Exploring 'Nature' Conceptualisations and 'Connections': A Case Study in Tāmaki Makaurau Auckland, Aotearoa New Zealand

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ABSTRACT

Human actions and activities, particularly in urban Western countries, are degrading 'nature' at an unprecedented rate. As a result, the global environmental scientific community stress the urgent need to shift behavioural actions to more sustainable ones, for example actions that are respectful toward 'nature' and other species.

To shift actions, it is crucial to understand what underpins them. As it is largely suggested that beliefs about 'nature' inform subsequent actions toward 'nature', the interest for environmental managers should be understanding what underpins these beliefs to initiate change. Research exploring the beliefs that people hold about 'nature' is growing but is still scarce in environmental management as most research is initiated from the psychological discipline. This means that the findings from such studies struggle to make their way into environmental management and therefore the implications are not translated into practical outcomes which are relevant to environmental managers active in the field. Consequently, the research in this thesis explored four facets of beliefs relating to 'nature' to contribute to environmental management literature and aimed to situate the findings into environmental management outcomes.

The four research areas investigated were conceptualisations of 'nature', conceptualisations of 'connections to 'nature'', what the self-perceived pathways or barriers to 'connections to 'nature'' are, and how respondents view themselves in relation to 'nature' along with examining whether this influences their pro-'nature' beliefs. These avenues of research were investigated with between 960 and 997 respondents from Tāmaki Makaurau Auckland, Aotearoa New Zealand[1] via a cross-sectional, qualitative online survey and interviews.

The findings suggested that most of the respondents conceptualise 'nature' as being something that neither humans nor human activities are a part and similarly mostly view 'nature' as separate from themselves. The research further uncovered that common associations of 'nature' are related to flora and fauna, and that there are several ways in which 'connections to 'nature'' are conceptualised, but most commonly, they are perceived as being cognitive, affective, or experiential connections. The research has shown that respondents commonly perceive modern societal factors as a barrier to their connection to 'nature' but on the contrary perceive exposure to 'nature' as being a key pathway to their connections. Lastly, the findings highlighted that interconnectedness with 'nature' correlated with higher pro-'nature' beliefs across the respondent group.

The research and its findings make an important contribution to the limited environmental management empirical research on 'nature' conceptualisations and 'connections' available internationally. This research also provides empirical insights into the population of Tāmaki Makaurau Auckland, which can be used to provide practical interventions and initiatives to facilitate stronger connections and relationships to 'nature'. These can be implemented in practice, policy/strategy, and planning. Recommendations are made to assist with this.

[1] 'Tāmaki Makaurau' and 'Aotearoa' are the Māori names for 'Auckland' and 'New Zealand' respectively and are used throughout the thesis to acknowledge Māori as the first people/settlers of this land.

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A note on the framing of the terms 'nature' and 'connection to 'nature'' within this thesis

As it was outlined in the abstract on pages iii-iv, this thesis explores conceptualisations of 'nature' and 'connections to 'nature'' (amongst other notions). Therefore, the terms are presented within single inverted commas (as above) to acknowledge they may have unique meanings to the reader, and, to emphasize that no working definition has been adopted for the purpose of this thesis as this contradicts the overall aim(s) of the research. In chapter six, the use of the single inverted commas is to reflect the terms as conceptualised by the respondents of this research.

CHAPTER 1 - INTRODUCTION

The following introductory chapter provides a theoretical and contextual overview of the research undertaken towards this PhD. It firstly outlines the thesis format. Thereafter an outline of the problem is presented, and the research aims, and objectives are described. A research justification from an environmental management perspective is then provided. This is followed by a historical and theoretical review relating to conceptualizations of, and 'connections' with, 'nature' which are central to the research. Background information on the study location is then outlined. As the format of the thesis is *with publication*, the methodological approach used in this research is described and an overview of the sample group is presented. The chapter concludes with an overview of the thesis structure.

1.1 THESIS OVERVIEW AND FORMAT

The research in this thesis explores human beliefs relating to 'nature'. It specifically focuses on self-reported 'nature' conceptualisations and connections. The study is conducted from an environmental management perspective using a sample of the Tāmaki Makaurau Auckland population. This is Aotearoa New Zealand's largest city and arguably the one that faces the greatest pressures facing 'nature' from anthropogenic activity.

The research was completed in the format of a *thesis with publication*. It meets the requirements outlined by Massey University in Appendix 1. This thesis includes four chapters which are written as individual journal articles. At the time of submission, all these chapters/journal articles have been submitted to international journals and are either *published* (chapter two, three, five), or *accepted subject to second review* (chapter four). A statement of contribution is provided for each chapter/journal article in Appendix 2.

This thesis starts with an introductory chapter which acts as an exegesis due to the nature of the chapters that follow. Four journal articles are then presented as individual chapters. The concluding chapter extends beyond a summary of findings to also incorporate a broader discussion of the relevance of the research for environmental management and the implications for policy, planning, practice, and theory. The chapter also outlines the limitations encountered during the research and provides recommendations for further research.

1.2 PROBLEM OUTLINE

All around the globe 'nature' is under significant pressure due to the impact of human actions and activities resulting in unsustainable exploitation of natural resources, extinction of flora and fauna species, hyper-pollution and over-consumption of goods and services. Despite decades of programmes, policies and legislations attempting to address these increasing challenges in the context of a growing population, progress remains poor (Díaz *et al.,* 2019). Therefore, the United Nations Environment Programme (2019) have stated that transformational change is urgently required if we want to reverse current destructive trends and protect 'nature' moving forward.

As human actions and attitudes are the primary driver behind the challenges facing 'nature', one of the goals of environmental management researchers and practitioners is to encourage

humans to behave and act more sustainably. This can take the form of encouragement towards generating less waste, respecting other species, consuming fewer natural resources, and seeking to live in ecological balance with 'nature'. However, understanding where to intervene in socio-ecological systems to initiate this change has been a core question in environmental management and sustainability sciences (Riechers *et al.,* 2021).

It is suggested that human beliefs and perspectives about 'nature' largely drive subsequent behavioural actions toward 'nature' (Meadows, 1999; Stern, Dietz, Abel, Guagnano & Kalof, 1999; Riechers *et al.,* 2021), and therefore it is important from an environmental management perspective to understand what potentially influences these beliefs. Empirical literature is slowly increasing on the topic; however, previous research tends to take a deductive approach and rarely comes from environmental management related disciplines and thus there are still significant gaps and shortfalls of which the research in this thesis contributes to. Specifically, areas such as how people conceptualise 'nature', how they perceive their 'connections to 'nature'', how their 'connections to 'nature'' may be influenced, or how people view themselves in relation to 'nature' and whether this influences their pro-'nature' beliefs and then relating the findings to environmental planning, policy/strategy, and practice.

Aotearoa New Zealand is often branded by its 'natural beauty', but the country experiences considerable challenges facing 'nature' from human activities and actions. However, as empirical research considering notions of connections and conceptualisations of 'nature' from an environmental management perspective is scarce both globally and in Aotearoa New Zealand, environmental management planning, practice and policy/strategy addressing these notions are similarly lacking.

Consequently, understanding and constructively exploring the potentially diverse conceptions of, and connections with, 'nature' through empirical research can help to inform practice, planning and policy/strategy for long-term environmental sustainability. This knowledge can assist those working in fields such as environmental management, sustainability, or conservation, to incorporate human beliefs relating to 'nature' to engage with the population more effectively in order to prompt the transformational change required to address the crises facing 'nature'.

1.3 RESEARCH AIM AND OBJECTIVES

The aim of this PhD research is to investigate beliefs about 'nature', specifically 'nature' conceptualisations and 'connections'. A respondent group from Tāmaki Makaurau Auckland, Aotearoa New Zealand was used as a case study with the purpose of trying to determine insights that could be used to assist environmental management. An important goal of the research is to increase knowledge into the human-'nature' relationship that can be used to develop stronger, more holistic approaches to address 'nature' degradation in Aotearoa New Zealand and contribute to environmental management literature globally.

The four specific research objectives investigated to address this aim are as follows:

Research Objective 1: To identify the ways in which 'nature' is conceptualised and what the most common aspects associated with 'nature' are by the public in Tāmaki Makaurau Auckland,

Research Objective 2: To identify how 'connections to 'nature'' are conceptualised by the public in Tāmaki Makaurau Auckland,

Research Objective 3: To understand self-reported pathways and barriers to 'connections to 'nature'' by the public in Tāmaki Makaurau Auckland, and,

Research Objective 4: To explore how the public in Tāmaki Makaurau Auckland view themselves in relation to 'nature' and determine whether there are correlations between interconnectedness with 'nature' and pro-'nature' beliefs.

To ensure this research is relevant to environmental management the findings will be used to generate recommendations as to how environmental managers can incorporate understandings of 'nature' conceptualisations and connections across planning, policy/strategy, and practice for more effective outcomes. This is done in each chapter (two to five) and in the final conclusion. Furthermore, the findings are used to support the overall proposition this thesis makes, being that exploring human beliefs relating to 'nature' should be prioritised further in environmental management research.

1.4 RESEARCH CONTEXT

The most recent report from the United Nations Environment Programme (2019) depicts the dire state of the health of 'nature' globally due to the cumulative actions of the global population. Exploitation and damage of natural resources has occurred at rates and intensities that have surpassed the capacity of the biological systems to absorb the damage and recover. For example, three-quarters of the land, and well over half of the marine environment, has been degraded and altered, one million plant and animal species are threatened with extinction, pollution has increased tenfold since 1980, and the average global temperature continues to increase from greenhouse gas emissions resulting in heightened climate change impacts (United Nations Environment Programme, 2019).

Despite the dire picture that the report presents, much effort has been made since the 1960s to address these issues through contemporary environmental movements, which are evident across most countries. The movements were induced by concern about [mis]management of natural resources and pollution which prompted the concept of sustainable development, which was popularized after the Brundtland Commission submitted the report *Our Common Future* (1987). The report contained long-term environmental strategies for the international community and was developed by representatives from developed and developing countries. Since then, there have been a raft of international agreements, conventions, legislations, policies, and protocols to address environmental issues. However, progress toward meeting the range of goals that have been developed within these remain poor (Díaz *et al.,* 2019). Despite the decades of work attempting to address degradation to the natural world and species extinction, the United Nations Environment Programme (2019) report proclaims that current global responses are insufficient and transformational change is urgently needed to protect and restore 'nature'. This has been echoed by numerous other sustainability scientists recently such as Abson *et al.,* (2017), Ives *et al.,* (2017) and Riechers *et al.,* (2021) to name a few.

Although humans are physically and materially dependent on 'nature' for survival, human actions toward 'nature' are the major driving force behind degradation of 'nature' around the globe, hence the increasing effort by environmental and sustainability scientists to shift these destructive actions (Díaz *et al.,* 2019; Elhacham, Ben-Uri, Grozovski, Bar-On & Milo, 2020).

However, since humans construct different relationships with 'nature' and interpret 'nature' differently, there are a complex interplay of socio-ecological factors that need to be considered when trying to address this human induced degradation of 'nature' and change behaviours (Glaeser, 2001; Díaz *et al.,* 2019; Elhacham *et al.,* 2020; Riechers *et al.,* 2021).

It has been postulated that beliefs and mindsets underpin behavioural actions through several theories. These include (to name a few) firstly, Meadows (1999)'s theory of 'leverage points for transformation', which hypothesizes that there are numerous hierachical points in an individual to influence and initiate change, and that the deepest and most effective point to influence are their underlying world-views and beliefs as they are what underpins their actions. Secondly, is the Value-Belief-Norm theory by Stern *et al.,* (1999) which postulates that values and beliefs inform norms of an individual. Thirdly, the theory of planned action by Ajzen (1991) which suggests that behavioural intentions of an individual are underpinned by their values and beliefs. Sustainability scientists such as Abson *et al.,* (2017); Fisher & Riechers (2019); Chan *et al.,* (2020); Riechers *et al.,* (2021); Ives, Freeth & Fischer (2020); Leventon, Abson & Lang (2021) argue that those working in environmental management need to better understand and focus on mindsets and beliefs about 'nature' if they are to achieve effective environmental sustainability outcomes. This is contrary to the current emphasis and employment of environmental management actions that attempt to shift people's actions to more sustainable ones through parameters such as environmental taxes, financial incentives, setting environmental targets, increasing protected natural areas etc., which merely intervene at a behavioural level without considering the beliefs and mindsets which underpin the actions in the first place. For example, these mindsets and beliefs include how people conceptualise 'nature', how they conceptualise their personal 'connections to 'nature'', and how people view themselves in relation to 'nature' (Abson *et al.,* 2017; Fischer & Riechers, 2019; Chan *et al.,* 2020; Leventon *et al.,* 2021).

The link between beliefs about 'nature' and pro-'nature' behaviours specifically is evidenced in the large body of empirical research that has shown a strong link between feelings of connection with 'nature' and pro-'nature' behaviours. For example, Whitburn, *et al.* (2020) conducted a meta-analysis of 26 studies which collectively represented a sample of 13,237 individuals and employed methods ranging across 12 connection-to-'nature' scales. Whitburn *et al.* (2020) found that respondents who feel connected to 'nature' are significantly more likely to engage in pro-'nature' behaviours. This pathway has been since identified in numerous other empirical studies published after this meta-analysis such as Richardson, *et al.* (2020), Aguilar-Luzón, *et al.* (2020), Berrera-Hernández, *et al.* (2020), Martin, *et al.* (2020), Anderson & Krettenauer (2021) and Burrows, *et al.* (2022) whom all have conducted empirical research testing whether feelings of connection to 'nature' translate to pro-'nature' behaviours and have all found positive correlations. Therefore, by increasing understandings of the potentially varied beliefs relating to 'nature' that populations hold and their relationship or 'connections' with 'nature', environmental management and sustainability practitioners have the potential to reconfigure the role of 'nature' as held in individuals' or society's worldviews for sustainability transformation (Riechers *et al.,* 2021)[2].

[2] It is acknowledged however, that in the context of achieving environmental sustainability, there are other factors at play when attempting to shift behaviours to more sustainable ones – such as socioeconomic factors (Wang, et al. 2020). Consequently, it is not intended that the justification to investigate human beliefs relating to 'nature' to prompt sustainable outcomes is portrayed as being the only way we can achieve sustainability transformation. Nevertheless, the research outlined in this thesis adopts the position that it is reasonable to assume that certain beliefs and mindsets relating to 'nature' are more likely to result in pro-'nature' beliefs based on the large body of empirical research that has shown this strong link (e.g., as outlined in the meta-analysis by Whitburn et al., 2020 and discussed in this section).

1.5 RESEARCH JUSTIFICATION

Empirical research exploring human beliefs related to 'nature', specifically understanding how connected people feel they are with 'nature', has increased over the past few decades as outlined in two recent multidisciplinary reviews by Restall & Conrad (2015) and Ives *et al.,* (2017). However, despite the relevance for environmental management, conservation, or sustainability, both reviews call attention to the fact that there is little research which specifically focuses on how the human-'nature' 'connection' is relevant for sustainability efforts and that since most research comes from the psychological discipline, there is a siloing of knowledge. For example, Ives *et al.,* (2017) showed that from 475 journal articles published between 1984 and 2015, the most common discipline researching the human-'nature' 'connection' was psychology, and that there is little mention in published journal articles as to how the human-'nature' 'connection' relates to sustainability issues. Mostly, literature simply just explained and described varying 'connections to 'nature'' with little environmental policy guidance. Restall & Conrad (2015) similarly showed that out of 90 journal articles published between 2002 and 2011 exploring human-'nature' 'connections', most of them were published in the Journal of Environmental Psychology and that of the 90 articles, only 13.0% analysed the human-'nature' 'connection' from a conservation perspective whereas 66.0% analysed it from a psychological perspective. This resulted in only 30.0% of the journal articles translating the implications of the findings to environmental management practice, policy, or planning. Thus, the authors argue that this deficiency reduces the ability for findings and concepts to be applied to environmental policy or management decisions to help achieve environmental sustainability.

Therefore, both Restall & Conrad (2015) and Ives *et al.,* (2017) argue that placing greater emphasis on determining how the human-'nature' connection can assist in the transformation towards greater environmental sustainability is important. Specifically, that "*more needs to be done towards multi-disciplinary research that is relevant and practical to both environmental managers active in the field*" (Restall & Conrad, 2015, p. 273). Bamberg, Fischer & Geiger (2021) and Wullenkord & Hamann (2021) more recently similarly pointed to the fact that there has been little integration of findings from studies of human-'nature' relationships into environmental research and practices that aim to change human action. Consequently, they argue "*[research] needs to change*" and that researchers need to apply psychological processes more into socio-ecological transformations for sustainability (Wullenkord & Hamann, 2021, p.1). Ives *et al.,* (2017) additionally highlight gaps in empirical research on the human-'nature' connection of which the research in this thesis contributes too. Firstly, that there is a lack of research over a diversity of cultural contexts. Secondly, that there is a lack of research at the community or society level as most research explores these notions at an individual level. This is a particular oversight as environmental management action is often needed at this scale.

Despite the recent increase in empirical literature on the human-'nature' connection and relationship, the top five countries in which research is undertaken are the USA, Australia, Canada, United Kingdom, and the Netherlands, with little coming from Aotearoa New Zealand[3] (Ives *et al.,* 2017). Since the scientific theory that advises environmental management is still lacking in terms of understanding varying beliefs relating to 'nature' across the Aotearoa New Zealand population, it is of little surprise that environmental management practice has to date largely failed to integrate consideration of the potentially varied beliefs people have relating to 'nature' and how this could inform more effective practice, policy, and planning.

[3] Any research relating to the human-'nature' connection or relationship that has been undertaken in Aotearoa New Zealand is outlined in section 1.6.2.2.

For example, Aotearoa New Zealand has over 50 'nature' focussed non-Government and/or profit organisations (see Environment and Conservation Organisations of Aotearoa New Zealand (2021) for a list of most of them), all of which either focus on encouraging participation in conservation activities (e.g., Conservation Volunteers, Eco Matters, Forest & Bird), educating people on environmental challenges (e.g., Sustainable Coastlines, Greenpeace, WWF), or prompting people to lobby Governments on environmental issues (e.g., Forest & Bird, Greenpeace, WWF). Despite the important role that each of these organisations play, none intentionally focus on first understanding, and then supporting or shifting the beliefs that the population hold about 'nature'. A similar situation is observed in relation to Government organisations in Aotearoa New Zealand. The national Department of Conservation, Ministry for the Environment, or local authorities such as the one in the study location - Auckland Council, tend to adopt a 'one approach fits all' when developing and considering their 'nature'-related policy/strategy and planning. They operate under the assumption that all the population conceptualise 'nature', conceptualise their personal 'connections to 'nature'', and view themselves in relation to 'nature' the same way.

Current legislation associated with managing 'nature' also uses terms such as 'nature' with little consideration for the fact that there may potentially be varying conceptualisations of what it means to the population or differences in how they relate to it. This can create vagueness as to how 'nature' protecting policies, legislations are understood. Along with this, the term fails to have a consistent meaning within, and across varying government agencies. Not only can this potentially create conflict within government agencies as each department aims to achieve their objectives (McNeill, 2016), but can create further confusion when the term is used in a public-facing capacity. For example, the national Department of Conservation frames 'nature' as being native animals, native plants, and natural habitats (Department of Conservation New Zealand, 2020), whilst Auckland Council has no consistent definition or use of the term 'nature' and uses the terms 'nature', 'environment' and 'natural heritage' interchangeably with little specificity as to what the terms are meant to entail (Auckland Council, 2020).

Consequently, the four research objectives outlined in this thesis specifically respond to identified shortfalls in knowledge and gaps in empirical literature as outlined above by exploring human beliefs from an environmental management perspective. Firstly, by examining what people conceptualise as 'nature' and/or associate with 'nature', which responds to the gap in empirical research identified by authors such as Simberloff (2014); Beery, Jönsson & Elmberg (2015); Ives *et al.,* (2017) and Ducarme & Couvet (2020). Secondly, identifying what a 'connection to 'nature'' means to people, which responds to the gap in empirical research identified by Restall & Conrad (2015); Ives *et al.,* (2017); Salazar *et al.,* (2021) and Riechers *et al.*, (2021). Thirdly, examining what the self-reported barriers or pathways are to 'connections to 'nature'' which aims to fill a gap in empirical research identified by Ives *et al.,* (2017); Lumber *et al.,* (2017) and Richardson *et al.,* (2020). Finally, this research aims to fill a gap in environmental management empirical literature seeking to understand how people view themselves in relation to 'nature' explored via a psychological scale, and whether interconnectedness with 'nature' translates into pro-'nature' beliefs (a self-observed gap in environmental management empirical research).

By determining more in-depth understandings of beliefs relating to 'nature' – namely 'nature' conceptualisations and connections across the Tāmaki Makaurau Auckland population, information can be acquired that can be used to inform environmental management practice, policy/strategy, and planning. This enables more targeted regional approaches to be undertaken integrating human beliefs for widespread transformational change to achieve

environmental sustainability. Furthermore, undertaking the research contributes to environmental management literature locally, nationally, and internationally.

1.5.1 RESEARCH JUSTIFICATIONS BY INDIVIDUAL OBJECTIVE

As discussed, four research objectives were identified as ways to explore human beliefs relating to 'nature'. The aim of this section is to present a summary, and brief rationale behind each research objective. Further situation of the research objective into empirical and theoretical literature, as well as the full rationale for each, is discussed in greater depth within each relative chapter (two to five).

1.5.1.1 RESEARCH OBJECTIVE 1

The first objective of the research was to investigate how a sample of the Tāmaki Makaurau Auckland population conceptualise 'nature' and what is commonly associated with 'nature'.

Despite the growing consensus since the 1970s within the scientific community that we must protect 'nature'; the term still lacks clear definition (Worster, 1994). The result being that 'nature' has been argued as being at risk of becoming a term that means so many different things to different people that it is useless as a theoretical framework or explanatory device (Simberloff, 2014). This is not surprising given that 'nature' does not always have direct translations into other languages, and/or can embody different meanings across different academic disciplines, let alone throughout history and across different cultures and sectors of society (Descola, 2005).

This gap in empirical research has been highlighted by numerous authors. For example, Ives *et al.,* (2017) undertook a review of 475 publications relating to human-'nature' connection research and found that the term 'nature' is never clearly defined in both empirical and theoretical literature, exists primarily as a priori assumption, and is often ambiguous. This is problematic as the way individuals evaluate and enact their roles in the human-'nature' relationship and how they treat 'nature', is often related to their understanding of what 'nature' is (Flint, *et al.,* 2013; Restall & Conrad, 2015). Furthermore, from a local perspective, there are extensive efforts in Tāmaki Makaurau Auckland and nation-wide across Aotearoa New Zealand to protect and enhance 'nature', with millions of dollars invested in doing this. Therefore, it is crucial that knowledge about conceptualisations of, and associations with, 'nature' are formulated in environmental management so that practitioners can effectively engage with, and potentially shift, the public to more respectful attitudes/actions toward 'nature' and contribute to more targeted, and therefore effective, 'nature' practice, policy/strategy, and planning.

