

Measuring, understanding, and enhancing nature connectedness

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Abstract

1. A large body of literature illustrates that nature connectedness is associated with both higher wellbeing and a greater likelihood of displaying more pro-environmental behaviours, indicating it is an important leverage point for sustainability. It is therefore important to examine the correlates of nature connectedness to improve both the wellbeing of individuals, and the health of the planet.
2. Through a national-level survey in Australia, this paper contributes to this literature by exploring the correlates of nature connectedness, analysing the efficacy of different nature connection measurement tools, and undertaking a detailed examination of how policy can enhance nature connectedness.
3. Our results show that nature connectedness is higher for older Australians, individuals who grew up in rural or regional area, those who work part-time, are self-employed or retired, Indigenous Australians, and those who speak a language other than English.
4. Being too busy or not having enough time is the most common barrier to engaging with nature, with individuals on higher incomes being more likely to identify this barrier. Other barriers, such as lack of access, cost of access, and safety concerns, were more likely to be raised by people on lower incomes.
5. Different nature connectedness tools produce varied results, highlighting that researchers should carefully consider the tool

they apply in surveys. In particular, there were a number of differences in the results when using a measure of nature contact compared to subjective measures of nature connectedness.

Policy implications

Our research points to valuable policy levers such as increasing green space in urban areas, enhancing opportunities for meaningful interactions in nature, and addressing structural inequalities to enhance access to nature for certain groups. Doing so will help create positive change for both people and planet.

Keywords: Nature connection, measurement, social justice, demographics

1 Introduction

Nature connection is associated with higher wellbeing and increased likelihood of performing pro-environmental behaviours, making it an important leverage point for sustainability (Martin et al., 2020). Spending time in or near nature can improve health and wellbeing through many mechanisms, the most prominent of which is exposure to clean air and the opportunity for exercise, socialisation, and emotional and cognitive restoration (Hartig et al., 2014). Having a higher connection with nature is associated with higher levels of eudaimonic wellbeing, especially measures of personal growth, and also measures of autonomy, self-acceptance, and positive relationships (Pritchard et al., 2020). It has been associated with higher levels of pro-environmental or conservation behaviours (Mayer & Frantz, 2004): people who feel most connected with nature are also the most likely to take action to care for it. This aspect of nature connection is why it features prominently in several conservation policies, including Australia's Strategy for Nature (Commonwealth of Australia, 2019), Canada's 2020 biodiversity goals and targets (Biodivcanada, 2015), and the United Kingdom's 25-year environment plan (DEFRA, 2018).

Nature connection is a concept that has been used variably across different disciplines (Ives et al., 2017), but generally entails combinations of elements related to sense of identity, behaviour and activity, and felt relationship with the natural world. The proposed dimensions of nature connection are multifaceted, and include cognitive, emotive,

philosophical, material, experiential and behavioural elements (Hatty et al., 2020; Ives et al., 2017). For example, nature connection research ranges from examining relational interactions between people and place to studying nature connection as a distinct psychological entity that affects behaviour (Ives et al., 2017). A person's connection with nature may shape, or be shaped by, how they perceive of nature. For example, people with strong connection with nature tend to describe nature in experiential (e.g., positive emotions felt in nature) rather than descriptive terms (e.g., landscapes, plants) (Hatty et al., 2022). Previous research indicates that a stronger nature connection is associated with reporting feelings of wellbeing (e.g., reduced stress) when spending time in nature (Mena-García et al., 2020). Thus, understanding relationships between nature connection, wellbeing, and pro-environmental behaviours can be useful for informing policy seeking to influence any one of these dimensions.

An increased interest in studies on human nature connectedness has resulted in numerous validated scales to measure nature connection. Widely used scales or measures include Inclusion of Nature in Self (INS) (Schultz, 2001), Connectedness to Nature Scale (CNS) (Mayer & Franz, 2004), Nature Relatedness (NR) (Nisbet et al., 2009), and the CN-12 (Hatty et al., 2020). These scales vary in how they conceptualise and measure nature connection. Some scales are unidimensional, single item scales, such as the INS which conceptualises nature connectedness through cognitive beliefs (Schultz, 2001). In contrast, other scales are

multi-dimensional, seeking to conceptualise a range of different ways individuals can connect with nature. For example, the CN-12 has 12 statements to measure one's connection with nature through the dimensions of identity, experience, and philosophy. These dimensions explore how one includes nature in their self-identity, thoughts and emotions, behavioural elements, enjoyment of nature, and worldviews on the interconnectedness between humans and nature (Hatty et al., 2020). Research on the CNS, another multidimensional scale, has found that the identity dimension tends to be the most variable across population groups (Hatty et al., 2020; Nisbet et al., 2008)

Despite these scales measuring nature connectedness differently, research has indicated that they are highly correlated (Hatty et al., 2020; Tam, 2013). For example, the CN-12 and its dimensions have shown positive correlations with NR, time spent in nature, biospheric and altruistic values, and pro-environmental behaviours (Hatty et al., 2020). It has also been posited that multidimensional scales may be more appropriate for measuring nature connectedness due to them having stronger correlations with related variables such as pro-environmental behaviours (Hatty et al., 2020; Tam, 2013; Whitburn et al., 2020).

These scales have been applied around the world to better understand the different ways in which communities in different countries connect with nature. Indeed, in a multidisciplinary review, Ives et al. (2017) identified that nearly a quarter of longitudinal and cross-sectional nature

connectedness research used scales to measure nature connectedness, and that researchers were interested in nature connection as both a driver of other outcomes, and a benefit in itself. Much of the research on nature connection has been biased towards western and high-income countries, with most coming from the USA, Australia, Canada, Czech Republic, Germany, Japan, Singapore, United Kingdom, and The Netherlands (Ives et al., 2017; Soga & Gaston, 2023). It is possible that this bias is linked with concern for nature connection over the detrimental effects of urbanisation in these regions (Soga & Gaston, 2023). A global systematic review examining trends of nature connection across (predominantly) high-income countries report a general decline in nature connectedness which varies based on geographic and socio-economic factors (Soga & Gaston, 2023).

Through applying a macro-level perspective on nature connectedness, Richardson et al. (2022) compared the association of country-level factors of declining nature experience across 14 countries across the UK and Europe. They observed that nature connectedness, as measured through the INS, was most strongly correlated with biodiversity, followed by having an ageing population (positively), smartphone use (negatively), and income (negatively). This highlights the significance of the biodiversity-nature connection relationship, identifying nature connectedness as an important factor in enhancing conservation behaviours and a valuable leverage point for societal shifts towards sustainability (Richardson et al., 2022). At the individual level, studies

are shedding light on the complex associations with nature connectedness represented around the world. For example, while the act of smelling wildflowers has been found to be associated with health and wellbeing, the same study in the UK found no association between time spent in nature and health and wellbeing (Richardson et al., 2021).

Within Australia, several studies have shown that different socio-demographic factors are linked to one's level of connection with nature. In general, research shows similar patterns to those found internationally with individuals who have a higher level of education, higher income, identify as female, and older generally having higher levels of nature connection (Chawla, 2020; Fuller & Irvine, 2010; Keniger et al., 2013). For example, a national survey in Australia found that age, income, education, marital status and household structure are all important influences on various types of nature engagement (nature connectedness specifically however, was not examined) (Zuo et al., 2016). Similarly, Sockhill et al. (2022) explored the correlates of having ecocentric (as opposed to anthropocentric) values and found that those with ecocentric values tended to be older and identify as female, but earn below median income.

A study conducted in the Australian city of Brisbane found that people with higher nature relatedness reported fewer symptoms of depression, anxiety, stress and better overall health (Dean et al., 2018). Overall nature relatedness was higher in older people, females, those without

children living at home, not working, and people speaking English at home. Lin et al. (2017) have shown that aspects such as urban form in terms of yard size, and certain socio-demographics are connected to the frequency and time spent in private green space. House age and yard size is positively correlated with vegetation cover in yards, and people with a greater nature relatedness and lower socio-economic disadvantage also had greater vegetation cover. Finally, in the state of Victoria in Australia, women and older people were found to have stronger connection with nature and were more likely to spend increased time in nature during the COVID-19 pandemic compared with other residents (van Eeden et al., 2023). Living in an area of higher socio-economic advantage and having access to nearby nature (e.g., parks, waterways) were also predictors of spending time in nature during the pandemic.

However, prior to this study, research examining the correlates of nature connectedness in Australia was localised to a city or state. These challenges have resulted in piecemeal knowledge of nature connection in Australia with a gap in our understanding of nature connectedness for regional and rural populations. This study fills this gap by conducting the first national deep exploration of nature connection and its correlates in Australia.

This study also seeks to strengthen the evidence base examining nature connectedness and its correlates in three ways. Firstly, we provide a

detailed assessment of the different demographic and geographic factors associated with nature connectedness, and contrast these with the national and international literature. Secondly, we undertake a systematic comparison of different measurement tools to better understand their measurement bias and efficacy. Finally, we draw on the findings to put forward some policy recommendations on how nature connectedness can be enhanced.

2 Methodology

2.1 Data

The survey was administered to an existing panel sample run by the Online Research Unit. 4,114 participated in the survey, of which 108 responses were removed after undergoing a data cleaning process to remove speeders (those who completed the survey in less than 20% of the median completion time), straight-liners (those who give identical responses to a battery of questions), and those who responded to open-ended questions with non-sensical responses. While the process screened for respondents who provided illogical combinations of responses, none were identified. This resulted in a final sample of 4,006 de-identified individuals, with the response rate being 5%, reflective of response rates for large online panels which are typically lower than other traditional survey methods (Daikeler et al., 2020).

The sampling strategy ensured good representation was achieved across several demographic characteristics. This included a quota to obtain approximately equivalent sample sizes ($n = 500$) in each state and territory, and an urban/rural quota of 50% of respondents residing in capital cities, 25% residing in major cities outside capital cities, and 25% in all other areas. Quotas were also set for levels of education within each state to help ensure the sample was representative of a wide range of educational backgrounds. These quotas were broadly met, with only the quota in Northern Territory not being reached ($n = 306$), an area that is typically hard to reach in surveys (Australian Bureau of Statistics, 2022a). The sample characteristics indicate that there was good representation across key demographics such as gender, age, and education status, and income (Supplementary Information).

2.2 Survey design

The survey included questions on demographics, open-ended questions on nature engagement and connection, nature connection scales, nature contact, barriers to engaging with nature, wellbeing and health-related quality-of-life scales, level of interconnection with different environments, and activities undertaken in different environments (see Supplementary Information for full survey). This project has been approved by the University of Tasmania Human Research Ethics Committee (project ID 28109). All participants fully consented to being involved in the survey.

