research project* (3rd ed.). SAGE.
- O'Neill, A. (2021, April 1). *Urbanization in New Zealand 2019*. <https://www.statista.com/statistics/455899/urbanization-in-new-zealand/#statisticContainer>
- Ough Dealy, H. R., Jarvis, R. M., Young, T., Maharaj, K., & Petterson, M. (2021). *The role of hope in current conservation actions and attitudes and future conservation intentions*. Available from the Auckland University of Technology.
- Papa Taio Earthcare. (n.d.). *Courses*. Retrieved 21 January 2019, from <http://www.papataioearthcare.nz/courses>
- Parliamentary Commissioner for the Environment. (2017). *Taonga of an island nation: Saving New Zealand's birds*. <http://www.pce.parliament.nz/media/1695/taonga-of-an-island-nation-web-final-small.pdf>
- Peltzer, D. A., Bellingham, P. J., Dickie, I. A., Houlston, G., Hulme, P. E., Lyver, P. O. B., McGlone, M., Richardson, S. J., & Wood, J. (2019). Scale and complexity implications of making New Zealand predator-free by 2050. *Journal of the Royal Society of New Zealand*, 49(3), 412–439. <https://doi.org/10.1080/03036758.2019.1653940>
- Peters, M. A., Hamilton, D., & Eames, C. (2015). Action on the ground: A review of community environmental groups' restoration objectives, activities and partnerships in New Zealand. *New Zealand Journal of Ecology*, 39(2), 179–189. <https://newzealandecology.org/nzje/3234>
- Predator Free New Zealand. (2017). *National map*. [https://predatorfreenz.org/tools-resources/national-map/?utm\\_source=Newsletter&utm\\_campaign=3371e3c8ac-8+June++2017+latest+stories&utm\\_medium=email&utm\\_term=0fee93e1d-c-3371e3c8ac-497376333&ct=t\(PFNZ\\_8\\_June\\_2017\\_latest\\_stories\)&mc\\_cid=3371e3c8ac&mc\\_eid=b60d487864](https://predatorfreenz.org/tools-resources/national-map/?utm_source=Newsletter&utm_campaign=3371e3c8ac-8+June++2017+latest+stories&utm_medium=email&utm_term=0fee93e1d-c-3371e3c8ac-497376333&ct=t(PFNZ_8_June_2017_latest_stories)&mc_cid=3371e3c8ac&mc_eid=b60d487864)
- . (n.d.). *Predator Free NZ Trust national map*. Retrieved 30 January 2020, from <https://pfnz.maps.arcgis.com/apps/Styler/index.html?appid=d5c9a7acf6fa43939192d93f9df00138>
- Queen Elizabeth II National Trust. (2019). *Queen Elizabeth II National Trust annual report 2019*. <https://qeinationaltrust.org.nz/wp-content/uploads/2019/11/1166-QEII-Annual-Report-ffLR-FINAL-VERSION-FOR-WEB.pdf>
- Raposa, E. B., Dietz, N., & Rhodes, J. E. (2017). Trends in volunteer mentoring in the United States: Analysis of a decade of census survey data. *American Journal of Community Psychology*, 59(1–2), 3–14. <https://doi.org/10.1002/ajcp.12117>

- Rosenberg, W. (2018). Insecure work in New Zealand. *LHP Bulletin*, 71, 14–25. <https://lhp.org.nz/wp-content/uploads/2021/12/LHP-Bulletin-71-Nov-2017.pdf>
- Russell, J. C., Innes, J. G., Brown, P. H., & Byrom, A. E. (2015). Predator-Free New Zealand: Conservation country. *Bioscience*, 65(5), 520–525. <https://doi.org/10.1093/biosci/biv012>
- Russell Kiwi Protection. (2019). *Russell Kiwi Protection: A Russell Landcare project*. Russell Landcare Trust.