This research objective responds to the identified knowledge gap by employing an inductive research approach to understand conceptions of, and associations with, 'nature' held by a sample group of respondents. Applying an inductive approach provides a novel assessment technique as it allows for open-ended responses that enables more information to be determined through the ability for respondents to self-report their conceptualisations in contrast to previous research that has employed deductive research methods such as using imagery or using closed-ended questions (e.g., Kempton, Boster & Hartley, 1995; Hazula-

Delay, 2001; Van Den Born, 2008; Vining, Merrick & Kalnicky, 2008; Newton *et al.,* 2008; Buijs, Elands & Langers, 2009; Aaron & Witt, 2011; Tillmann, Button, Coen & Gilliland, 2019). Employing this research is also a first step in Aotearoa New Zealand, as there has been little research to date which has empirically explored conceptualisations of, and associations with, 'nature' (the research that has been undertaken and is relevant to this research area is outlined shortly in section 1.6.2.2).

1.5.1.2 RESEARCH OBJECTIVE 2

The second research objective centres around exploring and quantifying self-reported conceptualisations of personal 'connections to 'nature'' across a sample group from Tāmaki Makaurau Auckland.

Interest in human's 'connection' to 'nature' has a rich history in environmental literature (Schultz, Shriver, Tabanico & Khazian, 2004). More recently, disconnection between humans and 'nature' have been argued as being the driver of the crisis that 'nature' around the globe faces (e.g., by authors such as Haila, 2000; Vining, Merrick & Kalnicky, 2008; Zylstra, Knight, Esler & Le Grange, 2014; Beery *et al.,* 2015; Riechers *et al.,* 2021). This has resulted in the scientific community calling for people – particularly those in urban Western regions – to 'reconnect with 'nature'' given that 'connections to 'nature'' are strongly linked to pro-'nature' actions (Whitburn, *et al.,* 2018). However, through extensive reviews of both theoretical and empirical literature that explores the human-'nature' connection, Ives *et al.,* (2017) and Restall & Conrad (2015) found that the notion of 'connection to 'nature'' is used haphazardly resulting in little coherence on what the phrase means in practice, thus making it difficult for environmental managers to support or increase people's 'connections to 'nature'' as they potentially range across a spectrum of conceptualisations and associated values. Similarly, Salazar *et al.,* (2021) held workshops with 22 environmental researchers and practitioners with shared interests in the topic of human-'nature' connection. The group identified potential opportunities for future research which could help to advance understandings of human-'nature' connections. The top research priority identified being that the 'umbrella' notion of 'connection to 'nature'' needs to be further clarified and defined. This is particularly relevant in Aotearoa New Zealand, where there is little research (any relevant research is outlined in section 1.6.2.2) investigating how the population collectively and differently conceptualise their personal 'connections with 'nature'' and therefore subsequently there is little, to no, environmental practice and policy addressing the potentially varied conceptualisations. This is an oversight – given that the human-'nature' connection and/or relationship is an important place to intervene for sustainability outcomes (Riechers *et al.,* 2021).

Thus, acquiring a better understanding of what people variably conceptualise as a 'connection to 'nature'' has potential to assist with developing more targeted, cohort-specific approaches to help maintain or reconnect people to 'nature' in ways that meaningfully resonate with their prior perceptions and values (Vining *et al.,* 2008). This second objective similarly focuses on inductively exploring conceptualisations of 'connections to 'nature'' with the sample group of respondents, identifying the diversity and range of these conceptualisations, and situating the relevance for environmental management practice, policy/strategy, planning, and theory.

1.5.1.3 RESEARCH OBJECTIVE 3

The third objective investigates self-reported influences that impact upon personal 'connections to 'nature'' across a sample group from Tāmaki Makaurau Auckland.

Common areas of exploration within current human-'nature' connection empirical research are those seeking to understand what increases an individual's connection to 'nature' (e.g., Mayer, Frantz, Bruehlman-Senecal & Dolliver, 2008; Vining, Merrick & Kalnicky, 2008; Cosquer, Raymond & Prevot-Julliard, 2012; Liefländer, Fröhlich, Bogner & Schultz, 2013; Kals, Schumacher & Montada, 2016; Fretwell & Greig, 2019; Nisbet, Zelenski & Grandpierre, 2019). Most commonly, this research deliberately engages respondents in certain interventions such as conservation education programmes, exposing them to natural environments/scenes, and then testing whether their feelings of connection to 'nature' changes, and if so, to what degree. Interest in what decreases an individual's connection to 'nature' has not been tested empirically, however, there have been several theoretical discussions postulating that modern society is disrupting people's 'connections to 'nature'' (e.g., Orr, 1993; Shepard, 1993; Metzner, 1993; Pyle, 1993; Roszak, Gomes & Kanner, 1995). The strong interest in what influences 'connections to 'nature'' exists because there are strong links between 'connections to 'nature'' and pro-'nature' actions (Whitburn, *et al.,* 2018) and thus supporting and facilitating 'connections to 'nature'' can be beneficial for environmental sustainability.

Despite the increased research on what increases or (theoretically might) decrease 'connections to 'nature'', there is a gap in empirical research that seeks to explore self-reported influences on people's 'connections to 'nature'', specifically, what are self-perceived as pathways or barriers. This is an oversight, as discussed by Lumber *et al.,* (2017) 'connections to 'nature'' are extremely subjective and are formed through numerous experiences, thus making the development of specific pathways which increase/prompt/sustain 'connections to 'nature'' a complex undertaking. Therefore, there is significant merit in undertaking empirical research which allows for respondents to self-report their subjective thoughts, feelings and beliefs relating to what are perceived as being pathways or barriers to their connection to 'nature'. Increasing this knowledge can help environmental managers understand what tangible actions they can promote to encourage stronger 'connections to 'nature'' which could result in pro-'nature' actions (Lumber *et al.*, 2017; Ives *et al.,* 2018; Richardson *et al.,* 2020; Salazar, Monroe, Jordan, Ardoin & Beery, 2021).

The third research objective focuses on again, using an inductive approach to exploring collective perceptions with a sample group of respondents from Tāmaki Makaurau Auckland and subsequently applying the findings to environmental management with the aim of helping to inform environmental managers on how to better support and/or constructively prompt peoples' 'connections to 'nature'' for effective environmental sustainability outcomes.

1.5.1.4 RESEARCH OBJECTIVE 4

The purpose of the fourth research objective to explore how the sample group of respondents from Tāmaki Makaurau Auckland view themselves in relation to 'nature', and then examine whether this influences their level of pro-'nature' beliefs.

It is widely acknowledged that the way people perceive themselves in relation to 'nature' is influenced by a range of social, geographic, and social factors (Glaeser, 2001). The result being that all people are socialised to view themselves in relation to 'nature' differently from one another (Head *et al.,* 2005). Therefore, it is crucial that when designing interventions with the population seeking to increase respectful relationships with 'nature', environmental managers understand the potential complexities and differences across people's perceptions of how they view themselves in relation to 'nature', specifically, whether they feel interconnected or separate from 'nature' (Schultz, 2002; Abson *et al.,* 2017). This is important to demonstrate, especially given the strong link between feelings of interconnectedness with 'nature' and pro-'nature' actions (Whitburn, *et al.,* 2018). Therefore, this research seeks to increase understandings on how people view themselves in relation to 'nature', and whether this influences whether they have low or high pro-'nature' beliefs.

To achieve this research objective, a psychological scale will be deployed (the Inclusion of Nature in Self scale (INSS) by Schultz (2002) (Figure 1.1) to investigate how the sample group of respondents view themselves in relation to 'nature'. The INSS is then further deployed alongside the New Ecological Paradigm (NEP), a metric developed in the sociological discipline to measure an individuals pro-'nature' beliefs (Catton, Riley & Dunlap, 1980; Dunlap & Van Liere, 2014) to examine whether the varying ways that the sample group of respondents view themselves in relation to 'nature' correlates with different levels of pro-'nature' beliefs.

The INSS was originally developed within the psychology discipline using insights from scales to measure interpersonal closeness in a human relationship (e.g., circles with differing degrees of overlap were labelled 'self' and 'other' to indicate variations in perceived interconnectedness or separation). However, Schultz (2002) postulated that the same logic would apply to measure closeness between humans and 'nature' and thus created an altered version (e.g., instead of 'other' the second circle was labelled 'nature'). Despite this relevance for environmental management, the INSS is primarily employed within psychological empirical literature, and seldomly (if at all) is employed in environmental management empirical research. The INSS was also recently identified as a tool that is significantly useful to employ when seeking to understand varying levels of connectedness to 'nature' for sustainability workstreams (Salazar *et al.,* 2021) and thus employing the INSS (alongside the NEP) can provide important insights relevant to environmental management. This research objective therefore aims to show that employing these tools can contribute to the conundrum of understanding people's varying connectedness with, and levels of pro-'nature' beliefs, and then how this understanding can be constructively deployed to shift towards a more sustainable society and stop the rates of degradation of 'nature' that we see in contemporary times.

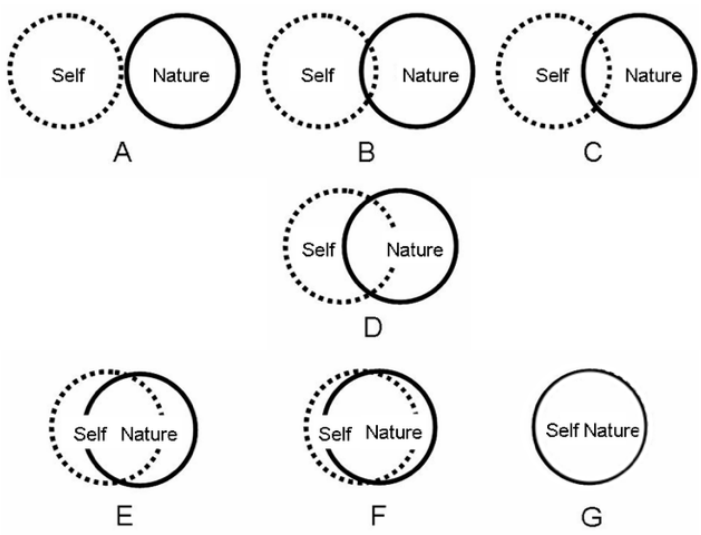

FIGURE 1.1. INCLUSION OF NATURE IN SELF SCALE (SCHULTZ, 2002)

1.6 HISTORICAL AND THEORETICAL REVIEW

An empirical literature review as a standalone chapter is not included in this thesis because each research chapter/submitted research article includes a review of empirical literature to situate the respective research objective. Instead, the purpose of this section is to provide a historical background to beliefs about 'nature' with particular focus on conceptualisations of, and connections with 'nature' and how these varied over different moments of history, and across different societies and philosophies. To achieve this, the broader cultural and religious conceptual dichotomies of East and West are used. Although it is acknowledged that there are several other cultural worldviews that could be explored within this historical background, examining the views of the East and West provides a sufficient insight and therefore a relevant foundation and context for exploring, and understanding, contemporary 'nature' beliefs and possible reasoning behind some of the beliefs that may be identified today (Flint, *et al.,* 2013). Furthermore, investigating cultural differences specifically by comparing East and West is common in disciplines such as psychology, philosophy, anthropology, archaeology, and applied linguistics (Pae, 2020). A discussion is also provided outlining the perspectives of 'nature' from *Mātauranga Māori* (traditional Māori belief systems) to situate the ways in which the indigenous peoples of Aotearoa New Zealand conceptualise 'nature'. This adds further context to the research.

Thereafter the corpus of theory from the 19th century until present day relating more broadly to the human-'nature' relationship/connection is reviewed to provide an underpinning theoretical and empirical context to this research. This is followed by a section which specifically outlines literature from Aotearoa New Zealand relating to the human-'nature' connection/relationship and perspectives of 'nature'.

1.6.1 HISTORICAL REVIEW

1.6.1.1 EAST AND WEST

Human-'nature' connections are greatly influenced by the ideas, and attitudes that different societies hold about 'nature' and can change across geographic, social, and cultural contexts (Glaeser, 2001). Therefore, historical 'nature' beliefs, specifically conceptualisations of 'nature', the human-'nature 'connection and how humans are viewed in relation to 'nature' across early Western civilizations and early Eastern civilizations are significantly distinct and contrasting (Callicott & Ames, 1989).

Entangled across a wide range of historical Western contexts is a dominating conceptualisation of humans being positioned separate from, and superior to, 'nature'. According to authors such as White (1967); Barber (2004) and Seaman (2009) this was due to the widespread adoption of Judeo-Christian doctrines which promoted the view of dualism between humans and 'nature', and that humans were dominant over 'nature'. This codified positioning of humans as separate from 'nature' originally appeared in the first book of the Old Testament, the Book of Genesis (1450 BC). Writings in the Book of Genesis promoted ideas that the Earth was God's fallen creation, which had been offered to humans to rule and procreate (Kay, 1989; Marangudakis, 2001). Specifically, the text that illustrates this view is Gen. 1:23: *"…and God said to them, 'be fruitful and multiple, and fill the Earth and subdue it; and have dominion over the fish of the sea and over the birds in the air and over every living thing that moves upon the Earth".* This doctrine of a 'creation' by God depicts an ideology of 'nature' having been created solely for humans, setting humans apart from 'nature' and advocating the control of 'nature' by humans (Takacs, Soule & Lease, 1996; Harrison, 1999). Further text within the Old Testament also describes God's 'establishment' of a particular hierarchy whereby humans hold a superior position and encourages the use of 'nature' as an instrument, resulting in a "*dominant theological tradition that articulated a strongly anthropocentric view of the human dominion*" (Kuper, 2014; Bauckham, 2002, p. 141).

Despite the view that the Old Testament promoted separation and superiority, it was not one that was shared by all scholars. For example, Leiss (1972), contends that the argued human superiority reflected a critical shift at the time whereby humans began to view themselves as needing to master their surrounding environments for survival. However, regardless of whether the conception of the human-'nature' connection was based on the necessity of superiority or separation in a negative sense; it still represented a way of thinking where 'nature' was viewed as an object, separate from humans, and thus prompting dualistic views that shaped early Western civilisations (Merchant, 1990).

The Greek philosophy movement, which arose in the sixth century BC; inherited the body of knowledge which was guided by these Judeo-Christian doctrines. Greek philosophers inherited a system of ideas about the 'divine' and the 'soul'. Above all, Greek philosophers were most interested in life itself and were persistently searching for life's underlying source (Mcclure, 1934). Clear anthropocentric perspectives were evident amongst this group of thinkers. Specifically, Plato (429 BC – 348 BC) and Aristotle (384 BC – 322 BC) shared an assumption in their literature that there was a clear dividing line between humans and 'nature'. For example, Plato (1925) explains "*I am devoted to learning; landscapes and trees have nothing to teach me – only the people in the city can do that*". Similarly, in his text *Politics* (1905), Aristotle frequently promoted anthropocentric ideals (Kuper, 2014). For example, Aristotle (1905, p. 1256b), wrote

"*After the birth of animals, plants exist for their sake, and… the other animals exist for the sake of man, the tame for use and food, the wild, if not all, at least the greater part of them, for food, and for provision of clothing and various instruments. Now if 'nature' makes nothing in vain, the interference must be that she has made all animals for the sake of man*". These comments expand on the Old Testaments' moral and religious justifications that promoted human separation from 'nature'. For example, Aristotle was injecting logic into the claims made in the original Old Testaments that 'nature' is made for the sake of human use, thus all elements of 'nature', fauna, and flora, were created for practical human values and humans were materially connected to 'nature' through the services and goods it provided to sustain life (Kuper, 2014). Chemhuru (2017) contends that Aristotle's philosophies continued to support the traditional Judeo-Christian distinction and division between 'nature' and humans.

Later, Greek philosophers such as Chrysippus (279 BC – 206 BC) and Lucretius (94 BC – 55 BC) who came after Plato and Aristotle also held similar views. Chrysippus found it 'absurd' to think that Earth was created for plants, or the 'irrational animals' (White & Coates, 1999), while Lucretius described the presence of mountains, forest, and wild beasts on Earth as a defect, discussing that Earth is *"greedily possessed by mountains and the forests of wild beasts … these regions it is generally in our power to shun" (cited in* Nash, 1967).

Thereafter, during the Medieval Western Europe era (5th-15th century), a generation of intellectuals continued the earlier lines of thinking and similarly constructed a category of 'nature' as being separate from 'culture' (Seaman, 2009). Whitney (1993) argues that some of the elements that were embedded in the earlier Judeo-Christian theologies encouraged medieval thinkers to have a rather aggressive perspective of 'nature'. Literature from this time found that those who discussed the relationship between humanity and 'nature' conceived 'nature' as existing outside of humanity (Seaman, 2009). However, there were no prominent mediaeval writers who wrote essays on 'nature' as a construct, instead, 'nature' just simply existed, which makes it difficult for historians to understand the conceptions of 'nature' during this period (Hanawalt & Kiser, 2008).

Moving into the 17th century, the image of human dominion over 'nature' prevailed, and philosophers shared a common assumption that 'nature' could be described as motion and matter and this conception led to a mechanistic conception of 'nature' (Osler, 1979; Yayli, 2015). Philosophers and scientists also became interested in understanding earlier Judeo-Christian concepts of 'God's creation' within the new scientific paradigm that was beginning to emerge as part of the scientific revolution (Weinberger, 1989; Montuschi, 2010). However, White (1967, p. 1207) argues that during the beginning of the scientific revolution, scientists inherited the "*orthodox Christian arrogance toward 'nature'*" and thus, "*science was cast in the matrix of Judeo-Christian theology*". 'nature' had begun to be perceived as a book, and anybody that could read this book was able to understand the will of God. Therefore, the aim at that time was to use scientific methods as an instrument to read the book of 'nature' to understand God (Pepper, 1996).

The founders of modern science, such as Francis Bacon (1561 – 1626) and Descartes (1596 – 1650), abandoned the theological foundations of science. Specifically, for Bacon, science was to "*lay the foundation, not of any sect or doctrine, but of human utility and power [in order to] command 'nature' in action*" (Weinberger, 1989, p. 17). Through this new medium of science, humans became processors and masters of 'nature' and Bacon and Descartes played key roles in transforming the conceptions by humans of their surrounding environment to a mechanistic and methodological view (Merchant, 1990). Bacon's view was that in order to understand and comprehend 'nature', one must dominate 'nature' and its secrets be 'revealed by force' (Yayli,

2015). Merchant (1990, p. xvi) argues that Bacon's 'knowledge is power' dictum along with the mechanistic perspective of 'nature' prompted the perspective of a "*mechanistic world view in which 'nature' was reconstructed as dead and passive, to be dominated and controlled by humans*". Bacon's influential views on 'nature' and his fundamental beliefs that it was something to interrogate is argued as being an important moment in the origin of modern science as we know it now and greatly accelerated the degradation of 'nature' (White, 1967; Gower, 1997).

Throughout the 17th century, scientific methods were believed to be the foundation of all knowledge, resulting in an analytical and reductionist attempt to deconstruct 'nature' into pieces to understand how 'nature' works. This conception entailed the emergence of a new paradigm; the ideology being what cannot be empirically measured, cannot have true existence (Pepper, 1996; Montuschi, 2010). Although it was Bacon who promoted the idea of conquering 'nature', Descartes had similar perspectives, stating that humans could become masters and owners of 'nature' (Kennington, 1978). In his view, humans were the only beings that existed in the universe in a spiritual and substantial sense. Anything that is not human, does not have spirit, therefore 'nature' and its parts only function mechanically (Haila, 2000; Yayli, 2015). Thus, philosophers during the 17th century struggled to understand how the mind could have any connection with something mechanical, namely, 'nature' (Collingwood, 1945).

The 18th century thereafter saw the start of the movement we can term, 'Western environmentalism' as Western nations began to acknowledge the impact of industrialisation and economic development on 'nature' (Grove, 1992). Some of the key markers which reflected this was the publication of *Essays on Field Husbandry in New England* by Eliot (1748) promoting soil conservation, the first 'nature' protection petition to stop waste dumping in Pennsylvania in the United States of America taking place (with a successful outcome), the publication by English philosopher Jeremy Bentham titled *Introduction to the Principles of Morals and Legislations* (1789) which argued that animals exist not just to meet the needs of humans but also have their own rights, and the publication of *An Essay on the Principle of Population* by Malthus (1798) which was the first literature to acknowledge how population growth will place pressure on 'nature'.

Thereafter, the 19th century saw the first documented acknowledgments and recognition of climate change. For example, French scientist Jean Fourier used the term 'greenhouse effect' for the first time to illustrate the Earth's atmosphere as being the planet's 'insulating blanket' which traps gases to maintain the Earth's temperature (Fourier, 1824). A few decades later, American scientist Eunice Newton Foote further theorized that increases in carbon dioxide from industrialisation could impact Earth's temperatures (Foote, 1856). Shortly after, Swedish scientist Svante Arrhenius later claimed that it is specifically coal burning which increases carbon dioxide in the atmosphere (Arrenhius, 1896). The 19th century saw terms such as 'acid rain' be coined (Smith, 1872), the first legal Act being implemented to make dumping of sewage in streams illegal (British River Pollution Control Act, 1876), the development of the world's first ever national conservation park (Yellowstone National Park) (Jackson, 1942) and the development of the first National Bird Reserve in Florida (Conservation Fund, 2022).

The following 20th century then saw a rise in strong environmental movements which spanned across the West such as green consumerism which entailed more emphasis on purchasing products which had little environmental impact (Shanagher, 2020), 'green' political parties which put the health of 'nature' into Government decision making (Dominick, 1998) and the animal rights movement which centred around people advocating the welfare and wellbeing of animals in the agricultural industry (Silberman, 1988). Literature highlighting the importance of living in harmony with 'nature' and promoting the idea that humans and 'nature' are

interconnected started to become common across multiple disciplines, of which the key literature will be discussed further in section 1.6.2.

As opposed to the historical Western conceptualisations, historical philosophies of the East viewed an overall interconnectedness between humans and 'nature' tightly rooted in spirituality (Callicott & Ames, 1989). In ancient Eastern philosophies there are substantial amounts of literature without author nor date which contrasts with Western philosophy where key individuals are almost always known (Dasgupta, 1922). Furthermore, as there is also no strict equivalent to 'nature', or a 'nature'-culture/'nature'-human dialectic in a number of these cultures, it is easier overall to study their conceptions by comparing general theories about life, and reality (Barnhart, 1997). Barnhart (1997) proposes three dominant models of philosophy of the Eastern world – Hinduism, Buddhism and Daoism, which will be used to outline the human-'nature' conceptualisations in historical Eastern contexts.