Nature connection was measured using two different measurement tools – the Inclusion of Nature in Self scale (INS), and the CN-12. We also analysed frequency of environmental visitation to examine how these results contrast with the nature connection scales. The INS asks respondents the degree to which they feel they are interconnected with nature, while the CN-12 comprises a series of 12 questions regarding nature connection across three dimensions (identity, experience, and philosophy) (Hatty et al., 2020). Following the approach used by Hatty et al. (2020), the 12 data items were averaged to calculate an overall score, with the data items in each of the three dimensions also averaged to obtain the dimension scores. Finally, the question on environmental visitation asks respondents how often respondents have spent time in nature, with nine response options provided ranging from ‘never’ to ‘every day’. These three variables were chosen as they conceptualise nature connection and contact in different ways (the INS being a single dimension scale, the second being a more standard multi-dimensional, quantitative scale, and the third being a more objective scale of nature connecting behaviour).

Barriers to nature connection were assessed based on a question asking respondents “do you wish you could spend more time in nature?”. For participants who selected ‘yes’, eight response options were provided, while four responses options were provided for those who selected ‘no’¹.

¹ Response options for those who selected ‘yes’ were: Too busy/not enough time; Lack of access to nature; Costs of accessing nature; Health issues prevent access; Friends and family aren’t into nature; Safety concerns; Unsure of where to go; and Other. Response options for those who selected ‘no’ were: I don’t like spending time in nature; I feel I

Responses which selected 'other' were analysed and re-coded to existing codes where appropriate.

2.3 Analysis

Associations were assessed using regression modelling. For outcome variables that comprised a single Likert scale (INS and environmental visitation), ordered logit models were produced with the demographic variables being the independent variable. For the CN-12, which is a continuous variable, ordinary least squares (OLS) models were produced.

Population groups examined were based on key demographic variables collected in the survey: age, gender, Indigenous status, whether the individual self-identifies as having a disability, language spoken at home, employment status, highest level of education, personal income, socioeconomic status of area, state of current location, remoteness of current location, and remoteness level respondent grew up in. To ensure no multicollinearity amongst the independent variables, variance inflation factors were calculated which indicated that multicollinearity was not an issue (Table 6 Variance Inflation Factor analysis in Supplementary Information).

spend enough time in nature; I think nature is scary or unsafe; and Other. Note there was a minor technical error in the survey, with participants who selected 'yes' being asked "Why are you **not** interested in spending more time in nature?", instead of "Why are you unable to spend more time in nature?". The majority of the sample (86.3%) responded as expected using the response options, while 13.7% of the sample responded as 'Other'. 5.2% (n=154) of these responses noted an issue with the way the question was asked. These responses were removed from the analysis on specific barriers.

Some data transformation was undertaken for three of the independent variables: employment status, personal income, and remoteness level respondent grew up in. For employment status, a separate category for ‘student only’ was created based on combining responses to this variable and a separate question on whether the respondent is currently studying. Furthermore, 97% of the 62 respondents who noted their employment status as ‘other’ could be recoded to a pre-existing category based on the open-ended responses they provided². Similarly for remoteness level respondent grew up in, eight respondents who identified that they live in “a mix of these/other” to childhood environment were recoded as they could be clearly aligned with one of the three other categories. The remaining respondents (n=45) were from a mix of environments, so these were recoded to “A mix”. Finally, personal income was transformed to income quintiles data from the Australian Bureau of Statistics (2022b).

3 Results

3.1 Who is connecting with nature?

3.1.1 Measuring nature connection using three different measures

As outlined in the methodology, three separate measures were applied to examine the distribution of nature connectedness across Australia: the

² A common response to the open-ended question was that they are receiving the disability pension. This was recoded to “not working or studying”.

Inclusion of Nature in Self (INS) scale; the CN-12; and a question on environmental visitation (see Figure 3 Distribution of Inclusion of Nature in Self scale responses, Figure 4 Distribution of CN-12 responses, and Figure 5 Responses to environmental visitation question: “Over the last year or two, about how often have you generally spent time in nature?” in Supplementary Information for distributions).

The correlations between the three variables were firstly examined, indicating that the three are highly correlated (Table 1).

Table 1 Correlations between three nature connection measures

	INS	CN-12
INS		
CN-12	0.648***	
Environmental visitation	0.413***	0.509***

Note: *** significant at 1% level ** significant at 5% level * significant at 10% level.

OLS models were then produced to examine the key socio-demographic characteristics associated with the three measures (Table 2). The results indicate that there are some consistencies when using the three different measures. For example, females, those with postgraduate qualifications, and those who grew up in a rural/regional area are found to have greater nature connectedness based on the two nature connection tools, and also have higher environmental visitation. While there is little variation between older and younger Australians in relation to environmental visitation, those in older age groups were found to have higher nature connectedness according to both the INS and CN-12. Indigenous Australians had higher levels of nature connectedness according to the INS, but not the CN-12.

Highest level of education was found to be associated with both nature connectedness and environmental visitation. Those with a certificate/diploma and postgraduate qualifications had greater nature connectedness when using both the INS and CN-12 compared to those whose highest level of education was high school. Individuals with undergraduate qualifications had higher nature connectedness only when measuring nature connectedness through the CN-12, and all university graduates had higher environmental visitation when compared to those whose highest level of education was high school.

One's employment status was a significant predictor for the two nature connectedness measures, and environmental visitation in particular. Compared to those who work full-time, individuals who are self-employed were found to have higher nature connectedness based on the INS, and those who work part-time had higher levels of nature connection based on the CN-12. Those who work full-time had significantly less environmental visitation than those who work part-time, casually, are self-employed, undertake home duties/volunteer work, or are retired.

There was little variation found between states. When using the INS, the Australian Capital Territory had significantly lower levels of nature connectedness compared to New South Wales (but not when using the CN-12). There was no variation found in the CN-12 model, while both Western Australia and the Australian Capital Territory showed

significantly higher levels of environmental visitation compared to New South Wales.

While those living in regional and remote areas had significantly higher levels of environmental visitation than those living in major cities, there was less variation observed when examining nature connectedness.

Those living in regional areas had significantly higher nature connection when using the CN-12, with no difference found based on the INS.

Childhood environment appears to be an important factor, with those who grew up in rural/regional areas having significantly higher nature connectedness using both the INS and CN-12, and higher environmental visitation compared to those who grew up in a large/capital city.

Table 2 Full model output using the three measures of nature connection

	INS	CN-12	Environmental visitation
Age			
18-30 years	-0.672*** (0.143)	-0.236*** (0.0911)	0.255* (0.146)
31-50 years	-0.389*** (0.136)	-0.108 (0.0862)	-0.0355 (0.139)
51-70 years	-0.0864 (0.115)	0.0347 (0.0729)	0.278** (0.120)
Gender			
Identifies as female	0.159** (0.0632)	0.206*** (0.0399)	0.384*** (0.0630)
Non-binary	0.515 (0.533)	-0.0347 (0.361)	0.124 (0.552)
Identifies as Aboriginal and/or Torres Strait Islander	0.562** (0.233)	0.213 (0.137)	0.382* (0.218)
Has disability/ies	-0.0155 (0.114)	0.0402 (0.0702)	-0.277** (0.114)
Speaks language other than English at home	0.424*** (0.107)	0.190*** (0.0678)	-0.104 (0.103)
Highest level of education			
Has not completed high school (Year 12)	-0.0276 (0.137)	-0.126 (0.0855)	-0.433*** (0.140)
Certificate/Diploma	0.260*** (0.100)	0.153** (0.0631)	0.108 (0.100)
Undergraduate	0.147 (0.101)	0.216*** (0.0646)	0.236** (0.101)
Postgraduate	0.268** (0.109)	0.273*** (0.0691)	0.449*** (0.109)
Employment status			
Part-time	0.0552 (0.103)	0.140** (0.0656)	0.283*** (0.101)
Casual	-0.148 (0.136)	0.00509 (0.0881)	0.272** (0.134)

	INS	CN-12	Environmental visitation
Self-employed	0.336** (0.133)	0.129 (0.0840)	0.505*** (0.135)
Engaged in home duties/volunteer work	0.0440 (0.155)	0.119 (0.0951)	0.716*** (0.155)
Retired	-0.0562 (0.116)	0.0708 (0.0736)	0.536*** (0.120)
Not working/studying	0.164 (0.196)	0.0920 (0.121)	0.374* (0.193)
Student only	0.119 (0.240)	0.102 (0.158)	-0.0464 (0.234)
Personal income quintile			
Lowest income quintile	0.357*** (0.119)	0.0761 (0.0740)	-0.133 (0.119)
2nd-lowest income quintile	0.172* (0.102)	0.0595 (0.0648)	0.0188 (0.101)
4th-highest income quintile	0.00371 (0.0968)	0.0190 (0.0614)	0.0480 (0.0948)
Highest income quintile	-0.0397 (0.110)	-0.123* (0.0701)	0.127 (0.108)
Standardised IRSAD score	0.0390 (0.0398)	0.0372 (0.0251)	0.0668* (0.0396)
State/territory			
Victoria	0.0291 (0.117)	0.0704 (0.0742)	-0.0199 (0.117)
Queensland	0.0218 (0.118)	0.0448 (0.0744)	0.0433 (0.119)
South Australia	0.101 (0.120)	0.116 (0.0754)	0.309** (0.121)
Western Australia	-0.169 (0.119)	0.0639 (0.0749)	0.239** (0.119)
Tasmania	-0.161 (0.127)	-0.00470 (0.0805)	-0.115 (0.128)
Australian Capital Territory	-0.250** (0.127)	0.00571 (0.0806)	0.257** (0.125)
Northern Territory	-0.103 (0.151)	0.137 (0.0951)	-0.140 (0.150)
Current remoteness level			
Regional	0.0903 (0.0904)	0.125** (0.0569)	0.585*** (0.0913)
Remote	0.336* (0.184)	0.188 (0.116)	0.657*** (0.186)
Childhood remoteness level			
Small/medium city	0.0735 (0.0820)	0.0691 (0.0522)	-0.0226 (0.0817)
Rural/regional	0.250*** (0.0778)	0.199*** (0.0491)	0.293*** (0.0778)
A mix	0.0668 (0.256)	0.228 (0.170)	0.128 (0.256)
N	3,510	3,510	3,510
Pseudo R-squared/Adjusted R-squared	0.014	0.035	0.019

Note: *** significant at 1% level ** significant at 5% level * significant at 10% level. Base case is aged 51-70, identifies as male, Aboriginal and/or Torres Strait Islander, does not have a disability, speaks only English at home, highest level of education is high school completion (year 12 certificate), employed full time, is in the third income quintile, currently lives in NSW, lives in a major city, and grew up in a large/capital city.

3.1.2 Examining nature connectedness through dimensions

The three dimensions of the CN-12 (Identity, Experience, and Philosophy) were analysed separately to examine what dimensions are driving the differences between population groups (Table 3). Overall, similar results

were observed for the three dimensions, however there were some key differences. Firstly, the differences observed by employment status appear to be driven by identity and philosophy dimensions, but not experience. Those who were working part-time, self-employed, undertaking home duties/volunteer work, or retired had a significantly higher score than those working full-time for the philosophy dimension but not the experience dimension. There were also few differences observed in the Identity dimension in relation to employment status.