- Russell Landcare Trust. (n.d.). *About us*. Retrieved 31 January 2020, from <https://russellkiwi.org.nz/about-us/>
- Sakofsky, M., & Cooney, L. (2017). *Overview paper on the state of volunteering in New Zealand*. Volunteering New Zealand. <https://www.oct.org.nz/files/dmfile/Overview-Paper-on-the-State-of-Volunteering-April2017.pdf>
- Sandiford, P. J., & Green, S. (2020). 'It's my passion and not really like work': Balancing precarity with the work–life of a volunteer team leader in the conservation sector. *Work, Employment and Society*. <https://doi.org/10.1177/0950017020942052>
- Seek Volunteer. (2021). *Environment & Conservation volunteer opportunities in New Zealand*. Retrieved 5 May 2021, from <https://seekvolunteer.co.nz/environment-conservation-volunteering>
- Seymour, V., & Haklay, M. (2017). Exploring engagement characteristics and behaviours of environmental volunteers. *Citizen Science: Theory and Practice*, 2(1)(5), 1–13. <https://doi.org/https://doi.org/10.5334/cstp.66>
- Singh, C. (2020, 22 April). Individual action versus systemic change: Lessons from COVID19 for climate change. <https://socialsciences.nature.com/posts/66491-individual-action-versus-systemic-change-lessons-from-covid19-for-climate-change>
- Sister Cities International. (2020). *About Sister Cities International*. <https://sistercities.org/about-us/>
- Sloane, G. M., & Pröbstl-Haider, U. (2019). Motivation for environmental volunteering – A comparison between Austria and Great Britain. *Journal of Outdoor Recreation and Tourism*, 25(March), 158–168. <https://doi.org/10.1016/j.jort.2019.01.002>
- Smith, F. (2009). Working on environmental projects in Cambodia: An interpretative phenomenological analysis of the experiences of some Western expatriates [Master's thesis, Massey University]. HandleNet. <http://hdl.handle.net/10179/1967>
- Smith, K., & Cordery, C. J. (2011). What works? A systematic review of research and evaluation literature on encouragement and support of volunteering. *Social Science Research Network*. <https://doi.org/http://dx.doi.org/10.2139/ssrn.1761655>
- Standing, G. (2011). *The precariat: The new dangerous class*. <http://ebookcentral.proquest.com/lib/aut/detail.action?docID=738838>
- Statistics New Zealand. (2011). *Time Use Survey 2009/10 Key facts*. Statistics New Zealand. <https://cdn.livechat-files.com/api/file/lc/att/6093951/>



- . (2020c, September 23). *Estimated resident population 2018: Data sources and methods*. <https://www.stats.govt.nz/methods/estimated-resident-population-2018-data-sources-and-methods>
- . (2020d). *Te Kupenga: 2018 (final) – English*. <https://www.stats.govt.nz/information-releases/te-kupenga-2018-final-english>
- . (2021a). *2018 Census data user guide* (2nd ed.). <https://www.stats.govt.nz/methods/2018-census-data-user-guide>
- . (2021b, March 31). *Subnational population projections: 2018(base)–2048*. <https://www.stats.govt.nz/information-releases/subnational-population-projections-2018base2048>
- Student Volunteer Army. (n.d.). *About SVA: A movement for volunteering*. Retrieved 29 August 2020, from <https://sva.org.nz/our-story/>
- Supporters of Tiritiri Matangi Inc. (2010). *Who are the supporters?* <http://www.tiritirimatangi.org.nz/who-are-the-supporters>
- Thompson, A. M. (1993). Volunteers and their communities: A comparative analysis of volunteer fire fighters. *Nonprofit and Voluntary Sector Quarterly*, 22(2), 155–166. <https://doi.org/10.1177/089976409302200205>
- Tierney, S., & Mahtani, K. R. (2020). *Volunteering during the COVID-19 pandemic: What are the potential benefits to people's well-being?* [https://www.cebm.net/wp-content/uploads/2020/04/Volunteering-during-the-COVID-19-pandemic-What-are-the-potential-benefits-to-people%E2%80%99s-well-being\\_.pdf](https://www.cebm.net/wp-content/uploads/2020/04/Volunteering-during-the-COVID-19-pandemic-What-are-the-potential-benefits-to-people%E2%80%99s-well-being_.pdf)
- Toran, K. (2014, November 11). *Tax policy and volunteer labor*. <https://www.urban.org/research/publication/tax-policy-and-volunteer-labor>