Firstly, in contrast to the Western attitudes of 'nature' being 'it', that is separate from humans, Hinduism philosophy views 'nature' as 'thou' and of which humans are an interdependent and interrelated part. Specifically, Hinduism proclaims that individual human lives are embedded in 'nature'. Within this train of thought, Hinduism believes that the water, the trees, the cows, are the same divine spirit that has manifested itself in different forms (Coward, 2003). This perspective is illustrated in the *Vedas* – believed to be the oldest literature of Hinduism, presumably written around 1000 BC consisting of hymns in the praise of 'nature' Gods (Dasgupta, 1922; Ghose, 2011; Renugadevi, 2012). The concept of 'oneness' was seen throughout the *Veda*s (Rao, 2014), and messaging throughout the *Vedas* indicates that all living and non-living creations, along with natural phenomenon are part of a divine power (Rajeev, 2012). The *Vedas* discuss that the five elements (space, air, fire, water, and earth) were all derived from Prakriti, the primal energy. Thus, it was believed that the human body is composed of this energy and each of the five elements was connected to one of the five human senses (sight, sound, smell, touch, taste). For Hindus, this was inseparable and part of their existence (Tanwar, 2016). The *Vedas* also contains several references to conservation and ecological balance. For example, it was expected that resources could only be exploited when they were required for survival, and these expectations were given such importance that doing otherwise was considered a sin (Renugadevi, 2012; Rao, 2014; Tanwar, 2016). This expectation is illustrated in a verse from the Rig-Veda, one of the texts inside the *Vedas*, stating that "*the sky is like father, the Earth-like mother, and the space as their son. The universe consists of the three and it is like a family. Any kind of damage done to any one of the three throws the universe out of balance*" (David, 1980).

The Upanishads, which are the later scripts within the *Vedas*, began to consider God as existing within the trees and that these were gifted to man as a companion for mutual survival (Rajeev, 2012). This is in clear contrast to the Judeo-Christian doctrine discussed earlier in which the creation by the divine implies that the natural world was created solely for humans, setting humans apart from 'nature' and advocates the control of 'nature' by humans (Lease, 1995; Harrison, 1999). Upanishad sages believed that although there was diversity across the beings and things on Earth, there was an underlying unity. For them, the identification between 'nature' *and* humans did not exist as humans are an inseparable part of 'nature' (Chatterjee, 2016).

Secondly, like Hinduism, Buddhist philosophies were founded on notions of interconnectedness with 'nature'. Specifically, Buddhist philosophy prompted the idea that humans should not be treated as being independent of 'nature' and vice-versa (Johnson, 1992). There are various conceptual pillars within the diverse Buddhist belief systems that speak to the interconnectedness between human and 'nature'. As an example, the pillar of dependent

origination or *pratītyasamutpada*, which is understood as meaning that all living creatures are connected through dependent co-arising, and this results in the interdependence between 'nature' and human (Singh & Kumar, 2019). Furthermore, this concept of dependent origination in Buddhist thought acknowledges that nothing can exist independent of other things, and that everything is in existence because of the relationships that are evident between other beings and phenomena (Xianlin, Zhongxin & Ikeda, 2001). Again, in opposition with the Western conceptions of human-'nature'connections, the concept of dependent origination, is one in which a human and 'nature' are interlinked, and where one is contained within the other. Therefore, humans and 'nature' are inseparable.

Toynbee and Ikeda (1982) discuss that in Japanese, the term for this concept is *eshō funi*. *E* standing for 'nature', *shō* standing for the individual life, and *funi*' standing for 'two but not two'. This refers to the inability to separate the human life from 'nature'. As opposed to the previous discussion of which the historical Western conceptualisations of 'nature' as the 'other' and the human-'nature' separation are blamed as being the key driver of the crisis facing 'nature' in contemporary times (White, 1967; Gower, 1997), authors such as White (1967); Sarabhai (2010); Donde (2014) and Zagonari (2020) argue that integrating these historical Buddhist views into conservation and environmental management are crucial for environmental sustainability.

Lastly, Daoism is one of the largest philosophical and religious systems of China (Hansen, 2003). Understanding the human-'nature' connection in Daoism is difficult as there are large differences between the English and classical Chinese language, and this is further heightened by the specific way in which Daoist's speak. One of the earliest literatures written by Laozi (considered the founder of Daoism) is the *Dao De Jing*, which is believed to have been written 2,500 years ago. The concept of *dao* refers to the totality of entities and the functions of each within the whole. The concept of *de* refers to the distinctiveness of each entity. Therefore, it is argued that the term *Dao De Jing*, evokes a plausible account of environmental holism and that sacrificing any beings should be avoided for the sake of the whole (Lai, 2003). The concept of *dao* is also understood as the idea of humans and 'nature' being closely connected to one another, and that they are intimate and inseparable in early Daoist thinking (Liu, 2016). Miller (1968) discusses at length the differences in how Daoist philosophies perceive 'nature' in comparison to the Western world, for example Daoist's conceive 'nature' as subjective versus the objective way in which it is perceived in the Western world, and that Daoist's imagine 'nature' as being internal in the human body. Daoist's believe the Earth does not lie outside humanity as an object that needs to be perceived, preserved, or 'saved'. Instead, it is something that 'forms' human beings. From this perspective, the current imagination that humanity and 'nature' are non-overlapping realms is hard to grasp for Daoists, as they are not considered distinct and activity from one domain will significantly impact the other.

1.6.1.2 MĀTAURANGA MĀORI

Of relevance to the location in which this research took place, this section presents a short discussion of the relationships that the indigenous people of Aotearoa New Zealand (Māori) have with 'nature'. Māori are believed to be the first settlers to the country. They came from Polynesia and settled in the country at some point between the 10th to 14th centuries (Garden & Stoll, 2005). Māori lived as the only ethnic group and culture until the early 1640's when the first European settler arrived – Dutch explorer Abel Tasman – and major colonization took place in the 1840s (Gibbons, 2002).

Traditional Māori values were (and still are) embedded in the concept of *kaitiakitanga* (guardianship) of 'nature', and Māori self-define(d) themselves as *tangata whenua* (people of the land). This means that harvesting of any natural resources was done under strict regimes of *mana* (spiritual authority), *tapu* (sacredness) and was often overseen by *tohunga* (priests). This significance of looking after and respecting 'nature' was rooted in substantial religious philosophy which was embedded in the view by Māori that they are interconnected with 'nature' (Begin & Smith, 2004; Harris & Tipene, 2006). Māori therefore strongly emphasize that the health of 'nature' is directly linked to their own spiritual and cultural well-being (Lockhart, Houkamau, Sibley & Osborne, 2019). This is underpinned by the concept of *mauri* – a life force which connects all living and non-living things (Patterson, 1998; Harmsworth & Awatere, 2013). Much like some Eastern cultures, there is no single word for 'ecosystem' in *te reo Māori* (Māori language). Instead, terms such as *whakapapa* (ancestral lineage) are used to understand the perspective of what an ecosystem is. From a Māori perspective, the universe is a series of genealogical webs that go back generations (Harmsworth & Awatere, 2013; Durie 2012). For Māori, humans are descendants from the *ātua* (Gods) – specifically *Papatūānuku* (Earth Mother) and *Rangi-Awatea* (Sky Father) (Rangihau, 1992; Hook *et al.* 2007). This concept of whakapapa between Māori and *Papatūānuku* and *Rangi-Awatea* connects Māori with all flora, fauna and natural resources through these recognised and highly valued genealogical bonds (Harmsworth & Awatere, 2013). This interconnected view was evidenced in the ways in which historical Māori chiefs would practice the custom of *taunaha whenua* – where land would be claimed and named after a part of the body (Grace, 1992), and how the term *whenua* (land) also means 'placenta' – signifying this interconnected and vital relationship of which humans are born from *Papatūānuki* (Harmsworth & Awatere, 2013).

Authors such as Patterson (1998) and Harmsworth & Awatere (2013) have explored the apparent differences between the indigenous population (Māori) and the Western population when it comes to the relationship with 'nature'. They have examined Māori knowledge, values and perspectives of 'nature' as well as their relationship with 'nature' and highlight the high level of interconnectedness that Māori feel with 'nature' in comparison to New Zealand European/Pākehā. It has been noted that Māori share similar views of 'nature' and the human-nature connection to those of the East discussed earlier which contrasts with predominant Western views that see humans as superior to, and dominant over nature (The Asia New Zealand Foundation Te Whītau Tūhono, 2019; Patterson, 1998). Most of the similarities between *Mātauranga Māori* (traditional Māori belief systems) and perspectives of humans in relation to 'nature' in Eastern philosophies such as Hinduism, Buddhism and Daoism, can be understood through understanding the 'self' across the cultures. Eastern notions of 'self' are interdependent of the collective, and this is aligned to the Māori perspective where their 'self' is also embedded in a collective network which is specifically opposite to the Western view (Kashima & Hardie, 2000; Harrington & Liu, 2002; Love, 2004).

These Māori worldviews have made their way into national policy, with the national Resource Management Act (1991) containing requirements that *kaitiakitanga* is to be supported and allowed to be practiced by Māori and that the relationship between Māori and their culture, traditions, ancestral lands, water, sites and *wāhi tapu* (sacred areas) are to be recognised as a matter of national importance (sections 7 and 6(e)). Furthermore, a recent Deed of Settlement with the Crown was achieved to grant the Whanganui River (located in the lower North Island of Aotearoa New Zealand) legal personhood as an indivisible and living entity. This was achieved through years of Māori-led legal battles aimed at successfully integrating Māori thinking into resource management matters viewing 'nature' as being a close, living relative (Artelle *et al.* 2018).

1.6.2 THEORETICAL REVIEW

1.6.2.1 INTERNATIONAL

Differing beliefs about 'nature', specifically conceptualisations of, and connections with 'nature' and how humans are viewed in relation to 'nature', as outlined above, has been of interest to authors and philosophers over the centuries. In the West it has prompted disciplines to emerge such as environmental ethics and environmental philosophy – both of which are concerned with the exploitation of 'nature' and the need to consider the relationship that humans have with 'nature' (Brenner, 1996; Norton, 2013). Accordingly, philosophers began to appear and generate theories which challenged the earlier dominant tenets that humans were separate from, or superior to 'nature'. For example, Henry Thoreau (1817 – 1862), who identified himself as a philosopher of 'nature', promoted the theory that 'nature' is an important aspect of the societal context and that by studying 'nature', one could understand humanity (Ruehl, 2019). Thoreau contested that humans are inherently connected with 'nature' specifically stating in one of his essays "*…I regard man as an inhabitant, or a part and parcel of 'nature', rather than a member of society*" (Thoreau, 1862, p. 1) and it was considered a fact for Thoreau that humans were bound up with the world physically and spiritually (Matzke, 2014). These views reflected the perspective held more generally across the Western neo-romanticism movement of which Thoreau was considered a key contributor, which saw literature, art, philosophy, and architecture beautifying 'nature' and reflecting intimate connections between society and 'nature' (Garber, 1977).

Thoreau's line of thinking acknowledging the important connection between humans and 'nature' was followed by theories such as Aldo Leopold's theory of 'land ethics' which promoted a deeper relationship and connection between humans and 'nature'. This is illustrated by his quote "*...we abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.*" (Leopold, 1949, p. viii), Leopold (1949, p. 2) further promoted the idea that "*everything is interconnected, and the disturbance of 'nature''s biotic structure – or – 'land pyramid' affects both human societies and environmental communities*".

Philosophers such as Arne Næss then emerged and took inspiration from philosophers such as Thoreau, Leopold, and the historical Eastern philosophies which tended to be one in which humans are portrayed as being an integral part of 'nature' and perceived an interconnectedness between humans and 'nature' (Callicott & Ames, 1989; Barnhart, 1997). For example, Næss developed the 'deep ecology' theory which promoted the idea that humans are "*knots in the biospheric net*" (Naess, 1973, p. 95) taking light from Daoism and Buddhism (Loy, 1997). Næss further emphasized that 'nature' did not exist for human sake – in direct contradiction to earlier views by Greek philosophers such as Descartes and Bacon, but that 'nature' has intrinsic value and that harming 'nature', is in effect harming humans.

Similarly, shortly after, the 'Gaia theory' proposed by James Lovelock (1979) suggested that the Earth and all organisms on Earth create an intertwined synergistic and self-regulating system, and therefore humans, animals, and all elements of the natural world are interconnected and dependent on one another for survival. Thereafter biology philosopher Edward O. Wilson developed the theory of 'biophilia', which postulated that humans share an innate bond with 'nature', and that humans have deep, emotional 'connections to 'nature'' because of evolution where the human brain was intertwined in natural settings for millions of years (Wilson, 1984). The biophilia theory is argued to be an important theme in conservation

sciences and prompted the consideration of the human-'nature' relationship in conservation related disciplines fuelling the rise in empirical research on the human-'nature' connection (Joye & De Block, 2011).

Considering this perceived innate bond that humans have with 'nature', concern around the impact of industrialisation and urbanisation on humans' ability to connect with 'nature', elicited theories such as the 'extinction of experience' by Pyle (1993). Specifically, the 'extinction of experience' related to the inability for humans to spend physical time in 'nature' and have less direct 'nature' experiences due to increased urban living and technological advancements (Pyle, 1993). Similarly, the ''nature' deficit disorder' theory developed by Richard Louv (2006) related to the reduced contact with 'nature' due to industrialisation and urbanism having negative impacts on mental development – specifically, the ability for children to develop intellectually.

The development of human-'nature'connection theories outside of the West include the theory of 'inter-be' by Vietnamese monk Thich (1996). The theory of 'inter-be' aimed reflect the interdependent and interconnected relationship of everything on Earth, and that the body and mind is interconnected with 'nature' and ecology, echoing earlier Buddhist, Hindu, and Daoist philosophies (Lim, 2019). For example, Thich (1996, pp. 43-44) explains that *"the whole cosmos is our body, and we are also the body of the entire cosmos*" and that "*the Five Aggregates [form, sensations, conceptions, mental activity, and consciousness] contain everything – both inside us and outside of us, in 'nature' and in society"* (Thich, 1999, p. 181).

Finally, albeit not a theory, it is important to consider the role of ecopsychology – a discipline which emerged in the early 1990's taking light from the earlier philosophers mentioned and from a psychological perspective had the goal of "*bridging our culture's long-standing, historical gulf between the psychological and the ecological...*' (Roszak *et al.,* 1995, p. 2) to "*heal the fundamental alienation between the person and the natural environment*" (Roszak *et al.,* 1995, p. 6).

Ecopsychology, along with the philosophies mentioned above, underpin the contemporary interest in the human-'nature' relationship and thus resulted in an increase of empirical research spanning across multiple disciplines (Seymour, 2016; Giusti, 2019); albeit predominantly from a Western context (Ives *et al.,* 2017). Most commonly, is the interest on 'connections to 'nature'' from a psychological and health discipline whereby focus has been on whether connecting to 'nature' has an impact on people's health and wellbeing, of which empirical research has strongly suggested that 'connections to 'nature'' can have positive impacts on health (Thompson Coon *et al.,* 2011; Capaldi, Dopko & Zelenski, 2014; Pritchard *et al.,* 2020). Secondly, is the attention from a conservation psychological perspective, seeking to understand whether connectedness to 'nature' results in pro-environmental behaviours – of which empirical research has similarly suggested a positive correlation (Whitburn *et al.,* 2019)[4].

Understanding and acknowledging the complexities of the human-'nature' relationship also plays an important role in landscape management to understand how varying landscape use policies can influence relationships between humans and 'nature' (Peng, 2020; Riechers *et al* 2020), urban design such as how urban settings can facilitate connections with 'nature' and result in health and wellbeing benefits (Colding *et al.,* 2020; Totaforti, 2020), and social economics to understand the way in which evolving human-'nature' connections both reflected

[4] However, this empirical research is predominantly quantitative coming from psychological disciplines and as discussed in earlier sections, many aspects relating to this field of research are under-researched in environmental management.

and resulted in economic-'nature' conflicts (Buckeridge, 2009). The continued emphasis on understanding the human-'nature' relationship/connection further prompted the development of numerous scales to 'test' 'connections to 'nature'', such as the Nature Relatedness Scale (Nisbet, Zelenski & Murphy, 2008), Connectedness to Nature Scale (Mayer & Frantz, 2004), Inclusion of Nature in Self scale (Schultz, 2002) and the Emotional Affinity toward 'nature' scale (Kals, Schumacher & Montada, 1999).

Despite the broad theoretical emphasis on the human-'nature' relationship/connection as outlined above and as reflected in a meta-analysis of 475 publications by Ives *et al.,* (2017), as discussed in section 1.5, empirical research is lacking specifically in environmental management exploring beliefs relating to 'nature'. Precisely how people conceptualise 'nature' and their 'connection to 'nature'', and people view themselves in relation to 'nature' and whether interconnectedness with 'nature' leads to pro-'nature' beliefs. Subsequently, the four research objectives outlined in this thesis were identified.

Despite this gap in empirical research, it is important to acknowledge that there has been limited research internationally that has sought to understand 'nature' conceptualisations and 'connections' more robustly, however, to avoid repetition in chapters two to five which examine relevant empirical literature, only a brief review is provided in this section.

Firstly, there have been some studies have been undertaken to examine the ways in which individuals understand or conceptualise 'nature'. These studies include those seeking to comprehend conceptualisations of 'nature' using imagery and asking respondents to identify and explain which environment images they considered to be more 'nature' than others (e.g., Van Den Born, 2008; Newton *et al.,* 2008; Buijs *et al.,* 2009), and through researcher-identified themes when respondents discussed 'nature' related topics (e.g., Kempton *et al.,* 1995; Hazula-Delay, 2001). Overall, the findings from these studies reflected a common view across respondents that 'nature' is separate from humans and/or human influences (further discussed in chapter two).

Similarly, but to a lesser extent, there has been some empirical research exploring how 'connections to 'nature'' are conceptualised or enacted. For example, by Fretwell and Greig (2019) who asked respondents what a 'connection to 'nature'' means to them in an open-ended context, Cosquer, Raymond & Prevot-Julliard (2012) who identified varying ways in which their respondents who took part in a 'nature'-related citizen-science program enacted their personal 'connections to 'nature'' through observing them, and Tillmann *et al.,* (2019) who sought to understand conceptualisations of 'connections to 'nature'' by children through focus group discussions to identify any common ways in which children spoke about their 'connections'. All studies displayed a diversity across their 'connection to 'nature'' conceptualisations (further discussed in chapter three).

Considering what may impact or influence 'connections to 'nature'', the topic has been researched with emphasis on what increases individuals' 'connections to 'nature''. Most commonly this is done by deliberately engaging respondents in certain interventions such as conservation education programmes, exposing them to natural environments/scenes, and then testing whether their feelings of connection to 'nature' changes, and if so, to what degree (for example see Mayer *et al.,* 2008; Vining, Merrick & Kalnicky, 2008; Cosquer, Raymond & Prevot-Julliard, 2012; Liefländer *et al.,* 2013; Montada, 2016; Schumacher & Montada, 2016; Fretwell & Greig, 2019; Kals, Nisbet, Zelenski & Grandpierre, 2019). However, by contrast, empirical research seeking to understand what decreases people's connection to 'nature' or acts as a barrier to people's feeling of connection to 'nature' is scarce. Despite this, scholars have

long speculated that the increase in urbanisation and modern ways of living has acted as a barrier to people's feeling of connection to 'nature' (Orr, 1993; Shepard, 1993; Metzner, 1993; Pyle, 1993; Roszak, Gomes & Kanner, 1995) (further discussed in chapter four).

Lastly, efforts have also gone into developing scales that can be used to test how interconnected people feel they are with 'nature' – such as the Inclusion of Nature in Self (INSS) scale by Schultz (2002) (Figure 1.1). However, as discussed in section 1.5.1.4, despite this scale being implemented across psychological research (for example Davis, Green & Reed, 2009; Bruni & Schultz, 2010; Martin *et al.,* 2020; McConnell & Jacobs, 2020), it has not been deployed in an environmental management context – albeit being very concise and easy to administer. Furthermore, the New Ecological Paradigm, a sociological scale developed by Catton *et al.*, (1980), and updated by Dunlap *et al.,* (2000), was developed to understand individuals' beliefs and/or attitudes relating to 'nature' (e.g., whether individuals hold pro-'nature' beliefs or not) – but again, has not been employed in environmental management literature (further discussed in chapter five).

1.6.2.2 AOTEAROA NEW ZEALAND

In this section I will identify and discuss literature that is considered most congruent with the aims and objectives of this thesis. However, it is important to note that each of the next four chapters which outline the research across the four research areas that are studied also contain their own review of literature (both internationally and nationally) and situate the findings amongst comparable studies where appropriate.

Just over a decade ago Newton, Fairweather & Swaffield (2008) investigated public perceptions of 'nature' by using photographs of different landscapes (e.g., from urban to wildnerness) They sought respondents (sample size not specified) in both Rotorua and Kaikōura to evaluate six photos in a way so as to reflect what they thought 'nature' meant/respresented. Their results suggested that most commonly, respondents selected wilderness landscape images (with no sign of humans or human influence) as being most reflective of 'nature', whereas imagery of landscapes which contained 'nature' within urban settings were considered least representative of 'nature'. Albeit being somewhat aligned to research area one of this thesis, Newton, *et al* (2008) did now allow respondents to self-report what 'nature' means to them, but instead sought respondents to select what they felt was considered more [or less] 'nature' based on the reseacher's assumptions as to what an appropriate scale of measurement was (six photos showing varying landscapes with none containing humans or animals but different man-made influences). This approach may have failed to encompass some of the broader ways in which people conceptualise 'nature' which may not necessarily be just related to landscapes.

Given that the way in which the national Department of Conservation frames 'nature' is rarely critiqued or analysed externally this was explored by McNeill (2016). McNeill found that they primarily frame 'nature' as "*the physical world – as opposed to humans or human creations with a heavy focus on the utility of 'nature'*" (pp.3). This depiction of 'nature' being something of which humans are not a part of is consistent with the lay-perspectives identified by Newton, *et al* (2008). Similarly albeit from a policy perspective, Froude, Rennie & Bornman (2010) attempted to develop a way to define, and measure 'natural character'. The aim being to provide insight into how the status and health of 'natural character' in certain environments in Aotearoa New Zealand could be measured to determine whether policy goals are being achieved. By undertaking a review of over 30 multi-disciplinary pieces of international literature which

presented varying definitions or views as to what 'natural character' is, the authors concluded that a plausible working definition of 'natural character' for policy makers in Aotearoa New Zealand could be "*free from the effects of human constructions or non-indigenous influences*" (pp.339). This proposed working definition is consistent with the perceptions of 'nature' found across lay-people of Aotearoa New Zealand by Newton, *et al* (2008) and the common way in which 'nature' is framed by the Department of Conservation as identified by McNeill (2016). Despite this, the working definition was developed based on theroretical discussions and arguments around differing views on what is constituted as being 'natural character' versus actually seeking lay-peoples perspectives. This is an oversight, as those responsible for implementing 'nature' related policy, legislation and strategy must equally depend on the public to assist with enhancing 'natural character' (e.g., by modifying behaviours etc). Therefore, it is important to firstly understand how the term is understood by the population before making a priori assumption and presuming it means the same thing to each individual.