Table 3 Ordinary Least Squares models with CN-12 dimensions as dependent variables

	Identity dimension	Experience dimension	Philosophy dimension
Age			
18-30 years	-0.255** (0.104)	-0.203** (0.0983)	-0.249*** (0.0904)
31-50 years	-0.105 (0.0980)	-0.124 (0.0930)	-0.0916 (0.0856)
51-70 years	0.0357 (0.0830)	0.0303 (0.0787)	0.0388 (0.0724)
Gender			
Identifies as female	0.201*** (0.0453)	0.154*** (0.0430)	0.282*** (0.0396)
Non-binary	-0.00694 (0.410)	-0.225 (0.390)	0.173 (0.358)
Identifies as Aboriginal and/or Torres Strait Islander	0.212 (0.156)	0.238 (0.148)	0.179 (0.136)
Has disability/ies	0.0331 (0.0799)	-0.0342 (0.0758)	0.151** (0.0697)
Speaks language other than English at home	0.217*** (0.0771)	0.141* (0.0732)	0.210*** (0.0673)
Highest level of education			
Has not completed Year 12	-0.133 (0.0972)	-0.123 (0.0923)	-0.119 (0.0849)
Certificate/Diploma	0.197*** (0.0718)	0.124* (0.0682)	0.117* (0.0627)
Undergraduate	0.264*** (0.0735)	0.199*** (0.0698)	0.159** (0.0642)
Postgraduate	0.366*** (0.0786)	0.237*** (0.0746)	0.168** (0.0686)
Employment status			
Part-time	0.187** (0.0746)	0.103 (0.0709)	0.110* (0.0652)
Casual	0.0431 (0.100)	-0.0578 (0.0951)	0.0256 (0.0875)
Self-employed	0.161* (0.0955)	0.0630 (0.0907)	0.166** (0.0834)
Engaged in home duties/volunteer work	0.0757 (0.108)	0.106 (0.103)	0.209** (0.0944)
Retired	0.0469 (0.0837)	0.0184 (0.0794)	0.180** (0.0731)
Not working/studying	0.200 (0.137)	-0.0303 (0.130)	0.0745 (0.120)
Student only	0.202 (0.180)	0.0395 (0.171)	0.0169 (0.157)
Personal income quintile			
Lowest income quintile	0.103	0.0954	0.00529

	Identity dimension	Experience dimension	Philosophy dimension
2nd-lowest income quintile	(0.0842) 0.0278	(0.0799) 0.0975	(0.0735) 0.0615
4th-highest income quintile	(0.0737) -0.00490	(0.0700) 0.0511	(0.0644) 0.0160
Highest income quintile	(0.0699) -0.158**	(0.0663) -0.0585	(0.0610) -0.150**
Standardised IRSAD score	(0.0798) 0.0436	(0.0757) 0.0378	(0.0696) 0.0256
	(0.0285)	(0.0271)	(0.0249)
State/territory			
Victoria	0.0947 (0.0843)	0.0435 (0.0801)	0.0657 (0.0736)
Queensland	0.0611 (0.0846)	0.0178 (0.0803)	0.0536 (0.0739)
South Australia	0.0883 (0.0857)	0.105 (0.0814)	0.177** (0.0748)
Western Australia	0.0438 (0.0852)	0.0653 (0.0809)	0.0955 (0.0744)
Tasmania	-0.0392 (0.0915)	-0.0256 (0.0869)	0.0806 (0.0799)
Australian Capital Territory	-0.0294 (0.0916)	-0.0208 (0.0870)	0.0995 (0.0800)
Northern Territory	0.138 (0.108)	0.0995 (0.103)	0.186** (0.0944)
Current remoteness level			
Regional	0.125* (0.0647)	0.130** (0.0614)	0.119** (0.0565)
Remote	0.223* (0.132)	0.194 (0.125)	0.121 (0.115)
Childhood remoteness level			
Small/medium city	0.0844 (0.0593)	0.116** (0.0563)	-0.0184 (0.0518)
Rural/regional	0.240*** (0.0559)	0.256*** (0.0531)	0.0532 (0.0488)
A mix	0.259 (0.193)	0.226 (0.183)	0.181 (0.169)
Constant	4.495*** (0.139)	4.946*** (0.132)	5.231*** (0.121)
N	3,510	3,510	3,510
Adjusted R-squared	0.035	0.023	0.040

Note: *** significant at 1% level ** significant at 5% level * significant at 10% level. Base case is aged 51-70, identifies as male, Aboriginal and/or Torres Strait Islander, does not have a disability, speaks only English at home, highest level of education is high school completion (year 12 certificate), employed full time, is in the third income quintile, currently lives in NSW, lives in a major city, and grew up in a large/capital city.

3.2 Barriers to connecting with nature

We found that 74.0% of respondents would like to spend more time in nature than they currently do (Figure 1). Time poverty was identified as the biggest barrier to spending time in nature (72.2% of respondents). This was followed by lack of access to nature (15.8%), health issues prevent access (11.8%), unsure where to go (11.5%), and costs of accessing nature (11.5%). A small portion of respondents provided an ‘other’ response (2.3%), mentioning barriers such as weather, ageing,

restrictions in allowing pets to certain nature areas, caring duties, access to transport, and not wanting to impact the environment.

There are notable differences for some barriers by remoteness (Figure 1). Lack of access to nature is more commonly noted by people in remote areas and major cities, highlighting that people living in regional areas are able to more easily access natural environments to engage in. Health issues preventing access is a more common barrier in major cities and regional areas, potentially indicating that the travel required in these areas to get to natural environments is a barrier for those with health issues. Finally, safety concerns are highest in remote areas, the reasons for which would need to be explored through further research.

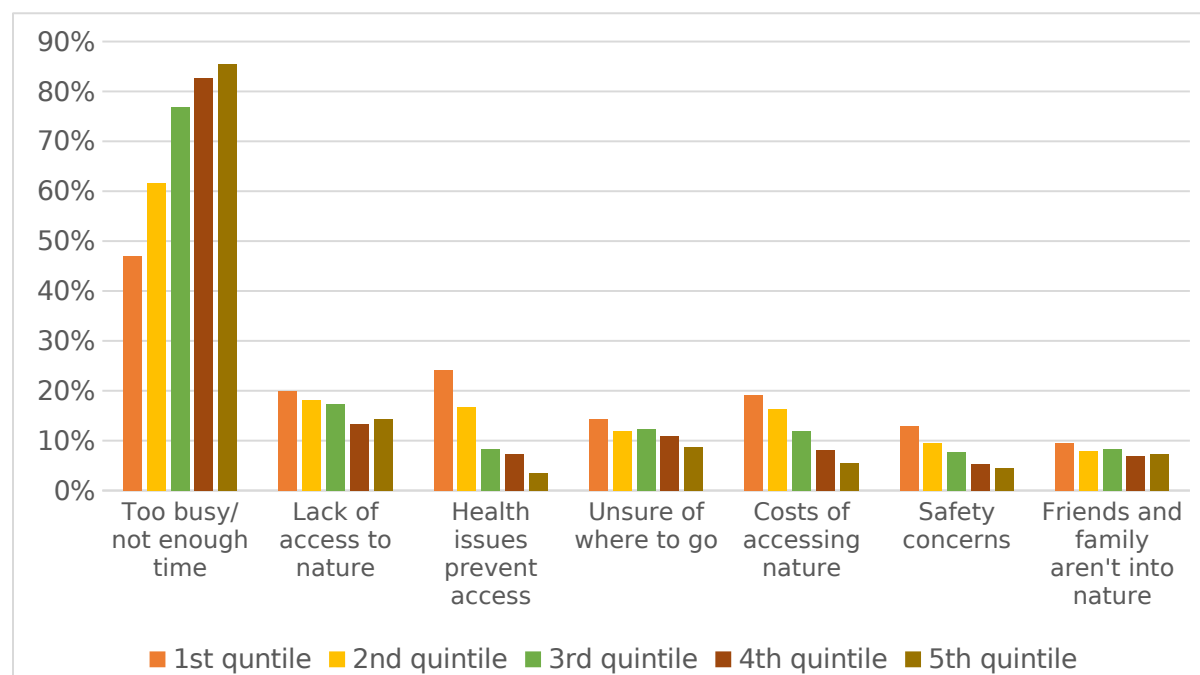
Figure 1 Barriers to spending more time in nature by current remoteness level



The barriers were also analysed by income quintile (Figure 2). Those in the highest quintiles were substantially more likely to report being too

busy or not having enough time to engage with nature. In contrast, most other barriers were faced predominantly by individuals on lower incomes.

Figure 2 Barriers to nature connection by income quintile



OLS models analysing all the barriers by demographic and geographic characteristics indicated that certain groups are facing multiple barriers (Table 4). For example, when controlling for all else, people on lower incomes were significantly more likely to identify lack of access, cost of access, and safety concerns, while people with disability were significantly more likely to identify health issues, and safety concerns. This analysis also identifies particular areas where policy reform can help enable greater access to nature. For example, certain groups, such as younger people and those who speak a language other than English at home were significantly more likely to identify being unsure of where to go as a barrier.