- Towns, D. R., Daugherty, C. H., Broome, K., Timmins, S., & Clout, M. (2019). The thirty-year conservation revolution in New Zealand: An introduction. *Journal of the Royal Society of New Zealand*, 49(3), 243–258. <https://doi.org/10.1080/03036758.2019.1652192>
- Trading Economics. (2020). New Zealand households debt to income 1991–2020 data | 2021–2022 forecast. <https://tradingeconomics.com/new-zealand/households-debt-to-income>
- Turns, A. (2020). *'Volunteering is one of the most important things you can do': How one student is tackling the environmental crisis*. <https://www.theguardian.com/education/2020/jan/27/volunteering-is-one-of-the-most-important-things-you-can-do-how-one-student-is-tackling-the-environmental-crisis>
- United Nations. (2017). *World population prospects 2017 – Data booklet*. [https://esa.un.org/unpd/wpp/publications/Files/WPP2017\\_DataBooklet.pdf](https://esa.un.org/unpd/wpp/publications/Files/WPP2017_DataBooklet.pdf)
- United Nations Department of Economic and Social Affairs Population Division. (2014). *World urbanisation prospects: The 2014 revision highlights* (ST/ESA/SER.A/352). <https://esa.un.org/Undp/Wup/Publications/Files/WUP2014-Highlights.pdf>
- Volunteering New Zealand. (2020). *State of volunteering report 2020*. [https://www.volunteeringnz.org.nz/wp-content/uploads/F\\_SOV-Report2020\\_Single-Pages\\_1July.pdf](https://www.volunteeringnz.org.nz/wp-content/uploads/F_SOV-Report2020_Single-Pages_1July.pdf)

- Wahlström, M., Kocyba, P., De Vydt, M., & de Moor, J. (Eds.). (2019). Protest for a future: Composition, mobilization and motives of the participants in Fridays For Future climate protests on 15 March, 2019 in 13 European cities.  
[https://www.researchgate.net/publication/334745801\\_Protest\\_for\\_a\\_future\\_Composition\\_mobilization\\_and\\_motives\\_of\\_the\\_participants\\_in\\_Fridays\\_For\\_Future\\_climate\\_protests\\_on\\_15\\_March\\_2019\\_in\\_13\\_European\\_cities/ink/5d3ef3eb299bf1995b54280d/download](https://www.researchgate.net/publication/334745801_Protest_for_a_future_Composition_mobilization_and_motives_of_the_participants_in_Fridays_For_Future_climate_protests_on_15_March_2019_in_13_European_cities/ink/5d3ef3eb299bf1995b54280d/download)
- Waikato Regional Council. (2017). *Quality of Life Survey 2016: Waikato regional results*. <https://www.waikatoregion.govt.nz/assets/WRC/WRC-2019/tr201711.pdf>
- . (2019a). *People's personal environmental actions*.  
<https://waikatoregion.govt.nz/Environment/Environmental-information/Environmental-indicators/Community-and-economy/personal-actions-report/>
- . (2019b). *Quality of Life Survey 2018: Waikato results* (14011727).  
<https://www.waikatoregion.govt.nz/assets/WRC/WRC-2019/TR201906.pdf>
- . (2019c). *Your environment – what matters?* (TR# 2019/09).  
<https://www.waikatoregion.govt.nz/services/publications/tr201909/>
- . (2019d). *Your Environment: What Matters? Tō taiao: He aha ngā tino take? A survey of residents of the Waikato region*.  
<https://www.waikatoregion.govt.nz/services/publications/tr201909/>
- . (2020). *WPI: Environmental attitudes*.  
<https://waikatoregion.govt.nz/community/waikato-progress-indicators-tupuranga-waikato/environmental-attitudes/>
- Waimate North Landcare Trust. (n.d.). *Trust summary*. Retrieved 28 August 2020, from [http://www.waimatenorthlandcare.org.nz/trust\\_summary.htm](http://www.waimatenorthlandcare.org.nz/trust_summary.htm)
- White, K. M., Smith, J. R., Terry, D. J., Greenslade, J. H., & McKimmie, B. M. (2011). Social influence in the theory of planned behaviour: The role of descriptive, injunctive, and in-group norms. *British Journal of Social Psychology*, 48(1), 135–158.  
<https://doi.org/https://doi.org/10.1348/014466608X295207>
- Winch, K., Stafford, R., Gillingham, P., Thorsen, E., & Diaz, A. (2020). Diversifying environmental volunteers by engaging with online communities. *People and Nature*, 3(1), 17–31. <https://doi.org/10.1002/pan3.10147>