The views identified above are also somewhat contradictory to the traditional Māori view of 'nature' (as discussed earlier) which considers 'nature' as an interconnected part of humans and part of their *whakapapa* (ancesteral lineage) as Māori believe that they are descendents from the *atuā* (Gods), in particular *Papatūānuku* (Earth Mother) and *Rangi-Awatea* (Sky Father) (Rangihau, 1992; Hook *et al.* 2007; Harmsworth & Awatere, 2013). Nevertheless, Freeman, van Heezik, Stein & Hand (2015) found different perceptions when exploring how 187 children between 9 and 11 years of age define 'nature' across three cities in Aotearoa New Zealand – Auckland, Wellington and Dunedin. The authors found that despite a more general view that 'nature' was defined as plants, trees, animals etc., children also mentioned 'humans' and 'culture'. This may reflect a difference in perspectives across children and adults. This research is a positive step toward enhancing the knowledge around lay-perceptions of 'nature', as the reseach was inductive and allowed for children to express themselves freely without any constraits or pre-determined responses or scales of measurement. The research also shows that exploring the varying conceptualisations of 'nature' in an open-ended context is possible, and can provide some insightful information.

Freeman, Stein, Hand & Van Heezik (2015; 2018) also explored whether socioeconomic status or ethnicity influenced the knowledge children have about 'nature', or whether proximity and access to 'nature' influenced the same sample group. Their results suggested that factors such as independence, social connections and deprivation influenced 'nature' knowledge the most; except for NZ European/Pākehā children where access to local biodiversity influenced levels of 'nature' knowledge. This research is complimentary to the research undertaken as part of this research as it provides knowledge around the beliefs relating to 'nature' and in particular, the ways in which interactions or 'connections' to nature may influence 'nature' beliefs. Most recently, Freeman, Buttery, Waters & Van Heezik (2021) explored what specific aspects of 'nature' (explicitly domestic green environments) are preferred by 72 older adult respondents and found that aspects such as non-native flowers/flowering shrubs, trees, and birds were most preferred. Again, the research outlined in this thesis compliments Freeman *et al* (2021)'s findings by striving to determine whether these are aspects that are also similarly most conceptualised as being 'nature' by adults.

StatisticsNZ (2018a), as part of their two-yearly general social survey, found that 'nature' is considered by the population (through a statistically significant sample size) as one of the two most important characteristics about Aotearoa New Zealand (along with freedom/rights/peace). Similarly but with Māori, as part of their survey exploring Māori wellbeing with over 8,500 respondents, StatisticsNZ (2018b) found that 90.0% of Māori stated that the health of 'nature' was quite, or very, important to them. This information provides

awareness that there may be differing views around 'nature' related issues across ethnicities. However, a shortfall of this research is that has not clarified with respondents at the start of the survey, what they conceptualise 'nature' to mean before seeking input on 'nature' related topics. Therefore, in this situation, it is not known what aspects of 'nature's' health is important to Māori (e.g., trees, water, the *atua*, fish, etc as an example). Similarly, given that Māori are noted to feel more interconnected with nature (as discussed earlier), this finding by StatisticsNZ (2018b) may suggest that feelings of interconnectedness translate into pro-nature beliefs, but this has not been further tested.

Exploring lay perspectives of 'nature' from a slightly different angle, research lead by Professor Ken Hughey has spanned over the past decade examining how the population of Aotearoa New Zealand perceive the *state* of 'nature' and how they perceive Government-led initiatives to protect and enhance 'nature'. The data is used to inform governmental agencies about what issues facing 'nature' are most concerning for the population to prompt further emphasis by policy makers. The most recent report (Hughey, Geoffrey & Cullen, 2019) suggests that the population's concern about issues such as climate change has increased dramatically since the early 2000's, and that most feel that the country's natural environments are in 'adequate' or 'good' states. Earlier, Hughey, Kerr & Cullen (2014) have also explored whether ethnicity influences perceptions on the state of 'nature' and found that there are signifcant differences between ethnicities in terms of views on issues relating to water quality, and management. As mentioned earlier, this shows that there are differing perspectives around issues facing 'nature' across ethnicities, but again, fails to first understand what the population commonly conceptualizes as 'nature' before seeking their input into the what the main concerns about 'nature' are.

Despite the previous work mentioned at the time of writing, there has been little literature in Aotearoa New Zealand which has explicitly sought to understand the varying conceptualisations of 'connections to 'nature'' that the population hold. Of most relevance, is work undertaken by Freeman, Stein, Hand & Van Heezik (2015) who as part of the same study discussed above, explored how children self-define their 'connection with 'nature''. Their results showed that the child respondents commonly discussed 'connecting to 'nature'' in areas where birds and other species are visible, e.g., physically or experientially. As mentioned earlier with regards to their other study exploring how children define 'nature' (Freeman, *et al,* 2015), this is a step in the right direction in developing a knowledge base around the varying conceptualisations that people may hold and shows that this type of research is achievable and provides useful information about the human-nature relationship previously not known.

Although Government agencies have not sought to understand the differing ways in which the population views, conceptualises or enacts their 'connections to 'nature'', there is an increasing acknowledgment in Government literature that the 'connection'/relationship between people and 'nature' is an important consideration in conservation and future environmental sustainability (however what these 'connections' may mean to the population has not been tested). For example, the national Department of Conservation (2011) acknowledged as part of their National Education Strategy the importance of increasing children's 'connections to 'nature'' and how this may influence their pro-'nature' actions as adults. Consequently they commissioned a report that aims to provide guidance to the education sector of Aotearoa New Zealand about how they can employ varying interventions to enhance and prompt children to connect with 'nature'. The interventions included ensuring environmmental education programmes are personally relevant to children, ensuring that role models show an active interest in 'nature', and allowing children more uninterrupted time in 'nature' (Department of Conservation, 2011). However, again, this report makes an assumption about the most

prominent ways in which children 'connect with nature' without first understanding whether there are different ways that 'connections to nature' can be enacted.

Similarly, in Tāmaki Makaurau Auckland, the local authority (Auckland Council) recently acknowledged the significance of understanding individuals' feelings of connectedness to 'nature' and its importance in pro-'nature' actions as part of their annual social monitoring programmes and employed the Connectedness to Nature Scale (CNS) by Mayer & Frantz (2004) with a subset of the population to create a baseline so that annual monitoring could take place (Ovenden & Roberts, 2021). The results suggested that the population of Tāmaki Makaurau Auckland feel high levels of connectendess to 'nature', however this assumed that the population conceptualises their 'connections to nature' in the same way that the CNS measures 'connectedness' (which is measuring levels of kinship and affective individual feelings with nature). Therefore, their future research would be advantaged if they determined an initial understanding firstly as to what a 'connection to nature' means to people, and then subsequently undertook research to test these 'connections' for more accurate results and conclusions.

The Department of Conservation has also emphasized the connection between 'nature' and positive health and wellbeing outcomes over the past decade, commissioning multiple reports that either explore the relationship empirically or theoretically. For example, the Department of Conservation (2021a) empirically investigated how interactions with 'nature' during COVID19 lockdown restrictions increased feelings of mental wellbeing. Blaschke (2013) was earlier commissioned to provide advice to the Department of Conservation as to how the mental health and well-being benefits of visiting the country's public conservation areas could be measured by synthesizing theoretical literature from around the world. More recently, a symposium led by Dr Catherine Knight (Knight, 2021) supported by the Ministry for the Environment and New Zealand Government, brought together a range of experts from various fields with the aim of identifying how 'nature' can be incorporated into more areas to increase the mental wellbeing benefits for the national population. Given the increased awareness of these links, the Office of the Prime Minister provided a fellowship for researchers' Aussiel, *et al.* (2021) to attempt to codify the various contributions that 'nature' provides to specific aspects of wellbeing to help with better translating concepts such as ecosystem services into Government policy and budgets. Despite this growing body of literature, as identified by Knight (2020), empirical research in Aotearoa New Zealand specifically exploring the link between mental wellbeing and 'nature' exposure is scarce.

In terms of understanding what may prompt the population's pro-'nature' behaviours or beliefs, the Department of Conservation (2021b) explored perceptions of the state of the natural environment, wildlife, understanding of pests, biodiversity, and conservation. Using results from 3,900 respondents they attempted to understand what motivates some individuals to partake in conservation activities. The findings suggested that many of the respondents had a limited understanding about biodiversity and that this is what inhibited their ability and/or desire to participate in taking action to protect biodiversity. Furthermore, that around three-quarters of the respondents agree that 'nature' degradation is one of the most important issues in modern times and this this view was shared more across those that spent more time outdoors. Similarly, Woolley, *et al* (2021) explored what influences whether an individual engages in conservation activities (specifically trapping pest animals, monitoring pest animals and monitoring native animals) and found that concern for the environment and feelings of connection with 'nature' were strong motivators to partake in these activities. Whitburn, *et al* (2018) explored with 423 respondents whether exposure to 'nature' and/or past pro-environmental behaviours was associated with current pro-'nature' behaviours and found that

both did increase engagement in pro-'nature' behaviours with feelings of connection to 'nature' having the largest influence. Albeit providing useful information to inform practice that could work to increase pro-'nature' behaviours, these approaches have not allowed respondents to self-reflect on what [else] may be a promoter (or barrier) to their 'connections to nature' and thus may miss other important influences. Allowing for self-reflection by respondents' on what influences their 'connections to nature' was done by Freeman, Waters, Buttery & Van Heezik (2019) who examined impacts of ageing on 'connections to 'nature'' with a sample of 72 respondents between 65-99 years of age and used an open-ended approach. By interviewing their respondents the authors found that nearly all respondents self-identified that reduced mobility was a primary factor limiting their ability to connect and/or engage with 'nature', however respondents closer to retirement age reported that the increased time they had allowed for greater 'nature' engagement. By providing their respondents the ability to self-identify and report their thoughts and beliefs, allowed for no barriers or limitations in responses and thus provides a more insightful and accurate insight into the phenomenon explored.

In summary, despite this growing acknowledgement in Aotearoa New Zealand literature around the human-'nature' relationship, there are still many opportunities to provide insight into the population's beliefs about 'nature'. At the time of writing, there has been little research that has sought to approach lay-members of the population to seek their perspectives on what 'nature' or a 'connection to 'nature'' means to them. There is also a gap in the knowledge around what is perceived as barriers or pathways to their 'connections to 'nature''. There has also been no research from an environmental management perspective in Aotearoa New Zealand which has employed the Inclusion of Nature in Self (INS) scale (Schultz, 2002) with the lay-population and examined whether responses to the scale correlates with different levels of pro-'nature' beliefs. Therefore, the research in this thesis compliments the current body of literature in Aotearoa New Zealand on the human-'nature' connection/relationship, and acts as a first step towards exploring the specific notions across the four research areas as outlined in section 1.5.1.

1.6.3 REVIEW SUMMARY

Understanding the historical backdrop to this study provides useful insight into how beliefs about 'nature', specifically conceptualisations of 'nature', human 'connections to 'nature'', and how humans are viewed in relation to 'nature', differed over various timeframes, philosophies, and cultures. This gives an important foundation and context for exploring, and understanding, contemporary beliefs about 'nature' and possible reasoning behind some of the conceptualisations that may be identified in contemporary times (Flint *et al.*, 2013). Furthermore, the overview of theories relating to the human-'nature' connection/relationship and subsequent empirical research themes which emerged from philosophies by those such as Aldo Leopold, Edward O. Wilson, and Henry Thoreau etc., provide the structure that supports the research objectives outlined in this thesis and helps to situate this research in the wider literature. Chapters two to five include reviews of empirical research relative to each research objective, nevertheless, a summary of the empirical research which directly relates to the research objectives of this thesis was outlined. Lastly literature on the human-'nature' connection or relationship that has taken place in Aotearoa New Zealand was referenced and how this research builds upon what is currently known is demonstrated.

1.7 BACKGROUND ON STUDY AREA

This research was undertaken in the city of Tāmaki Makaurau Auckland which is the largest city in the country Aotearoa New Zealand.

1.7.1 AOTEAROA NEW ZEALAND

Aotearoa New Zealand is considered a developed country (World Population Review, 2020) and has an estimated population of 5.1 million people with ongoing population growth estimated to be 1.0% every year until 2048, predominantly from increases in net migration (Statistics NZ, 2021). Aotearoa New Zealand's human history is considered short, as it was one of the last inhabited landmasses in the world (Irwin & Walrond, 2016). As it was discussed earlier, the Polynesian settlers who came to be called Māori were believed to be the first settlers to the country. They settled in Aotearoa New Zealand somewhere between the 10th to 14th centuries (Garden & Stoll, 2005). In the early 1640's, the first European to arrive to Aotearoa New Zealand was Dutch explorer Abel Tasman, and just over a century later in 1769 English navigator James Cook mapped the country's coast (Statistics NZ, 2015). Major colonization took place in the 1840s after the signing of the Treaty of Waitangi[5] resulting in a strong European influence and set of customs that largely reflect those of the European settlers who emigrated to the country, which is further evident in contemporary times (Gibbons, 2002).

At present, the largest ethnic cohort in Aotearoa New Zealand are European/Pākehā representing 70.0% of the population, followed by Māori (16.5%), Asian (15.0%), Pacific peoples (0.8%), Middle Eastern/Latin American/African (0.01%) and 'other' ethnicity (0.01%). The median age of Aotearoa New Zealand is 37.6 years. Females represent 50.3% and males represent 47.7% of the population (Statistics NZ, 2017).

[5] A controversial treaty between the British Crown and Māori that arguably ensured both groups sovereignty.

FIGURE 1.2 MAP OF AOTEAROA NEW ZEALAND (SOURCE: ADOBE STOCK)

Aotearoa New Zealand is made up of two islands – the North Island (*Te Ika a Maui* – the fish of Maui) and South Island (*Te Wai Pounamu* - the waters of greenstone) (Figure 1.2). The country was once part of an ancient land mass - 'Gondwana'- until approximately 80 million years ago when Aotearoa New Zealand broke away from this land mass due to massive tectonic shifts and became its own entity (Molloy & Enting, 1982). Due to the country's geographic isolation, the level of endemism of flora and fauna is one of the highest in the world (Brockie, 2007). The native flora and fauna in Aotearoa New Zealand are considered so distinctive, that it has been described as the "*closest we shall ever come to observing the products of continental evolution […] unless we discover higher life on another planet*" (Diamond, 1990, p. 3). The most significant change in Aotearoa New Zealand's natural environment occurred after the first phase of notable European settlement. With the influx of agricultural activities from this settlement there were devastating consequences for the country's flora, fauna, and landscapes (Garden & Stoll, 2005; Dominy, 2018). Park (2006, p. 196) describes this destruction of the country's natural environments as one of the most "*comprehensive transformations of indigenous 'nature' the world has ever seen*" and this has continued as human activities and actions, plus population growth has

continued to put stress on the natural environment in Aotearoa (New Zealand Ministry for the Environment and StatisticsNZ, 2021).

The Ministry for the Environment and StatisticsNZ release environmental reports which outline the health of Aotearoa New Zealand's natural environment every two years. The most recent report (The Ministry for the Environment and StatisticsNZ, 2021) highlights that native plants, animals, ecosystems, landscapes, freshwater, and marine environment are under significant threat around the country from human activities and actions. For example, almost 4,000 native species are currently threatened or at risk of extinction due to biosecurity risks, land clearance, intensive sheep and cattle farming, habitat destruction, and climate change. Soils and waterways in most areas of the country are facing poor health resulting from the logging of native forests, draining wetlands and land clearance, which has resulted in significant soil loss and pollution of waterways. Significant urban expansion, particularly in and around major cities such as Tāmaki Makaurau Auckland, has resulted in high land fragmentation threatening the versatility of the land. Freshwater systems, specifically in agricultural areas, are polluted from nutrients and sediment. Pathogens have resulted in nearly half of the country's waterways being unsafe for drinking and recreation. Air across the country, and particularly around the cities, is polluted due to home heating, transport, and various industries. Marine environments are becoming significantly degraded because of the land activities and because of issues with over-harvesting marine species. Lastly, the report shows that current greenhouse gas emission trends from transport and agriculture have resulted in Aotearoa New Zealand being one of the highest greenhouse gas emitters per capita for an industrialised country (Ministry for the Environment & StatisticsNZ, 2021).

1.7.2 TĀMAKI MAKAURAU AUCKLAND

Tāmaki Makaurau Auckland is in the upper half of the North Island (Figure 1.3). The region has the largest urban area of the country and is home to a population of approximately 1.7 million, accounting for 30.0% of Aotearoa New Zealand's population (Auckland Council, 2018). The region has seen an average of 1.5% population growth every year since 1986, and from 2021 until 2048 it is estimated that the population will continue to increase by 1.1% each year (StatisticsNZ, 2021). Tāmaki Makaurau Auckland is considered one of the most ethnically and culturally diverse cities in the world, with 180 ethnicities represented (Auckland Unlimited, 2021). The largest ethnicity is European/Pākehā representing up 53.5% of the population, followed by Asian (28.2%), Pacific peoples (15.5%), Māori (11.5%), Middle Eastern/Latin American/African (2.3%) and 'other' (1.1%). The median age is 34.7 years, and gender break-down is 49.4% male and 50.6% female (StatisticsNZ, 2018).

FIGURE 1.3 MAP OF TĀMAKI MAKAURAU AUCKLAND (SOURCE: ADOBE STOCK)

Tāmaki Makaurau Auckland has an array of natural environments, including 50 separate dormant volcanoes, 12 separate forest systems, 16,500 km of permanent rivers, 1,800 km of coastline, 72 lakes and several conservation areas (Bishop *et al.*, 2015; Singers *et al.*, 2017; GNS Science, 2018). As discussed earlier, like the rest of the country, the natural environment in Tāmaki Makaurau Auckland is facing significant pressures from the population's activities and actions (Auckland Council, 2020). For example, Tāmaki Makaurau Auckland covers 2.0% of the country's landmass and is home to an array of flora and fauna which are unique to Aotearoa New Zealand (Auckland Council, 2018), however a fifth are considered threatened (Auckland Council, 2018). Tāmaki Makaurau Auckland also used to be almost entirely covered by indigenous forest, but presently only 30.0% of this forest remains due to development and land clearance (Auckland Council, 2018). There has been ongoing loss of terrestrial native flora due to pests, urban expansion, and development (Auckland Council, 2020). The Waitakere Ranges which are home to kauri (*Agathis australis*) forest - one of the most ancient forests in the world, now represents the most heavily infected area of kauri dieback disease (*Phytophthora agathidicida*) (spread by humans) currently recorded in Aotearoa New Zealand (Wyse, Burns & Wright, 2014; Auckland Council, 2020). Furthermore, Tāmaki Makaurau Auckland has significantly degraded rivers and streams with most of them being in 'fair' or 'poor' conditions (Auckland Council, 2020) and the region has one of the highest rates of wetland loss in Aotearoa New Zealand (Ministry for the Environment & StatisticsNZ, 2021). Tāmaki Makaurau Auckland's marine environments are also subject to significant pressure due to on-land activities such as coastal development resulting in increased sedimentation, increase in pests threatening seabird populations, degraded stormwater infrastructure, agricultural practices,

and over-harvesting of marine species (Hauraki Gulf Forum & Auckland Council, 2020). Lastly, in comparison to the rest of Aotearoa New Zealand, Tāmaki Makaurau Auckland has one of the highest greenhouse gas emissions per capita (StatisticsNZ, 2018).

As it has been projected that the region will see the continuation of population increases over the next 20 years (StatisticsNZ, 2021), 'nature' will face increasing pressure through increased human activities within 'nature' and actions toward 'nature'. Therefore, it is crucial that future environmental management approaches are strategic and well informed to prompt widespread, transformational change if further degradation to 'nature' is to be prevented and some of the trends in damage reversed.

1.7.3 PRACTICE, POLICY, AND PLANNING IN TĀMAKI MAKAURAU AUCKLAND

To be able to understand how this research will link to environmental planning, policy/strategy, and practice in Tāmaki Makaurau Auckland, this section provides a brief overview of the context of how the local authority, Auckland Council, aligns planning, activities, policies, and strategies for the region (outlined in Figure 1.4). This is a useful frame of reference when reading chapters two to five as some refer to planning, policy/strategy, or practice implications in the Tāmaki Makaurau Auckland region, and when reading the implications and recommendations from this research in the conclusion of the thesis.

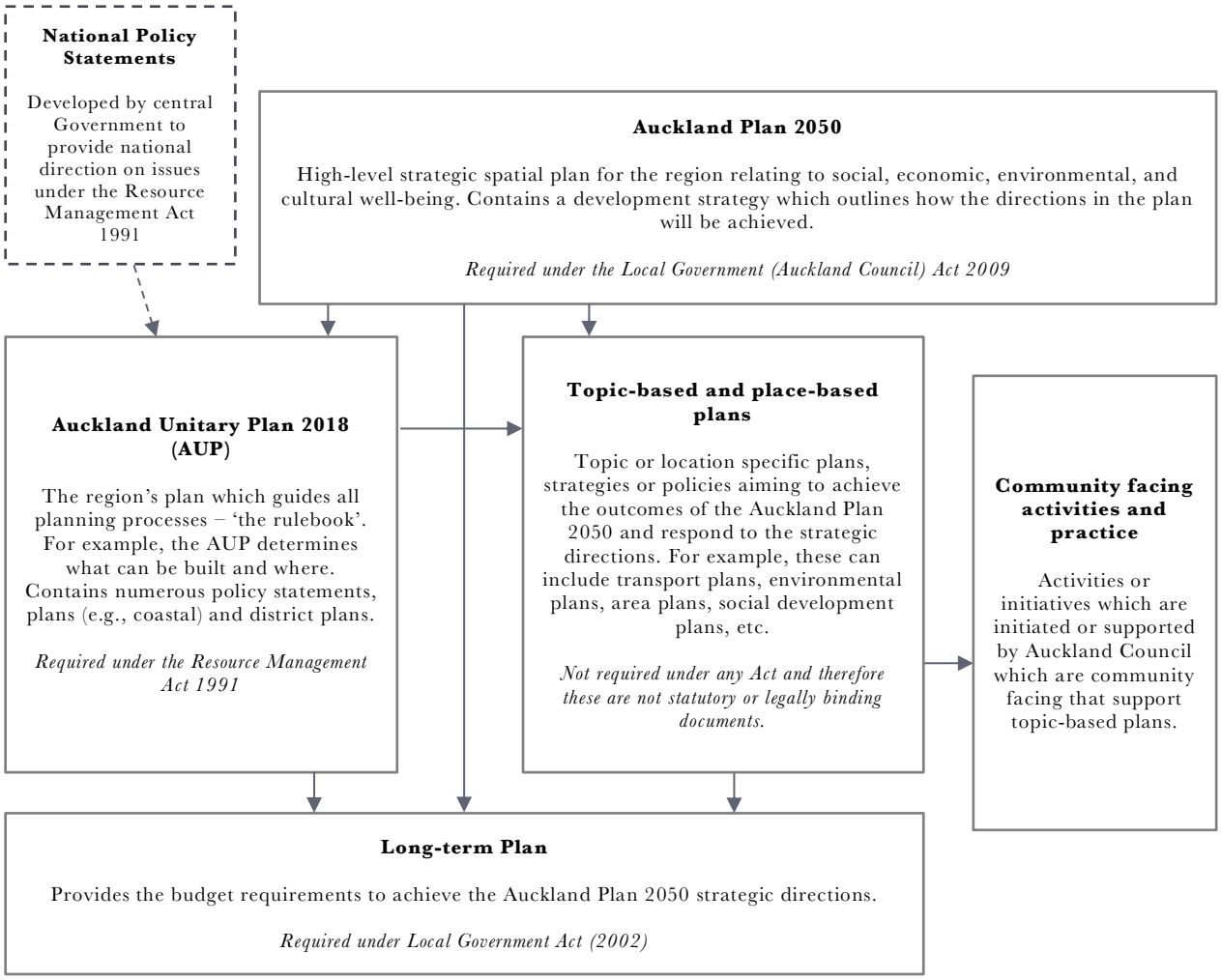

FIGURE 1.4 HOW AUCKLAND COUNCIL PLANS, STRATEGIES AND POLICIES WORK TOGETHER

Under the Local Government (Auckland Council) Act (2009), Auckland Council must prepare and adopt a spatial plan for the region. The most recent plan developed is the Auckland Plan 2050 (Auckland Council, 2018). The purpose of the spatial plan is to contribute to the region's social, economic, environmental, and cultural well-being through a comprehensive long-term strategy for the growth and development (covering 20 – 30 years). Within the spatial plan, are strategic directions and a development strategy which outlines how the directions will be achieved. The Auckland Plan 2050 provides the basis for planning regulations, strategies and policies relating to places, local board plans, bylaws, and the long-term plan.