Table 4 Regression output with barriers as dependent variables

	Not enough time	Lack of access	Costs of access	Health issues	Friends aren't interest ed	Safety concern s	Unsure of where to go
Age							
18-30 years	0.455* (0.234)	0.692** (0.296)	-0.167 (0.318)	-1.619*** (0.335)	0.281 (0.383)	-0.685* (0.377)	1.109*** (0.395)
31-50 years	0.184 (0.221)	0.340 (0.288)	0.243 (0.295)	-1.147*** (0.293)	0.302 (0.368)	-0.562 (0.356)	0.930** (0.388)
51-70 years	0.0539 (0.191)	-0.00668 (0.252)	0.288 (0.254)	-1.108*** (0.224)	0.0901 (0.309)	-0.573* (0.307)	0.304 (0.350)
Gender							
Identifies as female	0.0576 (0.0992)	0.0228 (0.117)	-0.445*** (0.134)	0.0384 (0.154)	-0.215 (0.160)	0.420** (0.167)	-0.00204 (0.136)
Non-binary	0.0157 (0.814)	-1.031 (1.105)		2.095** (0.864)		0.682 (1.111)	1.205 (0.765)
Identifies as Aboriginal and/or Torres Strait Islander	-0.266 (0.302)	-0.222 (0.384)	-0.623 (0.537)	-0.658 (0.645)	-0.447 (0.611)	0.376 (0.464)	0.223 (0.368)
Has disability/ies	-0.997*** (0.164)	0.341* (0.191)	0.214 (0.203)	2.044*** (0.183)	0.228 (0.261)	0.688*** (0.233)	0.254 (0.226)
Speaks language other than English at home	-0.131 (0.158)	0.212 (0.171)	0.280 (0.208)	-0.432 (0.308)	0.308 (0.235)	0.239 (0.240)	0.418** (0.195)
Highest level of education							
Has not completed high school	-0.409* (0.213)	-0.108 (0.268)	-0.0887 (0.275)	0.288 (0.312)	0.0779 (0.334)	-0.00359 (0.314)	0.147 (0.275)
Certificate/Diploma	-0.0838 (0.157)	-0.107 (0.188)	-0.00041 (0.203)	0.516** (0.250)	-0.230 (0.249)	-0.654*** (0.250)	-0.155 (0.199)
Undergraduate	-0.0540 (0.162)	0.131 (0.183)	-0.326 (0.220)	0.374 (0.267)	0.104 (0.240)	-0.174 (0.241)	-0.290 (0.201)
Postgraduate	-0.0974 (0.174)	0.120 (0.203)	0.0349 (0.232)	-0.00810 (0.294)	-0.383 (0.281)	-0.396 (0.275)	-0.755*** (0.250)
Employment status							
Part-time	-0.0219 (0.159)	-0.00529 (0.185)	0.322 (0.213)	0.650** (0.258)	0.0264 (0.266)	0.0738 (0.242)	0.0513 (0.204)
Casual	-0.0577 (0.216)	0.215 (0.240)	0.412 (0.278)	0.0116 (0.417)	0.772*** (0.292)	-0.422 (0.373)	0.119 (0.266)
Self-employed	-0.144 (0.214)	0.0242 (0.276)	0.135 (0.304)	0.327 (0.366)	-0.488 (0.477)	0.0278 (0.366)	-0.390 (0.365)
Engaged in home duties/volunteer work	-0.768*** (0.210)	-0.316 (0.304)	0.477* (0.285)	0.675** (0.322)	0.0278 (0.403)	-0.538 (0.394)	0.397 (0.273)
Retired	-1.516*** (0.184)	0.264 (0.245)	0.143 (0.249)	1.188*** (0.274)	0.689** (0.307)	-0.384 (0.326)	0.0437 (0.305)
Not working/studying	-0.940*** (0.269)	0.916*** (0.291)	0.802** (0.325)	0.414 (0.397)	0.326 (0.475)	-1.103* (0.575)	0.146 (0.366)
Student only	-0.396 (0.334)	0.970*** (0.328)	0.725* (0.408)	0.954** (0.486)	0.327 (0.505)	-0.243 (0.559)	0.579 (0.362)
Personal income quintile							
Lowest income quintile	-0.637*** (0.180)	0.0110 (0.212)	0.337 (0.232)	0.179 (0.267)	-0.110 (0.287)	0.439 (0.281)	0.0872 (0.241)
2nd-lowest income quintile	-0.413*** (0.158)	-0.0148 (0.184)	0.217 (0.206)	0.0764 (0.245)	-0.193 (0.256)	0.147 (0.253)	-0.0135 (0.214)
4th-highest income quintile	0.0612 (0.155)	-0.402** (0.179)	-0.404* (0.212)	0.0864 (0.253)	-0.204 (0.242)	-0.544** (0.259)	-0.151 (0.202)
Highest income quintile	0.163 (0.180)	-0.383* (0.202)	-0.827*** (0.272)	-0.540 (0.342)	-0.0862 (0.274)	-0.769** (0.309)	-0.364 (0.244)
Standardised IRSAD score	-0.00123 (0.0624)	0.0850 (0.0735)	-0.0355 (0.0830)	-0.0228 (0.0940)	0.000127 (0.101)	-0.0521 (0.103)	-0.0507 (0.0848)
State/territory							
Victoria	-0.266 (0.186)	0.355 (0.223)	-0.0353 (0.232)	0.218 (0.281)	0.861** (0.346)	0.529 (0.331)	-0.0415 (0.285)
Queensland	-0.374** (0.186)	0.466** (0.225)	-0.322 (0.246)	0.280 (0.277)	0.389 (0.378)	0.518 (0.338)	0.221 (0.277)
South Australia	-0.0104	0.165	-0.319	-0.0565	0.372	0.0121	0.312

	Not enough time	Lack of access	Costs of access	Health issues	Friends aren't interest ed	Safety concern s	Unsure of where to go
	(0.192)	(0.231)	(0.246)	(0.294)	(0.374)	(0.363)	(0.270)
Western Australia	-0.235	0.0919	-0.345	-0.250	0.594*	0.523	0.407
	(0.185)	(0.226)	(0.245)	(0.289)	(0.351)	(0.329)	(0.266)
Tasmania	0.0799	0.137	-0.261	0.269	1.206***	0.503	0.527*
	(0.205)	(0.275)	(0.266)	(0.309)	(0.380)	(0.387)	(0.286)
Australian Capital Territory	-0.00298	-0.115	-0.270	0.180	1.013***	0.632*	0.506*
	(0.203)	(0.237)	(0.277)	(0.317)	(0.351)	(0.354)	(0.283)
Northern Territory	-0.353	0.823***	-0.525	0.142	0.944**	1.275***	0.328
	(0.231)	(0.281)	(0.340)	(0.397)	(0.438)	(0.394)	(0.348)
Current remoteness level							
Regional	0.0644	-0.717***	-0.123	-0.231	-0.455*	-0.574**	-0.273
	(0.135)	(0.174)	(0.179)	(0.204)	(0.248)	(0.243)	(0.194)
Remote	-0.0615	0.0495	0.519	-0.176	0.0311	-0.00082	-0.450
	(0.280)	(0.314)	(0.369)	(0.496)	(0.457)	(0.418)	(0.433)
Constant	1.456***	-2.005***	-1.792***	-2.302***	-3.174***	-2.101***	-2.842***
	(0.309)	(0.386)	(0.405)	(0.457)	(0.531)	(0.506)	(0.485)
N	2,616	2,616	2,607	2,616	2,607	2,616	2,616
Pseudo R-squared	0.154	0.052	0.057	0.240	0.039	0.064	0.050

Note: *** significant at 1% level ** significant at 5% level * significant at 10% level. Base case is aged 51-70, identifies as male, Aboriginal and/or Torres Strait Islander, does not have a disability, speaks only English at home, highest level of education is high school completion (year 12 certificate), employed full time, is in the third income quintile, currently lives in NSW, lives in a major city, and grew up in a large/capital city.

4 Limitations

Before discussing the results in greater detail, there are some limitations in the study that should be noted. First, as this was an online survey, there may be some sample bias toward those who are online. The sample was broadly representative of the Australian population (Table 5 Sample characteristics in Supplementary Information), and had adequate representation from older Australians who may be more likely to be offline. However, there may be some bias through unobserved characteristics.

Second, while the sample size was adequate for this analysis and broadly representative of the population, there were some population groups who were under-represented. Indigenous Australians, those who speak a language other than English, and those with highest education level as high school were under-represented in the survey. It should be noted also that larger states and those living in major cities were also under-represented, however this was by design through the sampling approach used to ensure that analysis could be undertaken for smaller states and those living in regional and rural areas.

5 Discussion

This is the first national survey to explore nature connectedness and its variation across diverse geographies and environments in Australia. The findings make an important contribution to the existing evidence base on

nature connectedness both within Australia and globally by examining the key characteristics associated with nature connectedness and assessing the use of different measurement tools. This section will discuss these results in greater detail by firstly examining the population groups who showed greater nature connectedness and how this compares to previous literature. We will then discuss the consistencies and inconsistencies in results between the three different measures, before finally outlining how policy can help support enhanced nature connectedness.

5.1 Variation in nature connectedness across Australia

The findings indicated that those identifying as female, those with postgraduate qualifications, those who work part-time, are self-employed, or retired, and those who grew up in a rural/regional area had greater nature connectedness across all three measures. Further, when examining nature connection specifically we also find that older Australians, Indigenous Australians, and those who speak a language other than English are more connected with nature. These findings align with previous studies, specifically, for age (Lin et al., 2014; Meis-Harris et al., 2019; Selinske et al., 2023), gender (Meis-Harris et al., 2019; Selinske et al., 2023), employment status (Meis-Harris et al., 2019), education level (Lin et al., 2014) and rural residence (Bashan et al., 2021).

At a broad scale, Richardson et al. (2022) found that that regions with a higher proportion of older residents and higher levels of biodiversity were associated with populations who had higher connection with nature. Combined, these findings may support that access to nature is an important factor predicting connection. However, urban vs rural residence and access to local nature are not always predictors of connection with nature (Meis-Harris et al., 2019; van Eeden et al., 2023) and it is important to consider that populations are heterogenous at a local scale thus there are other, perhaps cultural and demographic factors, that may drive connection with nature more so than access to nature (Selinske et al., 2023). Our findings accord with this in that while there appeared to be a link between environmental visitation and nature connection for some groups, certain population groups had higher levels of nature connection despite having lower levels of visitation.

Examining the CN-12 dimensions provides some evidence to better understand what may be driving differences in nature connectedness. For example, our results show that variation in nature connectedness by employment status was largely driven by the philosophy dimension. This indicates that the higher levels of nature connectedness found for people in certain employment types is not simply driven by these individuals having more time to engage in nature. In contrast, the differences by childhood environment are driven by divergences in identity and experience, with no difference observed in the philosophy dimension.

The divergent dimensions driving the differences in nature connectedness for different population groups may be explained by some individuals having greater control over certain demographic characteristics (e.g. employment status) compared to others (e.g. childhood environment). More specifically, there may be an association between the type of person who elects to undertake a particular style of work (e.g. self-employed) and their philosophical feelings toward nature connection which explains the finding regarding employment status. Adults who participated in the survey likely had less control over childhood environment, which may explain why both identity and experience were the dimensions driving higher nature connection for those living in rural/regional areas.

5.2 The measure we use matters

By including two different measures of nature connectedness, and one measure of nature engagement, we can explore discrepancies between the measures. Several population groups were shown to have higher levels of nature connection according to the INS and/or CN-12, but no difference based on environmental visitation. This includes those who are linguistically diverse, those with a certificate/diploma, and those in the lowest income quintile. These results highlight that nature connection is more than just being outside, involving more introspective and reflective components.

Furthermore, those aged 18-30 were shown to have lower nature connectedness according to the INS and CN-12 compared to those aged over 70, but have higher levels of environmental visitation. Similarly, those in the Australian Capital Territory scored lower on the INS compared to those in the state of New South Wales but have higher levels of environmental visitation, suggesting a possible effect of local culture influencing outdoor recreation.

One notable difference between the scales was that the INS identified stronger nature connection among Indigenous Australians than non-Indigenous Australians, but this was not evidenced in responses to the CN-12. Given that it is widely established that Indigenous Australians have a deep and profound connection to Country (Altman & Kerins, 2012; Sangha et al., 2015; Yap & Yu, 2016) this finding warrants detailed examination in future. Concerns have been raised that nature connection instruments have been developed primarily based on studies conducted with samples in Western countries, and thus may have limited relevance to more diverse ways of knowing and connecting with non-human nature (Keaulana et al., 2021; Sedawi et al., 2021; Taylor, 2018)

We are unaware of other studies that have documented this difference between measurement instruments for Indigenous respondents, although differences have been detected between in the applicability of instruments for English-speaking compared with non-English-speaking populations (Tam, 2013). We recommend that further research consider

how and why different scales might be variably relevant to Indigenous communities and culturally and linguistically diverse communities more broadly so that appropriate tools can be used (or developed) to understand the population of interest.

5.3 Enhancing access to nature

Our research points to various ways that policy can help enhance nature connectedness across Australia and globally. Firstly, the significance of childhood environment highlights the importance of enhancing access to nature for those in urban areas. This is especially important when considering that around 85% of Australians live in cities (Coffee et al., 2016; Ruming & Baker, 2021) and that urban areas are becoming more populated and compact, leading to reduced green space availability (Haaland & van den Bosch, 2015; Lin et al., 2015). Thus, cities must consider carefully how to manage green space, and increase opportunities for interacting in green space in meaningful ways in order to maintain or increase levels of connection with nature.

While much of the policy in the past decade has concentrated on increasing the availability of green space in cities (Aronson et al., 2017; Threlfall et al., 2017), a greater understanding of motivations to be in nature is changing the perceptions of interventions. Increasingly, research is showing that one's level of nature connection impacts on the how mindfully an individual interacts with nature, and this desire to

mindfully interact with nature can act as a moderating factor in the well-being benefits gained from the time spent in green spaces (Chang et al., 2024; Dean et al., 2018; Pritchard et al., 2020). Policies that consider how to increase nature connectedness and create opportunities for meaningful interactions for urban residents can then increase the benefits accrued to individuals.

Recent research on affordances of nature has helped develop a better understanding of potential interventions useful for increasing mindful nature interactions (Brymer et al., 2021). Understanding that different groups of people (ages, cultures, physical abilities) will have different needs or desired ways to be in green spaces is important so that spaces can be adjusted as communities change in neighbourhoods or even at the city scale (Hadavi et al., 2015). Green spaces need to be designed along universal access principles, as well as age- and dementia-friendly environmental design principles to maximise reach (Fleming et al., 2023). It is equally important to recognise that individuals or groups may have to learn how to use and interact with different types of greens spaces to gain the most benefit from being in those spaces. Education around science and nature may be required to help individuals overcome fears associated with insects or animals. Programs around nature play, therapeutic horticulture or outdoor exercise may be required to teach people how to interact with green space in new, mindful ways (Araújo et al., 2019). A combination of adjusting the environment to meet the varied needs of the community as well providing processes to help people of all

ages engage with nature (and with each other) are both necessary for increased engagement – especially as the population of cities change dynamically through space and time (Lennon et al., 2017; Lin & Andersson, 2023).

It has been suggested that increasing opportunities for young people to interact with nature is important, as well as supporting older people's involvement in conservation, plus focusing on the need to target and direct various policies (Zuo et al., 2016). Our results support these recommendations showing the importance of childhood living environment for nature connection and the need to support older people to continue active engagement in conservation and other pro-environmental behaviours.

5.4 Reducing structural barriers to engaging with nature

Our research identified numerous structural barriers to engaging with nature that indicate a need for policy reform – particularly in the areas of public health and planning. Our findings show parallels between inequities of nature access and health inequities. It is well established that people on low incomes with lower levels of education experience poorer health outcomes (Brown & Homan, 2023). These same indicators of social determinants of health – the conditions of daily life – are associated with lower levels of nature connection. People experiencing structural barriers to health and wellbeing are also faced with structural

barriers to nature connection: a double bind, in effect. Conversely, if people with high levels of education, income and employment have greater nature connectedness, they are most likely afforded even greater opportunity for good health (Barragan-Jason et al., 2023). This finding suggests an important role for public health policy, with great promise for addressing this discriminatory situation. The incorporation of nature connection initiatives and opportunities into health promotion and preventative health strategies, for example, could be a simple step to create positive socio-*ecological* determinants of health and help to restore health inequities (Jackson, 2017).

Another significant nature connectedness inequity with policy implications is that accessing nature is prohibitive to some people due to cost. Cost may include the actual price of accessing natural spaces – from ticketed entry to parks, or high-end glamping and guided bushwalking tours. We need parks, wetlands, beaches and wilderness areas that are publicly accessible – free – spaces to ensure equitable access. Cost may also refer to the cost of travel to access nature. In many places, availability of free green space is increasingly diminished (Colding et al., 2020). People who live without ‘nearby nature’ (nature that is proximal to the places people live (Kaplan, 1992)) can only generate their connection experience by going elsewhere. Compounding this cost is that travel can also be difficult for people with disability or health issues, requiring additional supports. The implications for urban planning policies are evident: free and open green spaces within walking

distance of everyone's home would be an invaluable strategy for enhancing nature connectedness. The benefits would not only be for people without a home garden space, but also those for whom transport is difficult or unaffordable – rectifying multiple social and health inequities.

Our findings also indicate that although an embodied experience of nature is important (physically accessing nature) so too is enabling an emotional affinity (Richardson et al., 2022). This means that not only is the quantity and location of accessible green spaces important, so too is the quality of those spaces (Oh et al., 2022). Triguero-Mas et al. (2021) found an unsavoury practice of government and private housing organisations using the green space branding to sell housing, while not attending to pollution and other environmental degradation at those same sites. Attention to design principles, and incorporating green space and environmental management strategies into local, state and national environment policy areas is crucial to ensure that the benefits of nature connectedness are maximised.

6 Conclusion

This paper presents the first examination of nature connectedness at the national level in Australia. It also contributes to the international literature on nature connection by exploring the correlates of nature connectedness, scrutinising various nature connection measurement

tools, and exploring how policy can help support individuals to be more connected with nature.

Our results have shown that certain population groups have high levels of nature connection. This includes older Australians, those who grew up in a rural/regional area, those who work part-time, are self-employed, or retired, Indigenous Australians, and those who speak a language other than English. While our analysis cannot uncover the precise reasons for certain population groups having higher levels of nature connectedness, it likely comes down to access to nature, time availability, and cultural factors. Our analysis also emphasises how important it is to choose our measure of nature connectedness carefully, with our results highlighting that an objective measure of environmental visitation does not necessarily correlate with feelings of nature connection. Moreover, the two nature connection scales we used showed inconsistent results for certain population groups. In particular, Indigenous Australians, who are widely recognised to have a profound connection with nature, had significantly higher nature connectedness according to the INS, but not the CN-12. We suggest that further research should explore reasons for this in greater depth.

Importantly, our analysis points to valuable policy levers that can be used to enhance nature connectedness. These include increasing green space in urban areas, enhancing opportunities for meaningful interactions with nature in urban spaces, and addressing structural inequalities to provide

greater opportunities to access nature for certain groups such as those on lower incomes, people with disability, younger people, and those from a culturally and linguistically diverse background.

Being connected with nature can enrich the lives of individuals and help support people to develop greater awareness of the importance of our natural environment. With the world facing global environmental and sustainability challenges, enhancing nature connectedness is one way that can help generate positive change for both people and planet.

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7 Supplementary information

Table 5 Sample characteristics

Variable	n (%)	Percentage	National benchmark (2021 Census)
Age			
18-30 years	832	20.8%	21.6%
31-50 years	1,289	32.1%	35.0%
51-70 years	1,334	33.3%	29.2%
>70 years	551	13.8%	14.3%
Gender ³			
Male	1,913	47.8%	49.3%
Female	2,074	51.9%	50.7%
Non-binary	12	0.3%	N/A
Indigenous status			
Identifies as Aboriginal and/or Torres Strait Islander	79	2.0%	3.4%
Non-Indigenous	3,883	98.0%	96.6%
Disability			
Has disability/ies	363	9.1%	N/A
No disability/ies	3,643	90.9%	N/A
Linguistic diversity			
Speaks a language other than English at home	365	9.1%	22.3%
Speaks only English	3,641	90.9%	77.7%
Educational status			
Has not completed Year 12	353	8.8%	8.1%
Year 12 certificate	561	14%	33.4%
Certificate/Diploma	1,183	29.5%	31.5%
Undergraduate	1,052	26.3%	19.6%
Postgraduate	857	21.4%	7.4%
Employment status			
Full-time	1,716	42.9%	38.2%
Part-time	452	11.3%	21.3%
Casually employed	243	6.1%	N/A
Self-employed	258	6.4%	N/A
Home duties/volunteer work	208	5.2%	N/A
Retired	929	23.2%	N/A
Not working or studying	133	3.3%	N/A
Student only	65	1.6%	N/A
Income quintile			
Lowest income quintile	573	16.2%	20%
Second-lowest income quintile	813	22.9%	20%
Middle income quintile	527	14.9%	20%
Second-highest income quintile	1,015	28.6%	20%
Highest income quintile	616	17.4%	20%
State of current location			
NSW	537	13.4%	31.8%
Victoria	533	13.3%	25.6%
Queensland	534	13.3%	20.3%
South Australia	534	13.3%	7.0%

³ The national benchmark figures for gender are based on a question asking the respondent's sex, for which only male and female are options.

Western Australia	535	13.4%	10.5%
Tasmania	520	13.0%	2.2%
Australian Capital Territory	507	12.7%	1.8%
Northern Territory	306	7.6%	0.9%
Current remoteness level			
Major city	2,155	53.8%	72.2%
Regional	1,699	42.4%	26.0%
Remote	152	3.8%	1.9%
Remoteness level of childhood environment			
Large/capital city	1,791	44.7%	N/A
Small/medium city	913	22.8%	N/A
Rural/regional area	1,249	31.2%	N/A
A mix	53	1.3%	N/A

Table 6 Variance Inflation Factor analysis

	VIF	1/VIF
Age	3.88	0.258
Aged 18-30 years	4.58	0.218
Aged 31-50 years	3.23	0.309
Aged 51-70 years		0
Gender	1.1	0.912
Identifies as female	1.02	0.979
Non-binary	1.04	0.958
Identifies as Aboriginal and/or Torres Strait Islander	1.11	0.903
Has disability/ies	1.32	0.758
Speaks language other than English at home	1.31	0.765
Highest level of education		0
Has not completed Year 12	1.59	0.629
Certificate/Diploma	2.31	0.432
Undergraduate	2.25	0.445
Postgraduate	2.2	0.454
Employment status		0
Part-time	1.22	0.818
Casual	1.18	0.848
Self-employed	1.14	0.877
Engaged in home duties/volunteer work	1.17	0.853
Retired	2.57	0.389
Not working/studying	1.19	0.839
Student only	1.07	0.938
Personal income quintile		0
Lowest income quintile	2.04	0.49
2nd-lowest income quintile	2.05	0.488
4th-highest income quintile	2.13	0.468
Highest income quintile	1.95	0.512
Standardised IRSAD score	1.74	0.574
State/territory		0
Victoria	1.74	0.575
Queensland	1.77	0.565
South Australia	1.83	0.548
Western Australia	1.8	0.556
Tasmania	2.02	0.495
Australian Capital Territory	1.98	0.505
Northern Territory	1.79	0.56
Current remoteness level		0

Regional	2.19	0.456
Remote	1.38	0.722
Childhood remoteness level		0
Small/medium city	1.32	0.758
Rural/regional	1.44	0.695
A mix	1.03	0.967
Mean VIF	1.8	