The Auckland Plan 2050 informs the Auckland Unitary Plan (AUP) which contains the planning rules for the region and thus guides the way in which Tāmaki Makaurau Auckland grows and what growth looks like. For example, it determines what can be built and where. To achieve this, the AUP identifies and maps 30 zones within the region. These zones range from

urban zones (e.g., residential[6], business[7], open space[8], special purpose zones[9]) to rural zones (e.g., production, conservation, coastal, countryside). Each zone has a set of policies, objectives and activities which are permitted and/or required. To change one zone to another requires a plan change process, resulting in public consultation. This can be initiated by Auckland Council, a member of the public, or a business (e.g., residential, or commercial developer).

For some situations, national policy statements are developed by central Government to provide direction for matters of national significance. For example, these can include guidance as to how to accommodate urban growth, or how to manage certain ecosystems (e.g., coastal ecosystems). These policy statements must be considered in the AUP, and decisions under the AUP (e.g., whether to grant a resource consent[10] or not) must be consistent with national policy statements.

The Auckland Plan 2050 also informs a range of place and topic-based strategies, policies, and plans. Since the Auckland Plan 2050 is high-level with little detail as to how the strategic directions are to be achieved, these place and topic-based strategies, policies and plans are developed to achieve strategic directions in the Auckland Plan 2050. Topic-based plans include plans such as community and social development plans, environmental plans and strategies, housing plans, parks, sports, and outdoor plans, economic development strategies, and asset management plans, (Auckland Council, 2021b).

Place-based plans are location specific plans which seek to ensure that the needs of specific communities are met in various locations and contexts so that infrastructure can be adapted and updated. The topic-based and place-based plans, strategies and policies also must consider the AUP.

To support the topic-based plans, Auckland Council either initiates, or supports, community-facing programmes or initiatives. For example, in support of the Auckland Climate Plan (Auckland Council, 2020a), there are a range of education programmes that Auckland Council offers such as energy efficient building free advice. In support of the Regional Pest Management Plan (Auckland Council, 2020b), Auckland Council supports community organisations who undertake pest control, and so on. Despite there not being a clear link communicated by Auckland Council as to how each programme contributes to any specific topic-based plan, the programmes largely align with the social, economic, environmental, and cultural topic-based strategies or plans.

Lastly, the Auckland Plan 2050 informs the long-term plan which sets out the budget requirements and allocations to meet the strategic directions of the Auckland Plan 2050, and the topic-based and place-based strategies, plans and policies created under the Auckland Plan 2050.

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[6] Example zones within residential zones are single house zones, mixed house zones, terrace zones and apartment zones

[7] Example zones within business zones are business park zones, city centre zones and light industry zones

[8] Example zones within open space zones are conservation zones and recreational zones

[9] Example zones within special purpose zones are airport zones, cemetery zones and school zones

[10] In Aotearoa New Zealand, a resource consent is an approval from a local authority to undertake an activity (e.g., building a house) that will alter the surrounding environment.

As discussed earlier, the region is facing significant pressures from human activity and actions. In parallel to this, the region is facing a housing crisis (Ministry for Social Development, 2021) and the population is increasing (Statistics, 2018). Therefore, moving forward, local government agencies such as Auckland Council must balance the increase in housing availability and population growth with limiting the pressures this will place on 'nature'. Consequently, there is significant merit in providing insight into the Tāmaki Makaurau Auckland population's beliefs relating to 'nature' and how these beliefs influence subsequent actions toward 'nature' so that these can be encompassed in strategic and innovative ways in planning, practice, and strategy/policy to ensure the future environmental sustainability of the region.

1.8 METHODS AND APPROACH

This section will provide the rationale and theory behind the mixed-methods research approach employed, details on the data collection, discussion of the ethical considerations, and an outline of the methods used to analyse the data. A description of the sample group who engaged in the research is then provided followed by some important considerations to acknowledge. Finally, a researcher positionality statement is presented. Despite all efforts taken to avoid repetition, some areas discussed below will be also included in chapters two to five as each chapter contains separate methods sections (due to being written as journal articles) which outline the methodological approach and the data analysis procedures implemented to address each of the respective research objectives.

1.8.1 MIXED METHODS RESEARCH APPROACH

This research used a mixed-methods research approach utilizing both qualitative and quantitative questions in an online survey, structured and semi-structured interviews, and employed both qualitative and quantitative data analysis approaches. Further details on questions included in the online survey, structured and semi-structured interviews, along with the number of respondents, are outlined on Table 1.1. The approach to data analysis is discussed in section 1.8.4.

Environmental management is interdisciplinary and as such straddles both the environmental and social sciences. The core of the discipline is both the exploration of human beliefs and actions requiring critical, subjective thinking (Maykut & Morehouse, 1994; Williams, 2000) alongside the study of the natural, or inanimate world, which requires calculative, objective thinking (Ashley & Boyd, 2006). As such, there is no standard approach or 'one size fits all' to researching, understanding, and developing theories regarding environmental management, and therefore both qualitative and quantitative research approaches and data analysis processes can play a dialogic role in generating meaningful data in environmental management research (Sullivan & Wyndham, 2001; Ashley & Boyd, 2006).

Qualitative research approaches are considered humanist approaches and are significantly relevant to environmental management (Porteous, 1996). According to Porteous (1996, p. 46) humanist approaches are when a researcher becomes a "*critical observer of human 'nature', landscape, and interactions between the two*". This approach is in contrast with the 'science' approach which attempts to take an objective and 'value-free' stance where there is "*no place for culture's values, or the researcher's values or beliefs*" (Neuman, 2003, p. 547). The origin of qualitative

research comes from a mixture of sociology, humanities, and anthropology (Creswell, 1994), and the employment of qualitative research allows critical, theoretically provoked, interpretations of people's words and actions which permits a researcher to "*describe reality as experienced by the respondents*" (Sarantakos, 1998, p. 6). Therefore, qualitative research is holistic in its approach, and assists in contributing to the interpretative exploration of phenomenon and the formulation and development of new theories (Creswell, 1994; Leedy & Ormrod, 2011; Srnka & Koeszegi, 2017). This capacity to take in rich information and the ability to make sense or interpret subjective phenomena is an essential strength of this research approach (Ashley & Boyd, 2006; Roudgarmi, 2011).

Subsequently, questions relating to research objectives one, two and three were qualitative (Table 1.1). Using qualitative approaches in these research objectives, allowed for the use of open-ended questions to ensure that respondents beliefs, values and ideas were captured without any constraints of quantitative measures. These qualitative questions followed an inductive approach. The aim of applying such an approach in this research was to follow a more 'bottom-up' approach and as such provided the ability to make specific observations (e.g., conceptualizations of 'nature', 'connections to 'nature'', and perceived influences on 'connections to 'nature''), develop patterns to further explore, and subsequently develop theories or conclusions on the notions that could be explored (Azungah, 2018). This type of approach compares with that of taking a deductive approach, which would have entailed developing a theory and conclusion to test first – and then observing and confirming that theory with the findings (Azungah, 2018). Despite this, some deductive data analysis approaches were employed (which will be further discussed in section 1.8.4).

Questions relating to research objective four were quantitative. These questions were related to the Inclusion of Nature in Self Scale (INSS) (Schultz, 2002), asking respondents to select the pair of circles which best represented how they viewed themselves in relation to 'nature' (Figure 1.1) and statements which were created based on the New Ecological Paradigm (NEP) (Catton *et al.,* 1980; Dunlap & Van Liere, 2014), which required respondents to select an option on a Likert-scale (strongly agree [...] strongly disagree) (outlined in section 5.3.3). Through using quantitative scales such as these, there is the ability to determine whether there is a relationship between interconnectedness with 'nature' and pro-'nature' beliefs. Use of these quantitative questions also allows the ability to predict future trends and undertake objective analysis, and to recreate the research in other contexts – all a noted strength of quantitative research approaches (Babbie, 2010).

1.8.2 DATA COLLECTION METHODS

As part of the mixed-methods approach utilizing both quantitative and qualitative data collection methods, an online survey, structured and semi-structured (in-depth) interviews were employed to collect data with volunteer (non-random) respondents from Tāmaki Makaurau Auckland between January and April 2019. A description of the sample size and demographic breakdown is outlined in section 1.8.5.

The questions in the online survey can be found in Appendix 3, however as it will be further discussed in section 1.8.6.2, not all questions were used in the final thesis and therefore the questions that were are used are outlined on Table 1.1. The questions for the online survey were revised through numerous revision processes with input from my two PhD supervisors, and from a pilot study (discussed further in section 1.8.2.1.1). The interview questions are

included in Appendix 5, and how they were developed is discussed further in sections 1.8.2.2 and 1.8.6.2.

1.8.2.1 ONLINE SURVEY

Firstly, an online survey was employed of which most respondents engaged with (discussed further in section 1.8.5). The online survey was hosted on the Qualtrics™ platform.

Surveys are a common form of data collection and are successfully used for both qualitative and quantitative research (Kothari, 1990; Ponto, 2015). Surveys consist of a certain number of questions with an expectation that respondents can read and understand the questions, and either write or select responses that represent their personal beliefs, values, or perspectives. Respondents are expected to answer the questions on their own, without any aid from the researcher or any other persons (Kothari, 1990). Self-completion surveys have a balancing advantage over other forms of data collection (e.g., interviews) as they allow the respondent to select the time for completion, an option that significantly reduces the 'intrusiveness' of some research approaches (Aldridge & Levine, 2001). Similarly, self-completion surveys in which respondents are anonymous (as they were in this research, discussed further in section 1.8.3) and where there is no way that respondents can be personally stigmatized, are more likely to produce robust data as there is arguably less motivation for the participant to lie (Ong & Weiss, 2000).

Surveys being employed online, as was the case in this research, are becoming more common (Sue & Ritter, 2007). This is due to the increase in cell phone use and a decrease in landline phone use, along with more people keeping their contact details private make telephone surveys increasingly challenging to administer. Increased aversion to junk mail and cost of distribution causes postal surveys also to be increasingly ineffective in their reach and recruitment. Also, for many researchers, face-to-face surveys are incredibly time-consuming and potentially financially resource heavy (Sue & Ritter, 2007; Regmi, Waithaka, Paudyal, Simkhada & Van Teijlingen, 2016). Therefore, the rise of online surveys has become a more effective way to deal with a number of these issues. This approach is a relatively cost and time effective alternative to the more traditional approaches (Regmi *et al.,* 2016). Generating data through an online survey also has the potential to manage large amounts of data more efficiently. Online surveys are attractive to respondents as they are convenient in several ways, for example, that they can answer at any time, they can take as much time as they need, and can complete the survey in multiple sessions. Furthermore, with the rise of smartphones, participants can participate in online surveys from anywhere (Evans & Mathur, 2018). Another noted benefit for the researcher is that there is a higher response rate for each question due to the ways that online surveys are developed so that respondents must respond to a question before advancing to the next one (Regmi *et al.,* 2016).

The social networking site Facebook was used to circulate the online survey through the advertising function that the platform provides. Social networking sites have gained popularity across the world, with the use of Facebook being particularly noteworthy (Forgasz *et al.,* 2017). Facebook is one of the most popular websites in world, ranking directly after Google and YouTube (Neufeld, 2021). This global reach provides an excellent potential for recruiting participants for research projects (Thomson, 2014). Studies which have utilized Facebook advertising have commented on the potential of the platform as an efficient and effective mode of participant recruitment. Kapp, Peters & Oliver (2013) who used Facebook advertising for

research conducted in the health discipline claimed that "*the ease of Facebook ad distribution for study recruitment could revolutionize research*" (p. 136). Facebook advertising allows for advertisement of posts, e.g., an invitation to take part in an online survey, to be placed on newsfeeds of people who fit a target parameter that has been set. For example, with this research the age parameter was set to 16 years of age plus (due to ethics requirements as discussed further in section 1.8.3), all genders, and only those living in Tāmaki Makaurau Auckland.

The budget associated with the advertisement, dictates how many people will be shown the advertisement. In this case, approximately $600NZD budget was allocated, which resulted in the advertisement being shown on 8,000-10,000 individuals' newsfeeds. As the target population was anyone over 18 years of age who resides in Tāmaki Makaurau Auckland (n = 4.5m) the advertisement was visible to 0.002% of the population. In total, there were 1,500 clicks on the advertisement and from the 1,500 clicks, 963 people engaged in the online survey resulting in 0.09% of people who saw the advertisement engaging in the research. The total cost was $0.52NZD per response. This affordability of advertising online surveys in this manner is a noted benefit of employing online surveys in research, as it allows the ability to target a large pool of volunteer respondents with specific demographic attributes (Forgasz, Tan, Leder & McLeod, 2017).

The advertisement was revised multiple times to ensure that as much as feasibly possible it did not just attract 'pro-'nature' inclined' people to take part in the research. This was done through framing the research as neutral as possible, seeking people to *"have your say in 'nature'-related topics"*. However, as acknowledged in chapter two to five, it is difficult to avoid this and therefore there may have been bias toward this group of people. A small incentive was offered to those who took part in the research, of which they could go in the draw to win one of four $50NZD shopping vouchers.

Despite the noted success of advertising the online survey via social media, to minimize the sampling bias to those who have internet connections and are active on social media, pamphlets were dropped to approximately 1,000 households, invitations were mailed to approximately 100 households, and posters were erected in public places to advertise the online survey. Respondents were also able to request a physical copy of the survey with a free postage return envelope in the situation that they did not have internet access or were unable to access the online survey for any reason. However, only 2.0% of the respondents who engaged in the online survey came from these advertising approaches. Therefore, as highlighted chapters two to five, there is an acknowledged bias toward respondents who have internet connections, actively engage in social media, and have the ability to complete an online survey.

1.8.2.1.1 PILOT STUDY

Prior to executing the online survey, a small pilot study was conducted to ensure that the questions were clear and easy to understand from a lay perspective, and to test the proposed data analysis technique (content analysis – discussed further in section 1.8.4). Eight respondents engaged in the pilot study, and all were personal contacts of myself (husband, mother, stepfather, father, stepmother and three friends). Personal social contacts have been identified as being key resources in pilot studies, as they are a free resource, enthusiastic to help and can provide honest and critical feedback on questions (Joseph, Keller & Ainsworth, 2016). The pilot study also allowed some codes to be generated for a deductive content analysis of responses to questions relating to objective one (further discussed in section 1.8.4).

1.8.2.2 INTERVIEWS

Structured and semi-structured (in-depth) interviews were used to supplement the online survey for research objectives one, two and three to compensate for the sampling bias due to heavy online input, ensure a better sample coverage of the population and produce data which is as robust as possible (Ponto, 2015).

Structured and semi-structured interviews have become widely used in environmental management research as a method to generate people's reported experiences and actions towards the natural environment (Fontana & Frey, 1994; Young *et al.*, 2018). Posing questions to others concerning topics that researchers seek their knowledge about (including ideas, beliefs, values, desires, and aspirations) is a core capability of the human species (Brinkmann, 2013). However, what sets interviews apart from usual, everyday conversations is that they are reflected on, and planned. Potential respondents for the structured interviews were recruited through approaching people in public places (consciously attempting to target those who looked over 16 years of age due to human ethics requirements – of which age was confirmed on commencement of the interview) and the interviews were undertaken 'on the spot' and lasted approximately 20 minutes. The interviews were structured and asked similar questions to the online survey, however, due to the process of tightening and clarifying the research objectives during the execution of the online survey, the interview had less questions only relating to the identified research objectives which is discussed further in section 1.8.6.2.

Alongside the structured interviews, four further semi-structured in-depth interviews were undertaken to again test the validity of the responses from the online survey and structured interviews. The interviews were semi-structured to allow the ability to probe further to obtain more information or get clarification of unclear answers – a noted benefit of interviews which are semi-structured (Singleton & Straits, 2009). Recruitment for these interviews was done by social media advertising, using similar framing of the research as recruitment for the online survey (*"have your say on 'nature'-related topics")* and respondents were given a small token of appreciation consisting of a $20NZD cash voucher for their time. Four interviews were conducted as it was determined that after the fourth interview data saturation had occurred. As discussed in each respective methods section in chapters two to five, no differences in themes identified occurred across interviews and the online survey and therefore results are presented as a whole (versus broken down into data collection method).

After the interviews, extensive analysis (in this case, through the process of content analysis (Berelson, 1952) is usually carried out afterwards with the goal of understanding or developing a particular theory which the researcher is interested in (Brinkmann, 2013). Further details on how this was done are outlined in section 1.8.4.

1.8.3 ETHICS

This research followed the Massey University human ethics guidelines and procedure and was granted ethics approval before the online survey was circulated and before any interviews took place (Ethics Approval Number: 4000020091). The ethics was considered 'low-risk' as it involved human participants over the age of 16 years, did not target vulnerable groups and did not include questions that were likely to cause irrational action or reactions.

The online administration of surveys can raise unique ethical questions in comparison to traditional research methods such as face to face interviewing (Regmi *et al.,* 2016). The reason for this is that the researcher does not have the possibility to verbally elicit consent from the participants. To ensure that this step is achieved, it is common for researchers to put all the information about the research and the participant's rights on the first page of the survey (Regmi *et al.,* 2016). A downloadable PDF participant information sheet on the first page of the online survey was provided and is included in Appendix 6. Once the respondent had read this, they were directed to a page that acted as an online consent form and asked the participant to select either "*I consent*" or "*I do not consent*". If the latter were selected, the survey would automatically close. This question was a required field, so no respondent could continue unless they had responded.

Secondly, there are some concerns regarding the ability of an online platform to facilitate confidentiality and privacy (Crotty & Mostaghimi, 2014). The Qualtrics™ platform is Massey University's preferred online surveying platform and thus is provided as a free resource to Massey University students. Before using the platform, the Qualtrics™ Privacy Statement was reviewed to understand how personal data is generated and stored. As the Qualtrics™ platform itself did not store any data but acted as a 'data controller' and transferred the data straight to the user it was deemed to be an appropriate platform for this research.

To ensure anonymity and confidentiality, participants were not asked any identifying information about themselves (e.g., name, address, phone number) in the online survey. As an incentive to take part in the online survey, a small competition to win one of four $50.00NZD vouchers was run, and participants were asked to enter their e-mail address for the competition. This was asked on a separate page at the end of the survey, and the e-mail addresses were always kept separate from the participant's responses.

When conducting both the structured and semi-structured interviews, participants were provided with a printed copy of the participant information sheet if the interview was face to face or through e-mail if the interview was via Skype. The information was discussed with them before the interview, highlighting terms around anonymity and that the interview was being recorded. Once the participant had time to read the participant information sheet, they were asked to either sign the consent form (if I was physically in their presence) or to verbally consent (if via Skype or telephone) – which was then recorded. All data (such as recordings, transcriptions, notes, online survey data) were stored in an online cloud system, which was password protected.

1.8.4 DATA ANALYSIS

Data analysis, both qualitative and quantitative, generates correlations between variables and most importantly, converts the research into an output that is then able to contribute to current literature, research, and disciplinary knowledge, and to develop new theoretical concepts and theories (Aldridge & Levine, 2001). Researchers are then able to generate conclusions based on transcending what the raw data has presented (Cox, 2015). Both qualitative and quantitative data analysis approaches were employed in this research. Qualitative analysis which resulted in quantitative outputs was employed for research objectives one, two and three, and quantitative analysis was employed for research objective four.

1.8.4.1 QUALITATIVE ANALYSIS

Firstly, the general challenge of qualitative research is the requirement for the researcher to deal with vast quantities of textual data after data collection (Roudgarmi, 2011). The most effective way therefore to address the textual data is to implement a classificatory scheme to make sense of the data (Aldridge & Levine, 2001). This is particularly important in any form of survey or interview as researchers often struggle to navigate through large amounts of text and the requirement to transform the material into solid, and relevant, thought-provoking analysis (Brinkmann, 2013). Neuman (2003, p. 466) argues that qualitative analysis requires "*effort by the researcher to read and re-read data, reflect on what is read, and make comparisons based on logic and judgment*". Therefore, it is an extensive, iterative, and unfolding process, and is ultimately the responsibility of the researcher to select the way data is interpreted and categorized that best meets the philosophic orientation of the research while still upholding methodological rigor, and integrity of the respondents' responses (Woods & Graber, 2016; Richards & Hemphill, 2018).

Several techniques are used to interpret qualitative data and develop themes and patterns. The technique used in this research was the processes of content analysis (Berelson, 1952), a technique which has become prevalent within the field of environmental management (Cox, 2015). Content analysis allows for research to generate tangible outcomes to develop management actions (Leedy & Ormrod, 2011). This is done through analysing qualitative data and transforming it into quantitative data (Cox, 2015) by following a coding process to generate categories, with the aim of 'describing the meaning' of the data to generate theoretical relationships (Merriam, 2009; Roudgarmi, 2011).