Figure 3 Distribution of Inclusion of Nature in Self scale responses

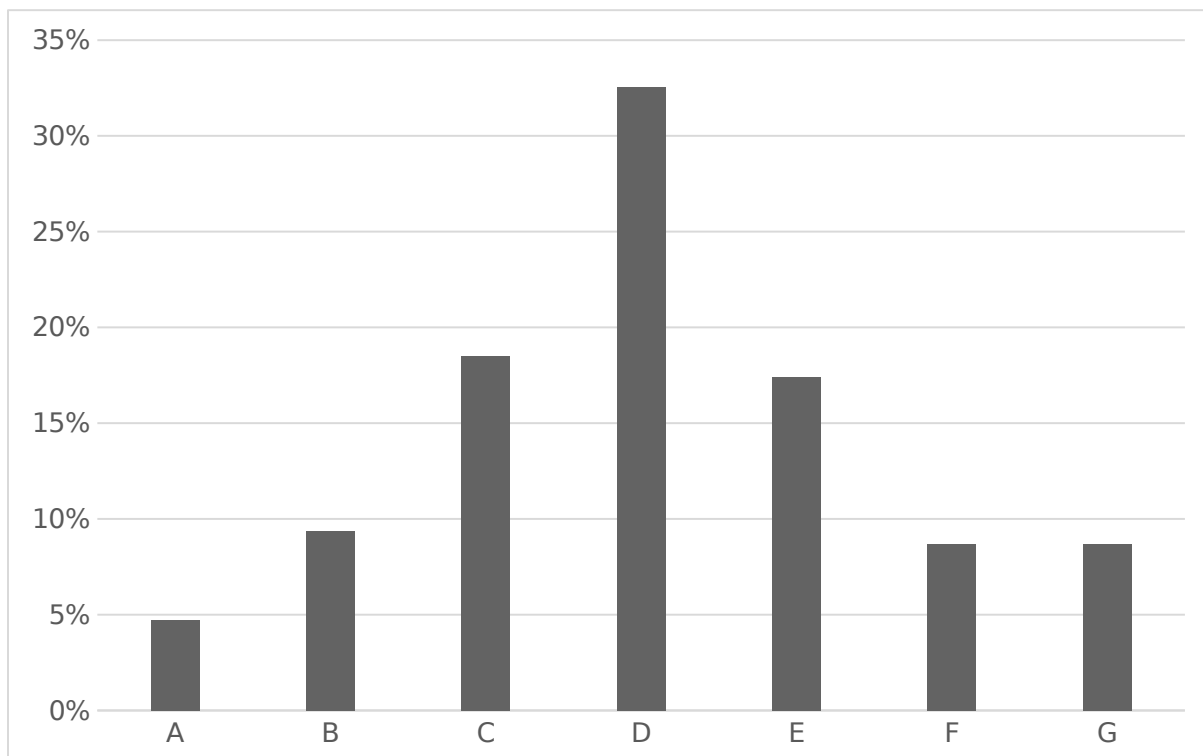


Figure 4 Distribution of CN-12 responses

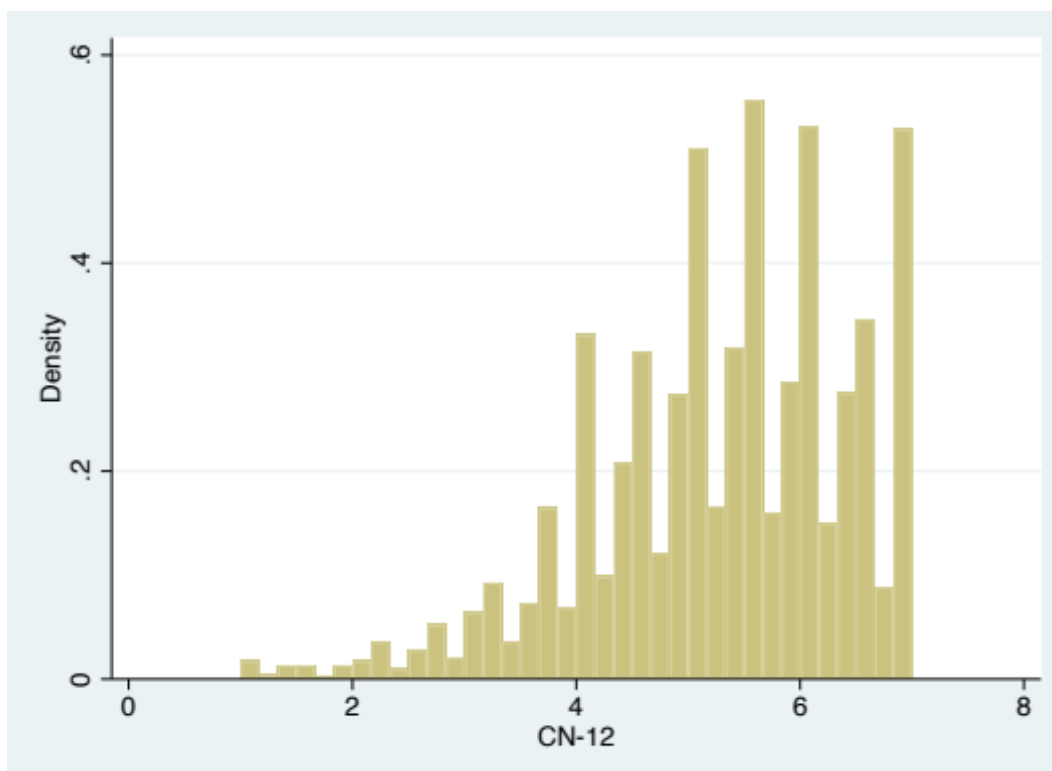
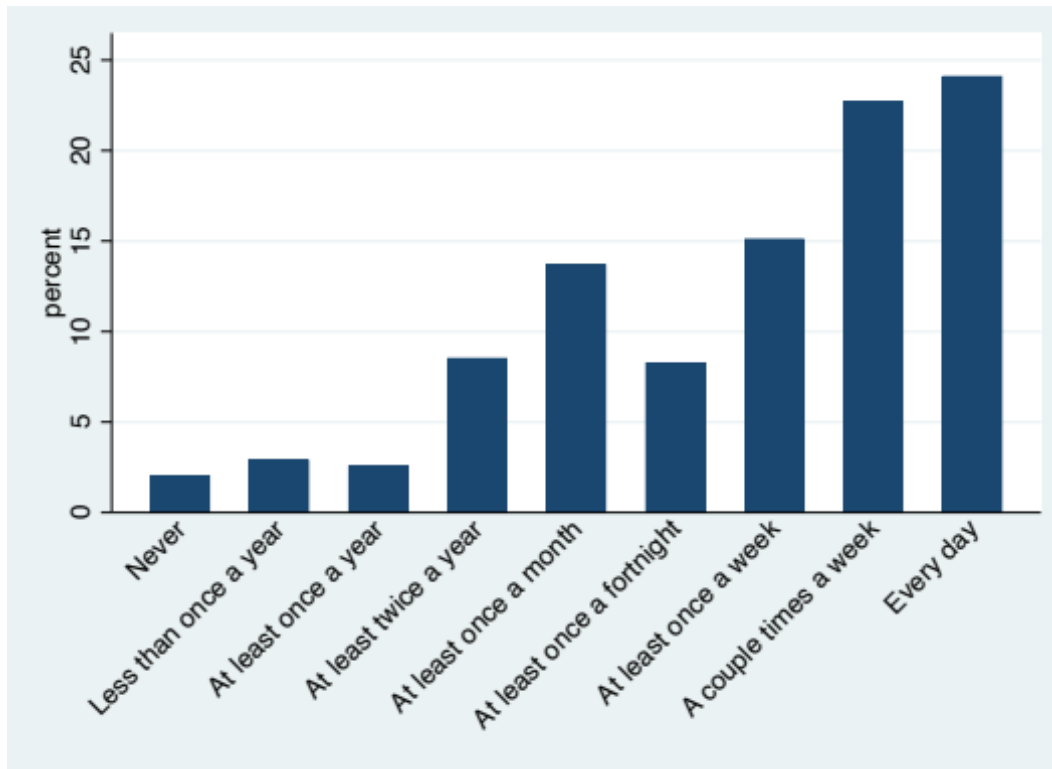


Figure 5 Responses to environmental visitation question: “Over the last year or two, about how often have you generally spent time in nature?”



Full survey

8 SECTION A: DEMOGRAPHICS

Please tell us a little about yourself and your situation.

Age: Please specify your age:

1. _____ years

Gen: Please specify your gender:

1. Female
2. Male
3. Non-binary
4. Prefer not to answer
5. Other (specify): _____

EmpStat: What is your current employment status? (If employed but currently on leave, this would still be classified as employed)

1. Employed full time (30 or more hours/week)
2. Employed part time (less than 30 hours/week)
3. Employed casually
4. Self-employed
5. Engaged in home duties or volunteer work
6. Retired
7. Unemployed
8. Other:

Enviro. Do you work in the environment sector?

1. Yes
2. No

Edu1: What is the highest level of education qualification you have completed thusfar?

1. Year 10 or below
2. Year 11
3. Year 12
4. Certificate I/II
5. Certificate III/IV
6. Diploma / Advanced Diploma
7. Bachelor's degree
8. Graduate diploma / Graduate certificate
9. Postgraduate degree

Edu2: Are you currently studying towards a qualification?

Y/N

If Yes:

1. Year 10 or below
2. Year 11
3. Year 12

4. Certificate I/II
5. Certificate III/IV
6. Diploma / Advanced Diploma
7. Bachelor's degree
8. Graduate diploma / Graduate certificate
9. Postgraduate degree
10. Other: ____

Disab: Do you identify as having a disability?

1. Yes
2. No

ATSI: Do you identify as Aboriginal or Torres Strait Islander?

1. Yes, Aboriginal
2. Yes, Torres Strait Islander
3. Yes, Aboriginal and Torres Strait Islander
4. No
5. Prefer not to answer

LOTE: What is/are the main language(s) you speak at home?

1. Only English
2. Other(s) (SPECIFY):

COB: In which country were you born?

1. Australia
2. Other (SPECIFY):

*(IF COB=2) **ARR:** In what year did you arrive in Australia?

1. _____ (year)

CHE: What sort of environment did you grow up in (to age 16):

1. Rural/regional area (less than 50,000 people)
2. Small to medium city (50-250 thousand people)
3. Large or capital city (more than 250 thousand people)
4. A mix of these/other: (SPECIFY)

(ALL) **PI:** What is your approximate HOUSEHOLD income? This refers to the total income from all household occupants, and includes income from wages and salaries, government benefits, pensions, allowances and any other income you usually receive, before deductions for tax, superannuation contributions, health insurance, amounts salary sacrificed, or any other automatic deductions.

1. \$1-\$199 per week (\$1-\$10,399 per year)
2. \$200-\$299 per week (\$10,400-\$15,599 per year)
3. \$300-\$399 per week (\$15,600-\$20,799 per year)
4. \$400-\$599 per week (\$20,800-\$31,199 per year)

5. \$600-\$799 per week (\$31,200-\$41,599 per year)
6. \$800-\$999 per week (\$41,600-\$51,999 per year)
7. \$1,000-\$1,249 per week (\$52,000-\$64,999 per year)
8. \$1,250-\$1,499 per week (\$65,000-\$77,999 per year)
9. \$1,500-\$1,999 per week (\$78,000-\$103,999 per year)
10. \$2,000-\$2,499 per week (\$104,000-\$129,999 per year)
11. \$2,500-\$2,999 per week (\$130,000-\$155,999 per year)
12. \$3,000-\$3,499 per week (\$156,000-\$181,999 per year)
13. \$3,500-\$3,999 per week (\$182,000-\$207,999 per year)
14. \$4,000-\$4,999 per week (\$208,000-\$259,999 per year)
15. \$5,000 or more per week (\$260,000 or more per year)
16. Negative or nil income
17. Prefer not to answer

MarS: What is your current marital status?

1. Never married
2. Widowed
3. Divorced
4. Separated but not divorced
5. Married (in a 'de facto' or registered marriage)

ECHS. Are you a parent or guardian of a child or children (17 years or younger)?

1. Yes
2. No

Pcode: And what is the postcode of your main residence?

1. _____

9 SECTION B: Human-Nature Connection

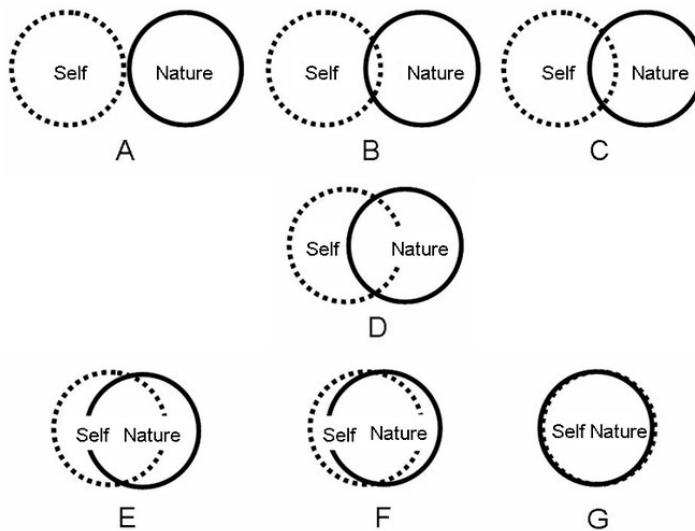
In this section we will ask you questions about how connected you feel with nature and what 'human-nature connection' looks like for you.

ND1: What comes to mind when you think of 'nature'? Please describe in your own words.
(optional) [OPEN TEXT]

ND2. What kind of interactions do you have with nature in your everyday life? Please describe in your own words. (optional) [OPEN TEXT]

ND3: Think of a meaningful experience you have had that shaped the way you think about 'nature'? Please describe it in 1-3 sentences in your own words.
(optional) [OPEN TEXT]

CN1. INS scale: How (inter)connected are you with nature in general? Choose the picture which best describes your relationship to nature.



CN2. Please rate the extent to which you agree or disagree with the following statements: *[PROGRAMMER NOTE: RANDOMISE STATEMENTS]*

Strongly disagree (1)	(2)	(3)	Neither agree nor disagree (4)	(5)	(6)	Strongly agree (7)
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1. I think of myself as someone who is very concerned about taking care of nature
2. My relationship to nature is a big part of how I think about myself
3. I feel uneasy if I am away from nature for too long
4. I feel right at home when I am in nature
5. Feeling connected to nature helps me deal with everyday stress
6. I feel a strong emotional connection to nature
7. I enjoy spending time in nature
8. I like to get outdoors whenever I get the chance
9. Being in nature allows me to do the things I like doing most
10. Everything in nature is connected (e.g. animals, plants, humans, water, air, land, fire, etc.)
11. Human beings and nature are connected by the same 'energy' or 'life-force'
12. Human wellbeing depends upon living in harmony with nature

10SECTION C: Nature engagement and environmental behaviours

In this section we will ask you about what types of nature you interact with, what you do while you are there and how those interactions relate to other behaviours and values in your life.

EB1. Over the last year or two, about how often have you generally spent time in nature?

1. Never
2. Less than once a year
3. At least once a year
4. At least twice a year
5. At least once a month
6. At least once a fortnight
7. At least once a week
8. A couple times a week
9. Every day

EB2. Over the last year or two, how often have you spent time in/at the following places? *[PROGRAMMER NOTE: Pipe into EC1 and EC2]*

NA (0)	Never (1)	Less than once a year (2)	At least once a year (3)	At least twice a year (4)	At least once a month (5)	At least once a fortni ght (6)	At least once a week (7)	A coupl e times a week (8)	Every day (9)
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1. A forest (an area filled predominantly with tall trees)
2. A grassland/savanna/open woodland (an area with mostly grass or low vegetation with occasional trees, not managed for domestical animal grazing)
3. A desert/dry scrubland (a dry area with sand and rock and some hardy vegetation)
4. A lake, river or other inland waterways
5. A wetland, marsh, or estuary (Intermittent fresh water or is regularly flooded with fresh or salt water. They comprise swamps, marshes, billabongs, lakes, lagoons, bogs, fens and peatlands)
6. An agricultural area managed for crops or pasture
7. The beach or coastal areas
8. On or in the ocean water (as separate to the beach or coast)
9. A zoo or wildlife park
10. A grassy parkland, botanic garden or playing field (managed, grassy lawns, some trees, managed footpaths)
11. A community garden
- 12.13. Your own garden or yard at home

EB3. Do you wish you could spend more time in nature? Y/N

If Yes, what are the major barriers to spending more time in nature? (select all that apply)

1. Too busy/not enough time
2. Lack of access to nature
3. Costs of accessing nature
4. Health issues prevent access
5. Friends and family aren't into nature
6. Safety concerns
7. Unsure of where to go
8. Other:

If no:

1. I don't like spending time in nature
2. I feel I spend enough time in nature
3. I think nature is scary or unsafe
4. Other: (specify)

PEB4: How often do you engage in the following environmental behaviours??

[randomize order]	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)	N A
I bring up environmental issues in conversation with my peers						
I try to encourage others to change a behaviour that I think is harmful to the environment						
I bring up positive nature experiences in a conversation, such as interesting facts about wildlife or stories about things I've seen or done in nature						
I share articles, pictures, or videos on social media about nature or environmental issues						
I consider environmental impacts when making purchasing decisions (e.g. product/service waste, packaging, carbon footprint, sustainability, local source etc)						
I contact businesses or governments about impacts on environmental issues I'm concerned about						
I sign petitions about environmental issues I'm concerned about						
I donate money to organisations that protect or support the environment						
I attend protests or rallies related to environmental issues						

I vote for people, parties, or policies that support nature						
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11 Section D: Wellbeing

In this section, we will ask about different aspects of your health and wellbeing including how satisfied you are with different aspects of your life. We want to understand both how different components of your wellbeing (e.g. physical, social, mental aspects) might benefit from nature engagement or connection and whether there are any aspects of your health that interfere with your engagement with nature.

Wel1: Thinking about your own life and personal circumstances, how satisfied are you with the following aspects of your life:

No satisfaction at all 0	1	2	3	4	5	6	7	8	9	10 Completely Satisfied
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1. your life as a whole?
2. your standard of living?
3. your health?
4. what you are achieving in life?
5. your personal relationships?
6. how safe you feel?
7. feeling part of your community?
8. your future security?
9. the quality of your local environment

Wel2. For these questions, please tick the box that best describes your situation as it has been over the past week

Q1 How much help do you need with jobs around your place of residence (eg preparing food, cleaning, gardening)?

- ☐ I can do all these tasks very quickly and efficiently without any help
- ☐ I can do these tasks relatively easily without help
- ☐ I can do these tasks only very slowly without help
- ☐ I cannot do most of these tasks unless I have help
- ☐ I can do none of these tasks by myself.

Q2 How easy or difficult is it for you to get around by yourself outside your place of residence (eg to go shopping, visiting)?

- ☐ getting around is enjoyable and easy
- ☐ I have no difficulty getting around outside my place of residence
- ☐ I have a little difficulty
- ☐ I have moderate difficulty
- ☐ I have a lot of difficulty
- ☐ I cannot get around unless somebody is there to help me.

Q3 How easy or difficult is it for you to move around (using any aids or equipment you need eg a wheelchair, frame or stick)?

- ☐ I am very mobile
- ☐ I have no difficulty with mobility
- ☐ I have some difficulty with mobility (for example, going uphill)
- ☐ I have difficulty with mobility. I can go short distances only.
- ☐ I have a lot of difficulty with mobility. I need someone to help me.
- ☐ I am bedridden.

Q4 How difficult is it for you to wash, toilet, dress yourself, eat or care for your appearance?

- ☐ these tasks are very easy for me
- ☐ I have no real difficulty in carrying out these tasks
- ☐ I find some of these tasks difficult, but I manage to do them on my own
- ☐ many of these tasks are difficult, and I need help to do them
- ☐ I cannot do these tasks by myself at all.

Q5 How happy are you with your close and intimate relationships?

- ☐ very happy
- ☐ generally happy
- ☐ neither happy nor unhappy
- ☐ generally unhappy
- ☐ very unhappy

Q6 Does your health affect your relationship with your family?

- ☐ my role in the family is unaffected by my health
- ☐ there are some parts of my family role I cannot carry out
- ☐ there are many parts of my family role I cannot carry out
- ☐ I cannot carry out any part of my family role.

Tick the box that best describes your situation as it has been over the past week

Q7 Does your health affect your role in your community (eg residential, sporting, church or cultural groups)?

- ☐ my role in the community is unaffected by my health
- ☐ there are some parts of my community role I cannot carry out
- ☐ there are many parts of my community role I cannot carry out
- ☐ I cannot carry out any part of my community role.

Q8 How often did you feel in despair over the last seven days?

- ☐ never
- ☐ occasionally
- ☐ sometimes
- ☐ often
- ☐ all the time.

Q9 How often did you feel worried in the last seven days?

- ☐ never
- ☐ occasionally
- ☐ sometimes
- ☐ often

☐ all the time.

Q10 How often do you feel sad?

- ☐ never
- ☐ rarely
- ☐ some of the time
- ☐ usually
- ☐ nearly all the time.

Q11 Do you normally feel calm and tranquil or agitated?

I am

- ☐ always calm and tranquil
- ☐ usually calm and tranquil
- ☐ sometimes calm and tranquil, sometimes agitated
- ☐ usually agitated
- ☐ always agitated.

Q12 How much energy do you have to do the things you want to do?

I am

- ☐ always full of energy
- ☐ usually full of energy
- ☐ occasionally energetic
- ☐ usually tired and lacking energy
- ☐ always tired and lacking energy.

Q13 How often do you feel in control of your life?

- ☐ always
- ☐ mostly
- ☐ sometimes
- ☐ only occasionally
- ☐ never.

Tick the box that best describes your situation as it has been over the past week

Q14 How much do you feel you can cope with life's problems?

- ☐ completely
- ☐ mostly
- ☐ partly
- ☐ very little
- ☐ not at all.

Q15 How often do you experience serious pain?

I experience it

- ☐ very rarely
- ☐ less than once a week
- ☐ three to four times a week
- ☐ most of the time.