Content analysis is flexible in the use of both deductive (applying pre-existing codes) and inductive (developing codes/categories through ongoing analysis of data) analysis (Elo & Kyngas, 2008). Determining which approach to use depends on whether there is prior knowledge on the phenomenon under investigation. Deductive approaches are more appropriate when there is previous research, or established knowledge paradigms on the topic, and inductive approaches are useful when there is limited or fragmented research on, or knowledge of, the phenomenon (Cho & Lee, 2014). Despite the research approach being inductive in research objectives one, two and three, deductive approaches were used during the process of content analysis. For example, for research objective two which looked at conceptualizations of 'connections to 'nature'', Ives *et al.,* (2017) had developed some dimensions of 'connections to 'nature'' through a meta-analysis they conducted, and these dimensions were used to inspire some initial codes. Furthermore, the pilot study as discussed in section 1.8.2.1.1 with eight volunteer respondents allowed for some codes to be pre-emptively generated for the data analysis.

Through using this systematic process of content analysis, two significant outputs were achieved. Firstly, theoretical insights emerged into the research areas which were reflected in the newly developed categories and themes that were generated. Secondly, the development of generalized, coded data can be used for future research that utilizes similar methodologies as this research. These two outputs are typical when undertaking a content analysis process (Srnka & Koeszegi, 2017).

Despite content analysis being described as "*a detailed and systematic examination of the contents of a particular body of materials for the purpose of identifying patterns, themes, or biases*"(Leedy & Ormrod, 2011, p. 155), authors such as Ahuvia (2001, p. 139) argue that content analysis is a "*method for*

counting the interpretations of content", given that the approach requires a subjective interpretation of textual data and therefore the researcher's values, beliefs, theoretical orientations and social/academic backgrounds can play a role in how text is interpreted. Thus, it is important to acknowledge that my own personal values, beliefs, and background contributed to the process of content analysis. In attempt to mitigate this as much as feasibly possible, coding was reviewed by a sociology PhD student colleague, one of the PhD supervisors, and a lay person outside of the research. Any discrepancies were dealt with through mutual agreement.

To undertake content analysis, data from the online survey was exported to Microsoft Excel, and interviews were transcribed by myself and similarly exported to Microsoft Excel. Responses each had their own row on Excel, and codes were inputted alongside the response across as many columns as required. Subsequently, codes were grouped into overall categories and themes using methods such as COUNTIF Excel functions. Often, more than one code was allocated to responses and therefore the categories and themes were not mutually exclusive.

To calculate the frequency, the percentage of the total number of respondents who referenced each category and theme was calculated (as shown in the results sections of chapters two to four). This is opposed to identifying all potential codes within a set of open-ended responses to calculate percentages of overall references respondents referenced (relative frequency), which requires an objective and absolute measurement of all possible references that respondents could make, something that is not possible due to the subjectivity of coding.

1.8.4.1.1 COLLECTIVE ANALYSIS VERSUS SUBGROUP ANALYSIS

This research sought to explore conceptualizations of 'nature', conceptualizations of 'connections to 'nature'' and perceptions on what influences 'connections to 'nature'', across the sample group collectively. This is opposed to undertaking a subgroup analysis seeking to explore *if* or *how* conceptualizations/perspectives differ based on varying demographics such as age, gender, or ethnicity. As mentioned in earlier sections, despite there being an identified gap in empirical research seeking to explore conceptualizations of 'nature', 'connections to 'nature'' and what influences 'connections to 'nature'', there have been a handful of studies which have in some way addressed these specific research areas. Similarly, all of which also analysed conceptualizations and/or perspectives across the sample group collectively as opposed to analysis by subgroup (e.g., research by authors such as Kempton *et al.,* 1995; Hazula-Delay, 2001; Van den born, 2008; Mayer *et al.,* 2008; Newton *et al.,* 2008; Buijs *et al.,* 2009; Cosquer *et al.,* 2012; Rosa *et al.,* 2018; Fretwell & Greig, 2019; Tillmann *et al.,* 2019; Nisbet *et al.,* 2019 and all provided insights into the different dimensions of the human-'nature' relationship by examining respondents' views collectively). Therefore, although it can be acknowledged that analysing conceptualisations and/or perspectives across different subgroups would be a useful area of research (and this is acknowledged across chapters two to four and the conclusion), this research is aimed to be a step before that in determining whether there are divergent conceptualizations and/or perspectives or not, and if so, what the main themes appear to be.

Had the aim of this research been to undertake subgroup analysis by demographics, the online survey and interviews would have been structured, and advertised differently. For example, questions would have been designed more quantitively to allow for easier correlation tests to be undertaken, there would have not been such a heavy reliance on data collection methods such as social media to attract respondents as this potentially limits input from older people

who do not engage in social media as much as younger people. Furthermore, effort would have been made to purposely visit specific cultural locations to ensure all ethnicities are represented and potentially offer the survey or interviews in different languages.

However, to make the research as robust as possible it was still deemed important to ensure that respondents who engaged in this research were a reasonable representation of the demographics of the Tāmaki Makaurau Auckland population e.g., they included a broad range of ethnicities, age groups and genders. As the online survey was taking place it was found that male respondents were significantly under-represented (by 95.0%) and it was necessary to change the Facebook settings to increase male participants to ensure the correct balance of males and female participants (as discussed further in section 1.8.5).

On the contrary, the objective in chapter five was different, whereby it was explored how people view themselves in relation to 'nature' and there was an aim to determine whether this changes across various age groups, ethnicities, or gender. Thus, the questions were quantitative (the INSS scale and NEP statements) allowing for this analysis to be done. This is discussed further in the next section.

1.8.4.2 QUANTITATIVE ANALYSIS

To reflect responses to the INSS, the number of responses to each selection was divided by the total number of responses. To determine whether responses to the INSS changed across different ethnicity, age, or gender cohorts, responses were grouped into the various demographic groups and frequency of each response to the INSS was divided by the group total. To measure a respondent's level of pro-'nature' beliefs, each respondent was given a score based on their responses to the NEP statements. The highest score per statement (indicating high pro-'nature' beliefs) was five. As there were seven questions, the highest possible score overall that a respondent could be allocated was 35, with the lowest possible being seven.

To determine whether responses to the statements based on the NEP changed based on the different INSS responses, scores were added up across each respondent and were then grouped into three categories; high pro-'nature' beliefs (e.g., respondents with total scores of 29-35), medium pro-'nature' beliefs (respondents with total scores of 21 – 28) and low pro-'nature' beliefs (respondents with total scores of 13 – 20) (taking insight from an approach that was used in research by New South Wales Environment Protection Authority (1997)). These were then grouped into INSS segments (e.g., A, B, C, D, E, F, G).

1.8.5 SAMPLE GROUP DESCRIPTION

Information on the sample group is provided in this chapter as it is structured as an exegesis and provides extra information that helps in providing more detailed context to the chapters/journal articles that follow.

1.8.5.1 SAMPLE SIZE

As reflected in Table 1.1, between 960 and 997 non-random respondents took part in this research, ranging across the four research objectives. This is considered a statistically significant sample size for the Tāmaki Makaurau Auckland region[11]. In total, 97.0% of respondents engaged in the research via the online survey, and the remaining 3.0% via interviews resulting in a significantly high input via the internet. If this sample had been a random one from the Tāmaki Makaurau Auckland region, then this sample would be large enough to reject a hypothesis of zero correlation with a p-value <0.05 (significance level) and a 90.0% power provided the true correlation between variables was at least r= 0.11.

TABLE 1.1. QUESTIONS ASKED TO RESPONDENTS TO ACHIEVE RESEARCH OBJECTIVES

Research Objective	**Question(s)**	**Asked via**	**# of Respondents**
To identify the ways in which 'nature' is conceptualised and what the most common aspects associated with 'nature' are	Can you please tell me in a few words what you think 'nature' is? *Please note, there are no right or wrong answers, I am solely interested in your personal ideas and thoughts.*	Online survey Structured interview Semi-structured interview	997 *All respondents responded to this question.*
To identify how 'connections to 'nature'' are conceptualised	Can you please tell me in a few words what you think a connection to 'nature' is? *Please note, there are no right or wrong answers, I am solely interested in your personal ideas and thoughts.*	Online survey Structured interview Semi-structured interview	990 *All respondents were asked (997), but seven did not provide commentary from the online survey.*
To understand self-reported pathways and barriers to 'connections to 'nature''	Do you have the connection to 'nature' you described in the last question?	Online survey Structured interview Semi-structured interview	976 *All respondents were asked (997), however 21 did not provide commentary from the online survey.*
	if yes Can you please explain in a few words why you feel you have the connection to 'nature' you described?	Online survey Structured interview Semi-structured interview	659
	if no Can you please explain in a few words why you think you do not have the connection to 'nature' you described?	Online survey Structured interview Semi-structured interview	24
	if sometimes Can you please explain in a few words why you sometimes have the connection to 'nature' described?	Online survey Structured interview Semi-structured interview	212

[11] Confidence interval = 95.0%, margin of error 4.0%

	if unsure Please explain	Online survey Structured interview Semi-structured interview	81
To determine whether there are correlations between individuals' feelings of interconnectedness with 'nature' and pro-'nature' beliefs	Please select which diagram below best displays how you view yourself in relation to 'nature'. Self = you personally [Inclusion of Nature in Self Scale]	Online survey	960 *All respondents were asked (963), but three did not respond*
	Please read the following statements, and indicate whether how strongly you either agree, or disagree with each of them: [Statements developed based on the New Ecological Paradigm]	Online survey	960 *All respondents were asked (963), but three did not respond*

Table 1.1 further reflects that the number of respondents who provided input into each research objective is different – for example 997 respondents contributed to research objectives one (online survey (n = 963), structured interview (n = 30), semi-structed interview (n = 4)), 990 contributed to research objective two (online survey (n = 956), structured interview (n = 30), semi-structed interview (n = 4)), 976 respondents contributed to research objective three (online survey (n = 942), structured interview (n = 30), semi-structed interview (n = 4)), and 960 respondents contributed to research objective four (online survey (n = 960)). This is due to two reasons:

1. Research objectives one, two and three which took a qualitative approach, generated data through the online survey and then by conducting further structured and semi-structured interviews on completion of the online survey. On the contrary, research objective four was entirely quantitative, and the questions relating to this research objective were only asked in the online survey (however only 960 respondents responded the questions relating to this objective, as opposed to the full 963 who engaged in the online survey). Structured and semi-structured interviews did not include the questions relating to this objective, as the aim of this research objective differed to the aims of research objectives one, two and three. Specifically, research objectives one, two and three sought to inductively explore conceptualisations and perspectives to identify themes, whereas objective four aimed to test whether correlations between interconnectedness with 'nature' and pro-'nature' beliefs arise, and whether feelings of interconnectedness with 'nature' changed based on respondents age, ethnicity, or gender. Therefore, further interrogation and/or validation was not required to achieve this research objective (albeit as discussed in chapter five, further examination of some key findings through qualitative approaches would be useful and are recommended).

Despite all 963 respondents being presented the whole online survey, in some instances respondents did not respond to the questions pertaining to research objectives. For example, all respondents responded to the question relating to research objective one, seven respondents did not respond to the question relating to research objective two, 21 respondents did not respond to the question relating to research objective three, and three respondents did not respond to the questions relating to research objective four. However, all respondents who engaged in both structured and semi-structured interviews responded to all questions.

1.8.5.2 SAMPLE DEMOGRAPHICS

The sample group was non-random, and respondents predominantly provided input via the online survey, however respondents ranged over various ethnicities, age groups, genders, and social groups. Firstly, respondents who engaged in the research ranged across five ethnicity cohorts (Table 1.2). Ethnicities are grouped in the same way as the Aotearoa New Zealand census groups ethnicities. Respondents could select as many ethnicities as they wanted (which is why the total on Table 1.2 is over 100.0%). The most common ethnicity that respondents identified with was NZ Pākehā/European (81.4%), followed by NZ Māori (13.0%), Asian (9.5%), Pacific Peoples (6.0%), MELAA (2.0) and 'other' (1.1%). Respondents who were coded as 'other' referred to either having no ethnicity or being a 'world citizen'. Six respondents preferred not to disclose their ethnicity (0.6%).

The ethnicity split was not reflective of the Tāmaki Makaurau Auckland regional split. Some ethnicities were over-represented in the research (NZ Pākehā/European by 27.9%, NZ Māori by 1.5%) and under-represented in others (Asian by 18.7%, Pacific Peoples by 9.5% and MELAA by 0.3%). Six respondents preferred not to disclose their ethnicity (0.6%), and there was no data for four respondents (0.4%) which consisted only of the structured interviewees as they were not asked for their ethnicity.

TABLE 1.2 RESPONDENT ETHNICITIES

Ethnicity of Respondents	**Online survey (963)**		**Structured interviews (30)**		**Semi-structured interviews (4)**		**Total of all (997)**		**Regional Split**
	count	%	count	%	count	%	count	%	%
NZ Pākehā/European	794	82.5	18	60.0	0	0.0	812	81.4	53.5
NZ Māori	128	13.3	2	6.7	0	0.0	130	13.0	11.5
Asian	91	9.4	4	13.3	0	0.0	95	9.5	28.2
Pacific Peoples	55	5.7	5	16.7	0	0.0	60	6.0	15.5
MELAA[12]	18	1.8	2	6.7	0	0.0	20	2.0	2.3
Other	12	1.2	1	3.3	0	0.0	13	1.3	1.1
Prefer not to disclose	6	0.6	0	0.0	0	0.0	6	0.6	0
No data	0	0.0	0	0.0	4	100.0	4	0.4	0
Total	**1,104**	**114.5**	**32**	**106.7**	**4**	**100.0**	**1,140**	**114.3**	**112.0**

Age of respondents ranged from the youngest group being 16 – 20, to the oldest group being 81 – 90 (Table 1.3). The most common age group who engaged in the research were those between 21 – 30 (25.8%), followed by those in age group 31 – 40 (19.3%), age group 41 – 50 (15.6%), age group 51 – 60 (15.2%), age group 16 – 20 (12.9%), age group 61 – 70 (7.3%), age group 71 – 80 (2.6%), and lastly age group 81 – 90 (0.4%). Three people preferred not to disclose their age group (0.3%). Five respondents have no data associated with them as the four semi-structured interviews were not asked for their age group, and one person who engaged with the online survey provided no response.

[12] Middle Eastern, Latin American, African

Age groups were not reflective of the Tāmaki Makaurau Auckland age group split, with some age groups being over-represented in the research (age group 16 – 20 by 6.3%, age group 21 – 30 by 9.7%, age group 31 – 40 by 4.5%, age group 41 – 50% by 2.3%, age group 51 – 60 by 2.9%) and under-represented in others (age group 61 – 70 by 1.4%, age group 71 – 80 by 2.6%, age group 81 – 90 by 1.0%, age group 91 + by 1.4% as no respondents in this age group engaged in the research).

TABLE 1.3 RESPONDENT AGE GROUPS

Age of Respondents	**Online survey (963)**		**Structured interviews (30)**		**Semi-structured interviews (4)**		**Total of all (997)**		**Regional Split**
	count	%	count	%	count	%	count	%	%
16-20	129	13.4	0	0.0	0	0.0	129	12.9	6.6
21-30	250	26.0	7	23.3	0	0.0	257	25.8	16.1
31-40	186	19.3	6	20.0	0	0.0	192	19.3	14.8
41-50	152	15.8	4	13.3	0	0.0	156	15.6	13.3
51-60	146	15.2	6	20.0	0	0.0	152	15.2	12.3
61-70	69	7.2	4	13.3	0	0.0	73	7.3	8.7
71-80	23	2.4	3	10.0	0	0.0	26	2.6	5.2
81-90	4	0.4	0	0.0	0	0.0	4	0.4	1.4
91+	0	0.0	0	0.0	0	0.0	0	0.0	1.4
I prefer not to disclose	3	0.3	0	0.0	0	0.0	3	0.3	0
No data	1	0.1	0	0.0	4	100.0	5	0.5	0
Total	**963**	**100.0%**	**30**	**100.0%**	**4**	**100.0**	**997**	**100.0**	**100.0**

Third, there was a relatively even split between genders engaging in the research (Table 1.4). Most commonly, females engaged in the research (51.2%) followed by males (47.7%) and non-binary (0.5%). This split was nearly exactly aligned with the Tāmaki Makaurau Auckland regional split, however males were slightly under-represented in the research by 1.7%, and females slightly over-represented by 0.6%. No data is available which reflects what percentage of the Tāmaki Makaurau Auckland population is non-binary, therefore it is unknown whether non-binary respondents were over or under-represented in this research. It is unknown the gender of six respondents (0.6%) as two respondents who engaged in the online survey did not respond to the question, and the four respondents who engaged in semi-structured interviews were not asked to indicate their gender. No respondents refused to disclose their gender.

As the aim of the research was to have respondents representing a somewhat broad range of genders, ethnicities, and age groups, halfway through the employment of the online survey the Facebook advertisement targeting settings had to be altered to just target males. This was because at this point, 95.0% of the respondents were female and thus males were significantly under-represented. This may be due to the fact that females are more likely to engage in surveys. Research within the health discipline similarly notes a higher ratio of females to males who respond to surveys (e.g., Glass, *et al.* 2015; Meiklejohn, Connor & Kypri, 2012; Dunn, *et al.* 2004; Eagen, *et al.* 2002). Furthermore, it is well documented that females tend to report higher concern for 'nature' related issues (e.g., Mohai 1992, Zelezny, *et al.* 2000) so it makes sense that this could result in a higher tendency to provide input into 'nature' related research.

Females have also been reported to use social media more than males (Pew Research, 2015) and are slightly more likely to click on Facebook advertising (Emarketer, 2012).

TABLE 1.4 RESPONDENT GENDERS

Gender of Respondents	Online survey (963)		Structured interviews (30)		Semi-structured interviews (4)		Total of all (997)		Regional Split
	count	%	count	%	count	%	count	%	%
Male	459	47.7	17	56.7	0	0.0	476	47.7	49.4
Female	497	51.6	13	43.3	0	0.0	510	51.2	50.6
Non-binary	5	0.5	0	0.0	0	0.0	5	0.5	0
No data	2	0.2	0	0.0	4	100.0	6	0.6	0
Total	**963**	**100.0**	**30**	**100.0**	**4**	**100.0**	**997**	**100.0**	**100.0**

To gain a general insight into the socio-economic demographics of the respondents, personal income (NZD) per annum was asked, along with the highest qualification the respondent had at the time of engaging in the research. Firstly, respondents who engaged with the research earned between $0 to $150,000 + (Table 1.5). Most commonly, were respondents who earn between $0 – 20,000 (21.0%), followed by $40,001 – 60,000 (18.1%), $20,001 – 40,000 (14.2%), $60,001 – 80,000 (12.9%), $80,001 – 100,000 (8.0%), $100,001 – 150,000 (6.5%) and lastly $150,001+ (3.2%). A further 124 respondents (12.4%) preferred not to disclose their personal annual income. No data was recorded for 36 respondents, as the 34 respondents who engaged in the structured and semi-structured interviews were not asked their personal income, and two respondents who engaged in the online survey did not respond to the question.

The personal income per annum split is not representative of the Tāmaki Makaurau Auckland split. Some income brackets were over-represented in the research ($40,001 – 60,000 by 0.1%, $60,001 – 80,000 by 1.4%, $80,0001 – 100,000 by 2.9% and $100,001 – 150,000 by 0.9%), and some income brackets were under-represented in the research ($0 – 20,000 by 13.9%, $20,001 – 40,00 by 6.7% and $150,000+ by 0.7%).

TABLE 1.5 RESPONDENT PERSONAL INCOME

Personal Annual Income of Respondents	Online survey (963)		Structured interviews (30)		Semi-structured interviews (4)		Total of all (997)		Regional Split
	count	%	count	%	count	%	count	%	%
$0 - 20,000	209	21.7	0	0.0	0	0.0	209	21.0	34.9
$20,001 - 40,000	142	14.7	0	0.0	0	0.0	142	14.2	20.9
$40,001 - 60,000	180	18.7	0	0.0	0	0.0	180	18.1	18.0
$60,001 - 80,000	129	13.4	0	0.0	0	0.0	129	12.9	11.5
$80,001 - 100,000	80	8.3	0	0.0	0	0.0	80	8.0	5.1
$100,001 - $150,000	65	6.7	0	0.0	0	0.0	65	6.5	5.6
$150,001 +	32	3.3	0	0.0	0	0.0	32	3.2	3.9
I prefer not to disclose	124	12.9	0	0.0	0	0.0	124	12.4	0

No data	2	0.2	30	100.0	4	100.0	36	3.6	0
Total	**963**	**100.0**	**30**	**100.0**	**4**	**100.0**	**997**	**100.0**	**100.0**

Secondly, respondents who engaged in the research had either no qualification at the lowest, or a PhD degree at the highest (Table 1.6). Most commonly were respondents whose highest qualification was a high school qualification (24.9%), undergraduate qualification (24.1%), polytechnic and/or trade apprentice (15.4%), master's degree (13.0%), postgraduate diploma/certificate (11.7%), PhD degree (3.4%), intermediate school (1.9%), followed by no qualification (0.7%). Twelve respondents (1.2%) preferred not to disclose their highest qualification, and no data was recorded for 36 respondents (3.6%) as two respondents did not respond to the question on the online survey, and the 34 respondents who engaged in structured and semi-structured interviews were not asked their highest qualification.

The highest qualification bracket split is not representative of the Tāmaki Makaurau Auckland split. Some highest qualification splits were over-represented in this research (none/primary school/intermediate school/high school by 3.1%, master's degree by 11.5%, PhD by 3.1%, postgraduate diploma or certificate by 8.9 and undergraduate qualification by 6.1%) and under-represented in others (polytechnic and/or trade apprentice by 37.5%).

TABLE 1.6 RESPONDENT HIGHEST QUALIFICATION

Highest Qualification of Respondents	**Online survey (963)**		**Structured interviews (30)**		**Semi-structured interviews (4)**		**Total of all (997)**		**Regional Split**
	count	**%**	**count**	**%**	**count**	**%**	**count**	**%**	**%**
None	7	0.7	0	0.0	0	0.0	7	0.7	24.4
Primary school	0	0.0	0	0.0	0	0.0	0	0.0	
Intermediate school	19	2.0	0	0.0	0	0.0	19	1.9	
Highschool	248	25.8	0	0.0	0	0.0	248	24.9	
Other - Polytechnic, trade apprentice	154	16.0	0	0.0	0	0.0	154	15.4	52.9
University - Masters	130	13.5	0	0.0	0	0.0	130	13.0	1.5
University - PhD	34	3.5	0	0.0	0	0.0	34	3.4	0.3
University - Postgraduate	117	12.1	0	0.0	0	0.0	117	11.7	2.8
University - Undergraduate	240	24.9	0	0.0	0	0.0	240	24.1	18.0
I prefer not to disclose	12	1.2	0	0.0	0	0.0	12	1.2	0
No data	2	0.2	30	100.0	4	100.0	36	3.6	0
Total	**963**	**100.0**	**30**	**100.0**	**4**	**100.0**	**997**	**100.0**	**100.0**

1.8.6 IMPORTANT METHODOLOGICAL CONSIDERATIONS

This section acknowledges some important considerations relating to the sample group and presentation of results.