Q16 How much pain or discomfort do you experience?

- ☐ none at all
- ☐ I have moderate pain
- ☐ I suffer from severe pain
- ☐ I suffer unbearable pain.

Q17 How often does pain interfere with your usual activities?

- ☐ never
- ☐ rarely
- ☐ sometimes
- ☐ often
- ☐ always

Q18 How well can you see (using your glasses or contact lenses if needed)?

- ☐ I have excellent sight
- ☐ I see normally
- ☐ I have some difficulty focusing on things, or I do not see them sharply. *E.g. small print, a newspaper or seeing objects in the distance.*
- ☐ I have a lot of difficulty seeing things. *My vision is blurred. I can see just enough to get by with.*
- ☐ I only see general shapes. *I need a guide to move around*
- ☐ I am completely blind.

Q19 How well can you hear (using your hearing aid if needed)?

- ☐ I have excellent hearing
- ☐ I hear normally
- ☐ I have some difficulty hearing or I do not hear clearly. *I have trouble hearing softly-spoken people or when there is background noise.*
- ☐ I have difficulty hearing things clearly. *Often I do not understand what is said. I usually do not take part in conversations because I cannot hear what is said.*
- ☐ I hear very little indeed. *I cannot fully understand loud voices speaking directly to me.*
- ☐ I am completely deaf.

Tick the box that best describes your situation as it has been over the past week

Q20 How well do you communicate with others (talking, signing, texting, being understood by others and understanding them)?

- ☐ I have no trouble speaking to them or understanding what they are saying
- ☐ I have some difficulty being understood by people who do not know me. I have no trouble understanding what others are saying to me.
- ☐ I am understood only by people who know me well. I have great trouble understanding what others are saying to me.
- ☐ I cannot adequately communicate with others.

12 SECTION E: Nature Connection and Wellbeing across environments

In this section, we ask how connected you feel to/at/with different environments and how much you feel those environments contribute to your wellbeing:

EC1. Please indicate how (inter)connected you feel to nature in/at/with the following places:

NA/I have never visited this place (0)	Not connect ed at all (1)	(2)	(3)	Somewh at connect ed (4)	(5)	(6)	Very strongly connect ed (7)
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1. A forest (an area filled predominantly with tall trees)
2. A grassland/savanna/open woodland (an area with mostly grass or low vegetation with occasional trees, not managed for domestical animal grazing)
3. A desert/dry scrubland (a dry area with sand and rock and some hardy vegetation)
4. A lake, river or other inland waterways
5. A wetland, marsh, or estuary (Intermittent fresh water or is regularly flooded with fresh or salt water. They comprise swamps, marshes, billabongs, lakes, lagoons, bogs, fens and peatlands.)
6. An agricultural area managed for crops or pasture
7. The beach or coastal areas
8. On or in the ocean water (as separate to the beach or coast)
9. A zoo or wildlife park
10. A grassy parkland, botanic garden or playing field (managed, grassy lawns, some trees, managed footpaths)
11. A community garden
12. Your own garden or yard at home
13. Observing the night sky
14. 15. Other _____

EC1a. Think about the environment in which you feel most (inter)connected with nature. Can you describe what it is about that place that makes you feel (inter)connected with nature (e.g. are there features of that place or things you do there that help you connect etc)? (optional)

[open text]

EC1b. Think about the times in which you feel most (inter)connected with nature. Can you describe what it is about that time that makes you feel (inter)connected with nature (e.g. what are you doing, who are you with, what is happening around you)? (optional)

[open text]

EC2. Please indicate how much you feel each of these places directly benefits your personal health and wellbeing when you visit it: *[PROGRAMMER NOTE: DISPLAY ITEMS FROM EC2 =>1]*

NA/I have never visited this	No benefit to my wellbein g	(2)	(3)	Some benefit to my wellbein g	(5)	(6)	A great benefit to my wellbein g
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place
(0)

(1)

(4)

(7)

1. A forest (an area filled predominantly with tall trees)
2. A grassland/savanna/open woodland (an area with mostly grass or low vegetation with occasional trees, not managed for domestical animal grazing)
3. A desert/dry scrubland (a dry area with sand and rock and some hardy vegetation)
4. A lake, river or other inland waterways
5. A wetland, marsh, or estuary (Intermittent fresh water or is regularly flooded with fresh or salt water. They comprise swamps, marshes, billabongs, lakes, lagoons, bogs, fens and peatlands.)
6. An agricultural area managed for crops or pasture
7. The beach or coastal areas
8. On or in the ocean water (as separate to the beach or coast)
9. A zoo or wildlife park
10. A grassy parkland, botanic garden or playing field (managed, grassy lawns, some trees, managed footpaths)
11. A community garden
12. Your own garden or yard at home
13. Observing the night sky
14. Other

EC2a. Think about the environment which you feel most benefits your health and wellbeing. What kinds of experiences do you have that support your wellbeing when you visit this place? (optional)
[open text]

EC3. Please think about what you do when you have visited these different types of environments in the last year or two. Select all that apply. [Programmer note: Pipe this from EC1, exclude any marked 'never', or 'NA']

1. A forest

Rest and recover	Disconnect from daily life	Socialise	Accompany children to activities	Engage in physical activities	Engage in motorised leisure activities (e.g. dirt-biking, 4-wheeling, off-roading)	Experience a sense of peace, tranquillity or awe	Engage in cultural activities	Enjoy nature	Have a picnic or BBQ	Walk your pet	Pass through to reach your destination	Engage in activities to protect or care for nature (e.g. landcare, conservation)	Look up at the moon or stars in the sky
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2. A grassland/savanna/open woodland

Rest and recover	Disconnect from daily life	Socialise	Accompany children to activities	Engage in physical activities	Engage in motorised leisure activities (e.g. dirt-biking, 4-wheeling, off-roading)	Experience a sense of peace, tranquillity or awe	Engage in cultural activities	Enjoy nature	Have a picnic or BBQ	Walk your pet	Pass through to reach your destination	Engage in activities to protect or care for nature (e.g. landcare, conservation)	Look up at the moon or stars in the sky
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3. A desert/dry scrubland

Rest and recover	Disconnect from daily life	Socialise	Accompany children to activities	Engage in physical activities	Engage in motorised leisure activities (e.g. dirt-biking, 4-wheeling, off-roading)	Experience a sense of peace, tranquillity or awe	Engage in cultural activities	Enjoy nature	Have a picnic or BBQ	Walk your pet	Pass through to reach your destination	Engage in activities to protect or care for nature (e.g. landcare, conservation)	Look up at the moon or stars in the sky
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4. A lake, river or other inland waterway

Rest and recover	Disconnect from daily life	Socialise	Accompany children to activities	Engage in physical activities	Engage in motorised leisure activities (e.g. boating, dirt-biking, off-roading)	Experience a sense of peace, tranquillity or awe	Engage in cultural activities	Enjoy nature	Have a picnic or BBQ	Walk your pet	Pass through/by to reach your destination	Engage in activities to protect or care for nature (e.g. landcare, conservation)	Look up at the moon or stars in the sky	Go hunting	Gf n
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5. A wetland, marsh, or estuary

Rest and recover	Disconnect from daily life	Socialise	Accompany children to activities	Engage in physical activities	Engage in motorised leisure activities (e.g. boating, dirt-biking, off-roading)	Experience a sense of peace, tranquility or awe	Engage in cultural activities	Enjoy nature	Have a picnic or BBQ	Walk your pet	Pass through to reach your destination	Engage in activities to protect or care for nature (e.g. landcare, conservation)	Look up at the moon or stars in the sky	Go hunting	Go fishing
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6. An agricultural area

Rest and recover	Disconnect from daily life	Socialise	Accompany children to activities	Engage in physical activities	Engage in motorised leisure activities (e.g. dirt-biking, 4-wheeling, off-roading)	Experience a sense of peace, tranquillity or awe	Engage in cultural activities	Enjoy nature	Have a picnic or BBQ	Walk your pet	Gardening activities	Pass through to reach your destination	Engage in activities to protect or care for nature (e.g. landcare, conservation)	Look up at the moon or stars in the sky	Go hunting	Go fishing
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7. The beach or coastal areas

Rest and recover	Disconnect from daily life	Socialise	Accompany children to activities	Engage in physical activities	Engage in motorised leisure activities (e.g. dirt-biking, 4-wheeling, off-roading)	Experience a sense of peace, tranquility or awe	Engage in cultural activities	Enjoy nature	Have a picnic or BBQ	Walk your pet	Pass through to reach your destination	Engage in activities to protect or care for nature (e.g. coast care, conservation, marine debris cleanup)	Look up at the moon or stars in the sky	Go hunting	Go fishing
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8. On or in the ocean water (i.e. as separate to the beach or coast)

Rest and recover	Disconnect from daily life	Socialise	Accompany children to activities	Engage in physical activities	Engage in motorised leisure activities (e.g. boating, Jet skiing)	Experience a sense of peace, tranquillity or awe	Engage in cultural activities	Enjoy nature	Have a picnic or BBQ	Walk your pet	Engage in activities to protect or care for nature (e.g. marine debris cleanup, starfish removal)	Look up at the moon or stars in the sky	Go fishing
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9. A zoo or wildlife park

Rest and recover	Disconnect from daily life	Socialise	Accompany children to activities	Engage in physical activities	Experience a sense of peace, tranquillity or awe	Engage in cultural activities	Enjoy nature	Have a picnic or BBQ	Walk your pet	Engage in activities to protect or care for nature (e.g. landcare, conservation)	Look up at the moon or stars in the sky	Go hunting	Go fishing
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10.A botanic garden or urban park with grassy lawns and trees

Rest and recover	Disconnect from daily life	Socialise	Accompany children to activities	Engage in physical activities	Experience a sense of peace, tranquillity or awe	Engage in cultural activities	Enjoy nature	Have a picnic or BBQ	Walk your pet	Pass through to reach your destination	Engage in activities to protect or care for nature (e.g. landcare, conservation)	Look up at the moon or stars in the sky	Go hunting	Go fishing
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11. A community garden

Rest and recover	Disconnect from daily life	Socialise	Accompany children to activities	Engage in physical activities	Experience a sense of peace, tranquillity or awe	Engage in cultural activities	Enjoy nature	Have a picnic or BBQ	Walk your pet	Garden or lawn care activities	Pass through to reach your destination	Engage in activities to protect or care for nature (e.g. landcare, conservation)	Look up at the moon or stars in the sky	Go hunting
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12.Your own garden or yard at home

Rest and recover	Disconnect from daily life	Socialise	Accompany children to activities	Engage in physical activities	Engage in motorised leisure activities (e.g. dirt-biking, 4-wheeling, off-roading)	Experience a sense of peace, tranquillity or awe	Engage in cultural activities	Enjoy nature	Have a picnic or BBQ	Walk your pet	Garden or lawn care activities	Pass through to reach your destination	Engage in activities to protect or care for nature (e.g. conservation, manage for biodiversity, create habitat wildlife)	Look up at the moon or stars in the sky	Go hunting
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