1.8.6.1 SAMPLE GROUP

Despite the sample size being statistically significant, the sample group is not representative of the Tāmaki Makaurau Auckland population as it was made up of non-random volunteers (those who voluntarily decided to engage in the online survey and interviews), did not reflect the age group and ethnicity split of the region (however gender split is nearly the same) and was almost entirely from online input (based on 97.0% responses coming from the online survey). However, non-random sampling is often associated with case study research and qualitative research as the aim is usually to explore certain phenomenon versus making statistical inferences (Taherdoost, 2016). This is a common approach reflected in environmental management literature (e.g., Kempton *et al.,* 1995; Hazula-Delay, 2001; Van den born, 2008; Mayer *et al.,* 2008; Newton *et al.,* 2008; Buijs *et al.,* 2009; Cosquer *et al.,* 2012; Rosa *et al.,* 2018; Fretwell & Greig, 2019; Tillmann *et al.,* 2019; Nisbet *et al.,* 2019).

Despite the common use of non-random samples in similar research, it is important to acknowledge that no significant generalizations can be made to the population. However, the sample can still provide a substantial insight as to what the trends of the region's population may be in terms of their beliefs about 'nature' (Taherdoost, 2016). In chapters two to five acknowledgement is made to this fact. Despite this, through targeting settings in Facebook advertising (discussed in section 1.8.2.1) and deliberate intent to approach 'random' people in public for interviews (discussed in section 1.8.2.2), effort was made to ensure that volunteers from a range of demographics took part in the online survey and interviews, and were as 'random' as possible, however this was difficult to control.

Had a representative, and random sample been sought online and offline, extensive resources would have been required to ensure that respondents were selected through random sampling (which is difficult due to limited time and funding for PhD research), ensuring each respondent had the same probability of being selected, and it would have been difficult to regulate as qualitative research predominantly relies on voluntary participation (Luborsky & Rubinstein, 1995).

Similarly, to ensure that age groups and ethnicity splits were reflective of the Tāmaki Makaurau Auckland split, as discussed in section 1.8.4.1.1, there would have not been such a heavy reliance on data collection methods such as social media to attract respondents as this potentially limits input from older people who do not engage in social media as much as younger people. Furthermore, there would have been purposely visiting specific socio-cultural locations to ensure all ethnicities are represented and potentially offering the survey and interviews in different languages.

Despite this, the breakdown of respondent demographics outlined in section 1.8.5 shows that the sample size and relatively broad range of individuals from varied demographics who took part in the online survey and interviews resulted in the sample group being sufficient for the exploratory research outlined in this thesis

1.8.6.2 PRESENTATION OF RESULTS

It is important to note that not all the questions included in the online survey have their responses presented as findings in chapters two, three, four and five as outlined on Table 1.1. The two reasons being:

1. The survey was created to ask questions to address the aims and objectives of the study. To achieve this, there were specific questions relating to the four research objectives (section 1.3), and other questions that were developed to more broadly understand conceptualisations of, and connections with 'nature' (resulting in a total of 37 questions). During survey development, it was considered beneficial to include more questions than less, to enable for further exploration or expansion on themes if required. On completion of the online survey, the findings from the questions specifically relating to the four research objectives were analysed and deemed as being sufficient in addressing the four research objectives. Despite this, findings from the other questions were analysed to ensure that they did not contradict the findings for the four research objectives (presented in Appendix 4). The further structured and semi-structured interviews that followed the online survey therefore only asked questions specifically relating to the four research objectives.

2. Originally, this PhD aimed to be completed via a thesis by traditional manuscript. However, after all data had been collected from the online survey, it was decided to transition to a thesis with publication, resulting in the requirement to focus on more narrowly identified research areas to produce journal articles (of which four were produced), and, to adhere to wording limitations associated with journal articles (all of which had word limits of ~8,000 words).

Therefore, it is acknowledged that there is data that was captured from the online survey that is not presented as part of these papers. However, questions and responses that have not been included have been determined to have no bearing on the outcomes and findings that are presented in this study. Despite this, the results for each question from the online survey are presented in Appendix 3 and further analysed in Appendix 4 for transparency.

1.8.7 POSITIONALITY

For researchers undertaking social science research, it is important to articulate their positionality to acknowledge how their position in the research may influence how it is conducted, the outcomes, and the results (Holmes, 2020).

Acknowledging my positionality within the subject of investigation (environmental management), I have 12 years' experience working in various sectors of environmental management – for example ranging across public and private sectors, non-profit organisations, and academia. My roles have included sustainability management and consulting, environmental strategy planning, environmental management tutoring, environmental campaigning, lobbying and advocacy. This has allowed me to gain various insights into environmental management and/or sustainability issues from a range of viewpoints and have led me to rationalize the purpose of the study at the broader level (specifically, due to anecdotal

observations of the lack of understandings around the diverse conceptualisations of 'nature' and the human-'nature'relationship across public, private, and non-profit sectors).

To consider positionality with respondents, acknowledgement of the 'insider-outsider' positionality debate is necessary (Holmes, 2020). For example, an 'insider' researcher is considered somebody who either has the same personal biography as respondents (e.g., gender, culture, class etc), or somebody who has the same level of intellectual knowledge, experience or insight into the phenomenon being researched. In contrast, an 'outsider' researcher is somebody who does not have the same biography as respondents, or has a different level of intellectual knowledge, experience or insight into the phenomenon being researched. In this research, I classify myself as both insider, and outsider, which is common with researchers as most inhabit multiple positions at a time (Merton, 1972). My positionality as an insider is due to the fact that I am aligned within the larger brackets of demographics of respondents who engaged in this research as outlined in section 1.8.5 (e.g., I am NZ Pākehā/European, female, within the age group 31 – 40, and am financially 'middle class' as the majority of respondents are too). However, I further acknowledge that I am similarly an outsider, particularly when engaging with respondents not within the same cultural, gender or age parameters as myself, and having a higher qualification than most respondents along with specific prior knowledge, experience, and insight in the research phenomenon. Therefore, I acknowledge this positionality may influence both the way in which respondents' respond to questions as part of the research, how the research was conceptualised, and how the data was analysed.

Most of the respondents who engaged in this research engaged via an anonymous online survey, and thus did not meet me prior to taking part. However, in the participant consent form (Appendix 6) it was discussed that myself as the researcher was undertaking a PhD and that I was very passionate about the topic. This may have resulted in respondents tailoring their responses in a certain way to try and 'please the researcher' (Mccambridge, De Bruin & Witton, 2012), however, to minimize this occurring, the online survey was entirely anonymous.

On the contrary to the anonymity of the survey, 33 of the 34 interviews (one was conducted over phone), were face-to-face either in person (n = 30) or via Skype (n = 3) and thus it is important that the interviewer remains impartial and does not influence responses or create bias (Mccambridge *et al.,* 2012). Therefore, on commencement of these interviews, internal reflection and acknowledgement was made regarding my positionality with respondents and as much effort was made to come across open and accepting so that respondents felt comfortable responding to questions honestly. This was further minimized by emphasizing that there are no wrong or right answers to questions, and that I was solely interested in personal ideas and thoughts.

1.9 CONCLUSION AND OVERVIEW OF THESIS STRUCTURE

This introductory chapter has provided the outline of the study area, provided the problem statement, discussed the research aim and objectives and the justification for the research, provided background on historical conceptions of 'nature' and the human-'nature'connection, and described the methodological approach used in this research.

The following four chapters illustrate how the research addressed the four research objectives. These chapters have been prepared as individual journal articles. Their publishing status is noted at the beginning of each chapter.

As discussed in section 1.8, there are aspects of the methods sections across all four chapters, which are similar in each given that each research objective was addressed by utilizing the same survey or set of interviews. Every effort has been made to present these sections differently to avoid issues with self-plagiarism in publications and repetition when reading this thesis.

The following chapters are as follows:

Chapter two - Conceptions of 'nature' (research objective one),

Chapter three - Conceptualisations of 'connections to 'nature'' (research objective two),

Chapter four - Perceived influences (pathways and barriers) on 'connections to 'nature'' (research objective three), and

Chapter five - Interconnectedness with 'nature' and pro-'nature' beliefs (research objective four).

Thereafter, the conclusion will bring together the findings and present the contribution to environmental management, implications for environmental management based on the key findings, and provide recommendations for future research and practice, along with the limitations faced during this research.

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CHAPTER 2 - CONCEPTIONS OF 'NATURE'

This chapter is an article that was published in the international journal *Earth* in June 2021. Minor formatting and grammatical changes have been made to ensure consistency across the thesis.

The article is titled:

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Authors: Lissy Fehnker, Diane Pearson and Peter J. Howland. The completed statement of contribution form for this article, indicating the percentage of each authors contribution is in Appendix 2.

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2.1 ABSTRACT

Empirical research that inductively investigates lay conceptions of 'nature' is scarce, despite global environmental narratives around sustainability calling for humans to have harmonious relationships with 'nature'. This paper presents inductive research that attends to the empirical knowledge gap by exploring how respondents self-reportedly conceive 'nature' using Tāmaki Makaurau Auckland, Aotearoa New Zealand as a case study. Results suggested that conceptions of 'nature' within the respondent group are diverse and range across 17 themes. Most commonly, respondents conceived 'nature' as being something that neither humans nor human influence nor activities are a part. This finding is consistent with what has been found by previous deductive research approaches to understanding conceptions of 'nature', however, this research provides a deeper understanding by identifying that respondents form associations with over 60 'aspects' of 'nature'. By highlighting the complexity of 'nature' from a human perspective and being able to identify significant components of 'nature' that people associate with, this study not only provides valuable insight for environmental management in the Aotearoa New Zealand study site, but also has potential to help towards improved management of human-'nature' interactions that can have more targeted impact towards sustainability goals at the global scale.

2.2 INTRODUCTION

Secretary-General for the United Nations António Guterres recently made a plea that "*our war against 'nature' must stop […] it's time to make peace with 'nature'*" (Guterres, 2019). This powerful statement raises two important and urgent questions. Firstly, what is 'nature' and/or what does 'nature' mean to people? Secondly, do the organizations and agencies charged with protecting 'nature' acknowledge that 'nature' may mean different things to different groups of society? Despite the growing consensus since the 1970s within the scientific community that we must protect 'nature'; the term still lacks clear definition (Worster, 1994).

Over the last decade, multi-disciplinary scholarly literature has debated the origins and meanings of the term 'nature' from a philosophical and theoretical stance. For example, conservationists Ducarme and Couvet (2020) and political scientist Arias-Maldonado (2015) provide useful discussions around the historical conceptions of 'nature' and how it has semantically mutated throughout history. However, there is scant literature exploring what the general lay public think 'nature' is across various contexts. At the time of writing, there has been little empirical research that has focused on exploring conceptions of 'nature' and even less that has sought respondents to reflect on what 'nature' means to them or reported their conceptions of 'nature' in an open-ended context.

Amongst the multi-disciplinary literature ranging from geography, urban planning, environmental education, and environmental studies that has investigated what 'nature' means to the lay public, Vining, Merrick & Kalnicky (2008) reported on their study which asked participants in the United States of America to list words that came to mind when thinking of 'natural' environments. Their results indicated that participants mostly referenced undisturbed environments, void of human influence, when discussing their understanding of 'nature'. Similarly, but with children, Tillmann, Button, Coen & Gilliland (2019) undertook research exploring conceptions of 'nature' in Canada. They asked their respondents what comes to mind when they think of 'nature'. Their findings concluded that the general conception children held towards 'nature' excluded humans. The authors highlight that amongst their child participants the term 'untouched' was an essential component of the way they conceived 'nature'. Similar results were also produced by Aaron & Witt (2011), who asked their child participants what 'nature' is to them and found that they mostly conceived 'nature' as containing natural elements (e.g., trees, plants, animals, flowers) or that it was often referred to as 'the wild' and that it was 'separate from the city'.

Another way to explore conceptions of 'nature' is using imagery. One such study was undertaken by Van Den Born (2008), who investigated the various personal images of 'nature' held by respondents in the Netherlands. This study involved presenting interview participants with ten photos representing varied environments. The results of this study strongly suggested that images depicting environments that contained human influence of some degree were considered 'less 'nature'' (e.g., urbanized sites). However, interestingly when respondents were subsequently directly asked and further probed as to whether humans were part of 'nature' or not, 50.0% believed humans were still part of 'nature'. Buijs, Elands & Langers (2009), also in the Netherlands, explored images of 'nature' and found that what people recognized as 'nature' varied across cultures (specifically there were differences between the Dutch and immigrants to the Netherlands). Most Dutch respondents (51.0%) held views of 'nature' that related to wilderness environments, whilst only 25.0% of immigrants held this view. Scenes with little evidence of human presence depicted within them and those that showed areas that appeared unmodified by humans were the ones that were mostly considered as portraying 'nature' by both New Zealanders and tourists in studies conducted in Aotearoa by Newton, Fairweather & Swaffield (2008).

Kempton, Boster & Hartley (1995) observed a dualistic view of 'society and 'nature'' e.g., that they were two separate entities, when they explored conceptions of 'nature' in a non-direct way by analysing ways in which respondents discussed 'nature'- related issues in extensive surveys conducted across the United States of America. Lastly, Hazula-Delay (2001) undertook research with participants who had been part of a wilderness camp for 12 days and noted that their conception of 'nature' aligned with something 'out there' e.g., excluding any human

involvement. Similarly, this conception was observed through the ways in which participants discussed 'nature' within unstructured interviews.

The findings from the studies discussed above provide interesting insights both into how respondents visualize 'nature' through imagery (Newton *et al.,* 2008; Van Den Born, 2008; Buijs *et al.,* 2009), and through researcher-identified themes when respondents discussed 'nature' related topics (Kempton *et al.,* 1995; Hazula-Delay, 2001), which points to the fact that most respondents see humans and 'nature' as separate from each other and 'natural' as being something that excludes human intervention. However, only three studies specifically sought and subsequently asked their respondents to reflect on what 'nature' meant to them personally in an open-ended manner (Vining *et al.,* (2008) with adults, and Aaron & Witt (2011) and Tillmann *et al.,* (2019) with children). As a result, to date most research has been deductive and there is an absence of inductive investigative approaches. Lack of inductive approaches may be limiting the understandings of people's deeper beliefs and associations of 'nature' being identified.

Empirical understanding of individuals' deeper beliefs is considered crucial information for those who seek to understand why some individuals behave in sustainable ways while others do not (Abson *et al.,* 2017; Riechers., *et al.* 2021). The scarcity in research exploring self-reported conceptions of 'nature' leaves a significant knowledge gap given the recognized importance of understanding and altering human-'nature' interactions to help to address the wicked environmental issues facing planet Earth (Sutherland, Dicks, Everard, Geneletti & Freckleton, 2018).

Subsequently this paper responds to this identified empirical gap in research on self-reported conceptions of 'nature'. The study presented in this article outlines an exploratory case study of conceptions of 'nature' amongst a sample of 997 respondents who participated voluntarily in this study from Tāmaki Makaurau Auckland, Aotearoa, New Zealand. Thus, highlighting the importance of more inductive approaches to understanding human-'nature' relationships both internationally and in Aotearoa.

This study is particularly important from an empirical research perspective because it quantifies for the first time the self-reported conceptions of 'nature' from an environmental management position, as opposed to psychological, of which most research on the human-'nature' relationship originates from (e.g., see Restall &Conrad (2015) and Ives *et al.,* (2017)).

Furthermore, the knowledge acquired from this study has the potential to prompt further research exploring conceptions of, and associations with 'nature' which could help to inform how the term 'nature' might be used more effectively in environmental management policies and programs. However, this study can provide context-specific insight into conceptions of, and associations with, 'nature' in the Tāmaki Makaurau Auckland region which may be useful to regional environmental policy and programs, as currently, public agencies and environmental organizations have no insight into what 'nature' means to the Tāmaki Makaurau Auckland population. Lastly, the insights gained from this study can enrich current empirical knowledge on the complex relationships between humans and 'nature'.

2.3 METHODS

2.3.1 ETHICS

Ethics approval was granted prior to commencing the study through Massey University, Aotearoa New Zealand. The research was considered low risk.

2.3.2 STUDY LOCATION

The Tāmaki Makaurau Auckland region is home to 1.57 million people accounting for 32.0% of the country's population (Auckland Council, 2018a). It is the fastest growing region in Aotearoa New Zealand with a growth rate of 1.9% per annum and is projected to be home to 39.0% of the national population by 2043 because of both domestic and international migration (Auckland Council, 2018b). The region is ethnically diverse, with the largest ethnic groups being European/Pākehā[13], Asian, Pacific Islanders and Māori and is considered one of the most ethnically and culturally diverse cities in the world (Auckland Council, 2018b). Aotearoa New Zealand is a developed country and is categorized as a Western country despite its geographic location and strong indigenous influences reflected in Mātauranga Māori (Māori worldviews) (World Population Review, 2020).

2.3.3 DATA COLLECTION

This study utilized qualitative online surveys and face-to-face and phone/video interviews. Facebook advertising, mail drops, and approaching people in public places were the key methods utilized to recruit participants. Facebook advertising was conducted by posting invitations to take part in the research to community groups across Tāmaki Makaurau Auckland. Facebook is an efficient way to engage with members of the population and to harness data (Franz, Marsh, Chen & Teo, 2019). The Facebook advertising feature was employed to target people over 16 years of age who lived within the Tāmaki Makaurau Auckland region. The invitation to participate in the research was kept as neutral as possible so as not to introduce bias prior to the survey. That is, we asked people to give their opinions on "*'nature'-related topics*". This approach was an effort to appeal to a broader audience than people who might be only ''nature'/environmentally inclined'. However, we acknowledge that it is difficult to avoid the fact that people who are more engaged with 'nature' would have been more likely to partake in the survey and therefore there may be a level of sampling bias toward this group of people.

Participants were directed to an online survey that was hosted by Qualtrics™. The host site contained a participant information sheet, consent form, and 37 questions[14]. Additionally, approximately 1,000 pamphlets inviting people to participate in the research were dropped into postal mailboxes randomly selected across the region to ensure that advertising of the research was not biased toward attracting only people who had social media accounts.

[13] Pākehā is a Māori term for New Zealanders of European descent.
[14] Not all questions were related to this study. This article represents part of the full study that took place. For further information, please contact the corresponding author(s).

Pamphlets also included researcher contact details for those participants who could not complete the survey online and wanted a physical copy sent to them with return postage. To maximize the response rate, on completion of the survey participants could go into a draw to win one of four $50.00NZD shopping vouchers.

Further individual semi-structured and structured interviews were conducted after the online survey. These interviews were carried out for two reasons. The first was to compensate for any sampling bias due to the heavy online input. The second was to give an opportunity to interrogate and to validate the online survey responses. Potential participants for these interviews (n = 30) were approached in public places e.g., beaches, parks, and markets in the Tāmaki Makaurau Auckland area. Interviews were conducted on the spot and lasted approximately 20 minutes. When initially approaching potential participants, a conscious effort was made to approach only people who looked over the age of 16 years due to human ethics requirements that prevent the questioning of minors. Once they agreed to participate in the research, participants were asked their age to further ensure that they were over 16 years of age. These interviews were supplemented further by semi-structured interviews (n = 4). Participants for these interviews were sought via a Facebook advertising post and were given a $20.00NZD cash voucher for their time. The interviews lasted approximately one hour and were less structured than the previous interviews. The aim of these interviews was to ensure that even if a participant was interviewed in their own time in their own home (the interviews were conducted over Skype (n = 3) and telephone (n = 1)) and given as much time as required to respond and to discuss their conceptions of 'nature', no other dominating themes or conceptions would emerge based on this different context. Therefore, these interviews were not conducted to draw new conclusions, but to ensure the data was as robust as possible.

2.3.4 SAMPLE GROUP

In total, 997 volunteer participants took part in the online survey (n = 963) and interviews (n = 34) (the participants either took part in the online survey or interview – not both). If this sample had been a random one from the Tāmaki Makaurau Auckland region, then this sample would be large enough to reject a hypothesis of zero correlation with a p-value <0.05 (significance level) and a 90.0% power provided the true correlation between variables was at least r= 0.11. However, because this sample is a convenience sample of volunteers rather than a random sample, it is important to acknowledge that any conclusions about the population must be treated with caution. Gender split across participants was 48.0% male and 52.0% female, which is closely representative of the gender split in the region (StatisticsNZ, 2018). The target settings for the online survey advertisement had to be altered three quarters of the way through the duration of its publication due to an increased input by female participants. Initially it was set to both genders, but in the last quarter the targeting was changed to target only males. The age of participants was a relatively even spread, with the minimum age of participants being 16 and the eldest being in the 81-to-90 age group. Age groups were not reflective of the Tāmaki Makaurau Auckland split (StatisticsNZ, 2018). Some ethnicities were over-represented compared to Tāmaki Makaurau Auckland statistics (e.g., NZ European/Pākehā by 27.9%, Māori by 1.5%), and under-represented in others (e.g., Pacific Peoples by 9.5%, Asian by 18.7%, MELAA[15] by 0.3%) (StatisticsNZ, 2018). Therefore, this explorative case study is not ethnically or age representative.

[15] Middle Eastern, Latin America, African

An important limitation with the study that needs to be acknowledged is that there is a level of response bias towards individuals who have access to the internet and actively engage in social media, given the high response rate to this research by those participants who engaged in an online capacity and undertook the Qualtrics-based survey.

2.3.5 SELF-REPORT MEASURES

To explore the potential variations in conceptions of 'nature', the online survey and interview question specifically asked respondents *"please tell me in a few words what you think 'nature' is"*. We deliberately presented the question in a way that was as open-ended as possible. It was reiterated that there were no right or wrong answers and that it was the participants' subjective ideas and thoughts that were being sought. Participants were given a free response text box on the online survey and were given as much time as needed to explain their responses in the interviews. This question was the first question that participants were asked when engaging in the survey (after initial demographic questions). The question was followed by other questions that related to other areas in our broader study (e.g., seeking conceptions of the participants' 'connections' to 'nature', factors that influence human-'nature' connections, pro-'nature' beliefs).

2.3.6 CONTENT ANALYSIS

The open-ended quality of the survey question seeking conceptions of 'nature' generated a high amount of textual data. Responses were coded and then categorized into 28 non-mutually exclusive categories based on applying content analysis of the data and using a deductive (applying pre-existing codes and categories based on an earlier pilot study) and inductive (developing codes and categories through analysis of the data) approach (Table 2.1) (Cho & Lee, 2014; Elo & Kyngas, 2008). The 28 categories then were grouped further into 17 overall themes using an inductive approach. All coding of data was undertaken by the lead author and was reviewed by an independent colleague. Any discrepancies were addressed through mutual agreement. Due to the subjectivity of coding, it is impossible to identify all potential codes within a set of open-ended responses. Accordingly, the most effective representation of themes within such a set of responses is to establish the percentage of respondents that referenced each theme. This approach is opposed to any attempt to calculate percentages of overall references (relative frequency) which would require an objective and absolute measurement of all possible references that respondents could make.

2.3.7 KEYWORD/TERMS SEARCH

Furthermore, to explore the various 'aspects' that are associated with 'nature', we ran a search across all responses to pick up keywords that we then grouped into overall themes (Table 2.2). The aim was to explore which specific 'aspects' of 'nature' came to mind when participants discussed their conception of 'nature'. The purpose of this approach to provide extra insight into conceptions and to respond to concerns as outlined by Ives *et al.*, (2017) that the term 'nature' often has been left undefined in research that explores human-'nature' connections. In the collation of results, each 'aspect' was given an equal value. Giving each 'aspect' the same value was necessary because the question did not ask respondents to rank these aspects of

'nature' by listing them in order of importance, for example, or by rating how much they felt each aspect was more 'nature' when compared to the others that they listed. We acknowledge that these associations may only reflect the respondents' thoughts at the time of taking part in the survey and therefore consider these the 'first' aspects that came to mind when respondents discussed their conceptions.

2.4 RESULTS

The results of the content analysis exploring conceptions of 'nature' are presented in Table 2.1, and results of the keyword/terms search exploring associations with 'nature' are presented in Table 2.2. The results are presented as a whole, and not broken down by age, ethnicity, or gender as we did not find any differences in responses based on demographics. Furthermore, understanding whether there are differences in conceptions of 'nature' due to age, ethnicity, or gender was not the aim of this study, hence why statistically representative samples of ethnicity or age were not sought.

Firstly, Table 2.1 shows that 17 non-mutually exclusive themes of conceptions of 'nature' were identified as being referenced by the respondents in the study. In some instances, the theme is presented as a collective of categories to display the diversity within the theme.

The dominant respondent conception of 'nature' is that 'nature' is something of which neither humans nor human influence or activities are a part (58.1%). Conversely, only 6.8% of respondents had the opposing view – that 'nature' is something of which both humans and human influence and activities are a part. The theme that 'nature' is a personal experience or feeling was referenced by 38.0% of respondents. The theme that 'nature' is the outdoors was reference by 19.0% of respondents and lastly, was 'nature' being conceived as a resource by 14.5% of respondents. The remaining themes are further outlined in Table 2.1. The focus of this paper will be on themes one to eight (themes that were referenced by at least 5.0% of respondents).

TABLE 2.1 CONCEPTIONS OF 'NATURE'

Themes and Categories	**Frequency (%)[16]**
Theme 1 - 'Nature' is something of which neither humans nor human influence/activities are a part	58.1
Theme 2 - 'Nature' is a personal experience or feeling	38.0
2.1. A feeling	*35.2*
2.2. An experience	*2.8*
Theme 3 - 'Nature' is the outdoors	19.0
Theme 4 - 'Nature' is a resource	14.5
Theme 5 - 'Nature' is the environment/surroundings	11.6
Theme 6 - 'Nature' is everything/whole world/planet	10.3
Theme 7 - 'Nature' is all living beings/anything growing/anything breathing	9.6
Theme 8 - 'Nature' is something of which both humans and human influence and activities are a part	6.8
Theme 9 - 'Nature' is an aesthetic	4.6
Theme 10 - 'Nature' is biodiversity/ecosystems	3.9
Theme 11 - 'Nature' is a system/process/force	3.6
Theme 12 - 'Nature' is vulnerable/damaged	3.2
Theme 13 - 'Nature' is a personification	2.6

[16] Frequency reflects the percentage of respondents who referenced each theme/category. N.B. the total(s) add up to over 100.0% because respondents often referenced more than one theme/category.

Theme 14 - 'Nature' is an area/space/landscape that is in a healthy state	2.4
Theme 15 - 'Nature' is a creation by God/the Divine	2.1
Theme 16 - 'Nature' is humans but not human activities or influence	1.8
Theme 17 - 'Nature' is a social construct	0.4
Other (unclear response)	4.7

Secondly, keywords that respondents identified as 'aspects' most associated with 'nature' were counted and grouped into overall themes (Table 2.2). The aspects of 'nature' most referenced were those within the theme 'flora' (57.7%) and 'fauna' (40.3%). Other references to 'aspects' of 'nature' could be more broadly fitted within themes labelled as hydrological, geological, atmospheric, space, and consumables.

TABLE 2.2 ASSOCIATIONS WITH 'NATURE'

Themes and Aspects	**Frequency (%)**
Theme 1 - Flora	57.7
Keyword 1.1. - Plant(s)	17.2
Keyword 1.2. - Tree(s)	12.6
Keyword 1.3. - Flora	6.6
Keyword 1.4. - Forest(s)	5.4
Keyword 1.5. - Bush	4.7
Keyword 1.6. - Green(ery)	4.0
Keyword 1.7. - Garden(s)	2.1
Keyword 1.8. - Park(s)	1.9
Keyword 1.9. - Grass	1.6
Keyword 1.10. - Flower(s)	1.1
Keyword 1.11. - Field(s)	0.2
Keyword 1.12. - Meadow(s)	0.1
Keyword 1.13. - Wood	0.1
Theme 2 - Fauna	40.3
Keyword 2.1. - Animal(s)	15.3
Keyword 2.2. - Fauna	6.5
Keyword 2.3. - Bird(s)	4.6
Keyword 2.4. - Insect(s)	4.0
Keyword 2.5. - Wildlife	2.9
Keyword 2.6. - Bee(s)	1.8
Keyword 2.7. - Organism(s)	1.7
Keyword 2.8. - Species	1.4
Keyword 2.9. - Fish	0.9
Keyword 2.10. - Bug(s)	0.5
Keyword 2.11. - Worm(s)	0.2
Keyword 2.12. - Pet(s)	0.2
Keyword 2.13. - Spider(s)	0.2
Theme 3 - Hydrological	27.7
Keyword 3.1. – Ocean/sea	9.5
Keyword 3.2. - Water	6.5
Keyword 3.3. - Beach(es)	4.7
Keyword 3.4. - River(s)	2.9
Keyword 3.5. - Lake(s)	2.2
Keyword 3.6. - Stream(s)	0.7
Keyword 3.7. - Waterway(s)	0.7
Keyword 3.8. - Waterfall(s)	0.2
Keyword 3.9. - Harbour(s)	0.1
Keyword 3.10. - Estuary(ies)	0.1
Theme 4 - Geological	23.6
Keyword 4.1. - Earth	7.7
Keyword 4.2. - Land	6.5

Keyword 4.3. - Mountain(s)	3.8
Keyword 4.4. – Landscape(s)	2.1
Keyword 4.5. - Rock(s)	1.4
Keyword 4.6. - Soil	0.8
Keyword 4.7. - Ground	0.7
Keyword 4.8. - Hill(s)	0.3
Keyword 4.9. - Geology	0.1
Keyword 4.10. – Island(s)	0.1
Theme 5 - Atmospheric	10.7
Keyword 5.1. - Air	5.1
Keyword 5.2. - Weather	2.1
Keyword 5.3. - Sky	1.7
Keyword 5.4. - Rain	0.8
Keyword 5.5. - Wind	0.7
Keyword 5.6. - Cloud	0.2
Keyword 5.7. - Storm	0.1
Theme 6 – Space	8.4
Keyword 6.1. - Planet(s)	2.3
Keyword 6.2. - Space	2.2
Keyword 6.3. - Sun	1.6
Keyword 6.4. - Universe	1.5
Keyword 6.5. - Moon	0.4
Keyword 6.6. - Star(s)	0.3
Keyword 6.7. - Cosmos	0.1
Theme 7 - Consumable	0.9
Keyword 7.1. - Food(s)	0.5
Keyword 7.2. - Fruit(s)	0.2
Keyword 7.3. - Vegetable(s)	0.2

2.5 DISCUSSION

The aim of this case study was to address an empirical gap in knowledge both regionally and internationally by exploring self-reported conceptions of 'nature' with volunteer respondents in Tāmaki Makaurau Auckland, Aotearoa New Zealand using an inductive approach. By doing this it is hoped that this study prompts future research exploring conceptions of 'nature' to explore the application of findings to more practical environmental management policy, planning and programs. Despite this study being an exploratory case study, it still provides useful insights relating to the Tāmaki Makaurau Auckland context and could inform some policy, planning and programs in the region.

Overall, the results of the survey display a considerable diversity of responses relating to how 'nature' is conceived by the respondent group. The way in which 'nature' was described by respondents ranged across 17 themes and 28 categories. What respondents associated with 'nature' ranged over seven themes which contained a total of 63 aspects. The diversity of conceptions across the respondents highlights the potential issue with using the term 'nature' both in practice or research without further qualification because it may mean different things to different individuals and/or groups. To ensure brevity, the remaining discussion will focus on themes that were referenced by over 5.0% of respondents.

2.5.1 CONCEPTIONS OF 'NATURE'

Despite there being a range of conceptions of 'nature' identified in the survey, half of the respondents referenced theme one, which categorizes 'nature' as being something of which neither humans, nor human influence or activities, are a part. Responses allocated to this category included comments such as "*'nature' is anything that humans have not touched*", "*'nature' is anything that is not human*", "*'nature' is anything that has not been created by humans*", and so on. Comments such as these indicate that amongst respondents there is a conceived separation between humans and 'nature'. This dominating conception was expected given that previous more deductive studies outlined in the introduction demonstrated similar findings (Kempton, Boster & Hartley, 1995; Hazula-Delay, 2001; Van Den Born, 2008; Vining, Merrick & Kalnicky, 2008; Newton *et al.,* 2008; Buijs, Elands & Langers, 2009; Aaron & Witt, 2011; Tillmann, Button, Coen & Gilliland, 2019). However, this study revealed greater depth to what people conceive 'nature' to be by also identifying other significant themes of conceptions of 'nature' which will be further discussed.

The second most dominant theme referenced by respondents was that 'nature' is a feeling and/or experience. Examples of the types of responses that were encompassed in this theme include responses such as "*'nature' is calmness*" (feeling), "*'nature' is peaceful*" (feeling), "*'nature' is camping and trekking*" (experience). It is important to note here that all responses under this theme referenced positive feelings and experiences only (as opposed to negative feelings and experiences). This result is not surprising because there is extensive research highlighting the benefits of exposure to 'nature' for health and wellbeing (see a systematic review of literature by Twohig-Bennett & Jones (2018)). The common view amongst respondents who had their responses categorized within this theme was that 'nature' evokes a feeling aligned with forms of peace or calmness. This observation is consistent with previous research that has demonstrated that exposure to 'nature' alleviates stress-related conditions (e.g., Berman *et al.,* 2012; Beil & Hanes, 2013). Why 'nature' is conceived as feelings of peace or calmness to respondents may be for reasons expressed in the theory of biophilia (Wilson, 1984). Biophilia postulates that humans have affinitive, innate 'connections to 'nature'' which result from the human brain evolving intertwined with 'nature'. Fundamental to this theory is that humans are still attracted to 'nature' (over urban/manmade environments) and being in 'nature' provides a sense of refuge (Wilson, 1984). Given the conceptions found in this study, 'nature' being conceived as positive feelings (namely 'peace', 'calmness', etc.) reflects the overlap between environmental sustainability and psychological disciplines and warrants further research as to how 'nature' exposure potentially could be used as a method of stress-reduction.

The remaining themes, e.g., three to 17, were referenced by less than 20.0% of respondents but still provide interesting insights into the other types of conceptions that respondents have of 'nature'. The conception shared by 19.0% of respondents that 'nature' is the outdoors is consistent with research by Hazula-Delay (2001), who found when exploring conceptions of 'nature' that a common conception shared across their respondents was that 'nature' is 'out there'. Furthermore, the conception that the 'outdoors' is 'nature', along with interchangeable use of the two terms, is common across human-'nature'relationship literature (for example most recently, Meredith *et al.,* 2019; White *et al.,* 2019; Naomi, 2020; Harju, Balldin, Ladru & Gustafson; 2020). This conception further explains the popularity of concepts such as biophilic design, the aim of which is bringing outdoor elements inside (Kellert, Heerwagen & Mador, 2008). A noted limitation here is that we are unsure if respondents intended the term 'outdoors' to encompass everything (e.g., including human-made outdoor environments) or only the non-human aspects of the outdoors. The potential benefit of this conception is that any

communications to protect and to enhance the outdoors could be understood by this respondent group as protecting and enhancing anything outdoors and thus may result in a broad view of what 'nature' encompasses (e.g., all plants, animals, water bodies, etc.).

The conception that 'nature' is a resource was shared by 14.5% of respondents. This result is aligned with a finding from another aspect of our broader study (Fehnker, Pearson & Howland, 2022a) where we explored the same respondents' conceptualizations of their 'connections to 'nature''. The findings from this study showed that 4.3% of respondents referenced a 'connection to 'nature'' as being a material connection (e.g., 'nature' has material value through the resources/services 'it' provides) (Fehnker *et al.*, 2022a). This perspective implies anthropocentric values and the associated belief that 'nature' exists to meet human ends (Kellert, 1993; Burchett, 2014). From an environmental sustainability perspective, this conception logically should be a powerful motivation for pro-environmental attitudes as humans can see the direct benefit to themselves if they behave in ways to protect and enhance 'nature' (Kopnina, Washington, Taylor & Piccolo, 2018).

Themes five, six and seven are difficult to analyse because we are unsure if respondents referencing themes such as 'nature' is 'the environment/surroundings' (11.6%), 'nature' is 'everything/whole world/planet' (10.3%), or 'nature' is 'all living beings/anything growing/anything breathing' (9.6%) were intending to mean that these concepts were intended to include humans and/or human activities and influences. Whether humans were included or not has the potential to change the results in Table 2.1 (however not to the extent that it would have impacted the key findings of the study and direction of the discussion). Given the ambiguity associated with these themes it would have been useful to undertake further analysis by probing respondents in more detail to help to understand more specifically what these responses were meant to entail. However, the conception that ''nature' is the environment' is somewhat expected as the term 'environment' is often used by agencies in the study location when referring to 'nature' or the 'natural environment' (e.g., Auckland Council (2018)). Given that the term 'environment' has no global commonly agreed definition (Payne, 2017), comparable questions pertaining to how the lay public conceives the 'environment' can be raised at this point. Exploring the term 'environment' using similar methodologies to this study could be useful to help to clarify what is understood by this term and the differences people conceive between the two terms 'nature' and the 'environment'.

Theme eight categorizes the conception of ''nature' as being something of which humans and human influence and activities are a part' (6.8%). Individuals who view themselves or their community as part of 'nature' are less likely to harm 'nature', as harming 'nature' is in effect harming themselves (Roszak, Gomes & Kanner, 1995). Results from another aspect of our broader study (Fehnker, *et al.*, 2022b) supported this theorization. The results suggested that respondents who viewed themselves as interconnected with 'nature' (18.7%) (utilizing the Inclusion of Nature in Self scale developed by Schultz (2002)) were more likely to hold pro-'nature' beliefs. This conception potentially offers the most benefit for environmental sustainability outcomes. Therefore, it would be advantageous for environmental sustainability practitioners to work towards trying to encourage individuals toward a conception that 'nature' encompasses both humans and human influence and activities.

Each of the remaining nine themes were referenced by less than 5.0% of respondents. Examples include that 'nature' is an aesthetic (4.6%) e.g., "'*'nature'' is beauty*"; 'nature' is biodiversity/ecosystems (3.9%); 'nature' is a system/process/force (3.6%); 'nature' is vulnerable/damaged (3.2%); 'nature' is a personification (2.9%) e.g., "'*'nature'' is my mother*", 'nature' is an area/space/landscape that is in a healthy state (2.3%) e.g., "*'nature' is an area that*

is healthy and free of pollution", 'nature' is a creation by God/the Divine (2.1%); 'nature' is humans, but not human activities/influence (1.8%) and lastly, that 'nature' is a social construct (0.4%). The emergence of these smaller themes suggests that further targeted research into these areas is warranted, and that future research could build on smaller identified themes. As an example, questions emerge around why only 2.1% of respondents conceive 'nature' as a creation by God/the Divine yet 38.4% of the Tamaki Makaurau Aucklander (StatisticsNZ, 2018) identify as Christian in some form. Given that Christian denominations postulate God as being the creator of 'nature' (Moritz, 2013), a deeper exploration could shed light on this discrepancy.

2.5.2 ASSOCIATIONS WITH 'NATURE'

As well as understanding the dominant conceptions of 'nature', this study explored what 'aspects' respondents most associated with 'nature' (Table 2.2). The terms flora (57.8%) or fauna (37.2%) and keywords relating to these categories were the most referenced associations that people had with 'nature'. However, there were 37 other aspects of 'nature' that people identified, which highlights the risk of sustainability practitioners, researchers and policy makers focusing on only some of aspects of 'nature' and not focusing on others. Arguably focusing sustainability efforts on narrow associations of 'nature' may have long term implications for environmental management. These implications include the fact that treating 'nature' as quite specific elements (e.g., in this case, flora and fauna) could adversely affect human efforts to protect some elements of 'nature' that are outside of these categories. It potentially causes a situation where some things can be considered more 'nature' than others, leading to some aspects of 'nature' receiving more conservation and protection attention than others.

The findings that help to understand associations with 'nature' are useful for both future environmental sustainability empirical research and practice. For example, Ives *et al.*, (2017) argue that the term 'nature' is often left undefined in research exploring human-'nature' connections, which can be a major limitation as this results in little clarity as to what specifically people are connected to. Our findings demonstrate the importance for any research exploring conceptions of 'nature' to try to determine at the outset what respondents consider to be 'nature' because their conceptions of 'nature' might vary with study groups. Doing so can result in more specificity and targeted research that can draw stronger conclusions around which aspects of 'nature' are the ones to which respondents are connected or not.

Furthermore, we strongly suggest that future research from an environmental sustainability perspective continues to expand upon these ideas through exploring why respondents associate some 'aspects' with 'nature' and not others. For example, one avenue of future research could be whether communications by public agencies, organizations or media sources influence the public's conceptions of 'nature'. Other research could focus on whether where people live influence these conceptions and associations (e.g., whether predominantly coastal communities are more likely to associate coastal related aspects with 'nature' versus others). Furthermore, as mentioned in the methods section, we acknowledge that the reported aspects that respondent associate with 'nature' could merely reflect the first aspects that came to mind when partaking in the survey, and thus may not be the only aspects the respondent associates with 'nature'. We would strongly suggest that future research clarifies this with respondents, which could be done through employing a scale whereby respondents can rank each aspect they associate with 'nature' in order of perceived prominence.

Due to the number of themes and categories relating to the conception of 'nature' and the range of associations respondents have identified relating to 'nature', the results highlight that it is important to consider 'nature' within a broad context. Narrowly conceptualizing 'nature' may fail to encompass all aspects that are important to a population. It is also important to recognize that use of the term 'nature' in conservation and sustainability programs could have different connotations for different social groups, which could result in a fragmentation as to how the population responds to 'nature'-related communications, campaigns, and legislation. One way to address this issue could be by avoiding the term and instead by referring to the specific phenomena at issue. For example, in the context of conservation, preservation, or protection could include (hypothetically) terms like 'conserving plant species', 'protecting our landscape' or 'rivers are facing significant pressures'. However, future research could provide deeper insight into these associations at a more detailed level, as an example, when respondents reference 'birds', questions are raised as to whether they are referring to all birds, native birds, or exotic species. If studies such as this are replicated in other contexts, we suggest prompting respondents to discuss which specific species they are thinking of to draw further conclusive findings around potentially varying perceptions of whether only native species are considered 'nature', or not (hypothetically).

2.5.3 'NATURE' IS NOT HUMANS AND/OR HUMAN ACTIVITIES OR INFLUENCES

It is worrying from an environmental management perspective that over half of the respondents in this study held the conception that 'nature' is something that neither humans nor human influence or activities are a part given that numerous authors (for example Haila, 2000; Vining *et al.,* 2008; Zylstra, Knight, Esler & Le Grange, 2014; Beery, Jönsson & Elmberg, 2015) have argued that the conceived separation between humans and 'nature' is a significant contributing factor towards current ecological problems facing life on Earth. Although we did not further interrogate respondents' reasoning behind why they conceived neither humans nor human influence or activities as not being part of 'nature', we argue that it would be hard to doubt the strong influence that historical and contemporary culture has on the way that individuals conceive 'nature' (Heerwagen & Orians, 1993). For example, the perspective that humans are not part of 'nature' in contemporary times has been argued to be a result of historical narratives, belief systems and discourses that are a specific product of the cultural history of the West by several scholars and thinkers (for example White, 1967; Maccormack & Strathern, 1980; Descola, 1994; Ingold, 2000; Plumwood, 2001; Zylstra *et al.,* 2014). Specifically, White (1967) argues that present day humans are "*deeply conditioned by beliefs about our 'nature' and destiny, that is, by [historical] perspectives*" (White, 1967, p. 1205).

These historical conceptions of 'nature' are dominated by the conception that 'nature' is something separate from humans and is subject to human use, exploitation, and dominance (Glacken, 1992). Other authors such as Seaman (2009); Barber (2004); Bauckham (2002) postulate that this conceived separateness between humans and 'nature' is due to the historical Judeo-Christian belief systems that depicted humanity as positioned separate from and superior to ''nature',' which influenced the conceptions of 'nature' across early Western civilizations and still have some influence on contemporary conceptions. The historical perspectives are argued to be accentuated further through current Western mechanistic perspectives (Zylstra *et al.,* 2014), which divide issues we face into being either social, environmental, or economic (Sterling, 2001; Ehrenfelt, 2005;). The perspectives that treat 'nature' increasingly as a separate entity (of which the economy, society, and culture are not a part) are contributing constantly

towards a mental disconnect between economic growth and its detrimental impacts on 'nature' (Folke & Gunderson, 2012). Conversely, non-Western conceptions, such as those of Indian, Chinese, and Japanese cultures, can be very different in their outlooks and customs (Barnhart, 1997).

Callicott & Ames (1989, p. 5) categorize most Eastern conceptions of 'nature' as being 'holistic' as humans are seen as being part of 'nature'. Although this study showed no significant associations between response and cultural affiliation in New Zealand, Māori (the indigenous population) have long been recognized as having an interconnected and holistic relationship with 'nature' (Harmsworth & Awatere, 2013). Māori have unique, historical 'connections to 'nature'' that are deeply rooted in spirituality (Lockhart, Houkamau, Sibley & Osborne, 2019). Māori acknowledge themselves as tangata whenua (original people of the land) and thus consider themselves to be part of 'nature' (Lockhart *et al.,* 2019). This view is similar to the perspectives documented by many of the indigenous people in the Oceania region (Hviding, 2003). Given that Aotearoa New Zealand is considered a Western country with strong Western values and belief systems which were prompted by the process of colonization and given that NZ European/Pākehā were over-represented in the study (as discussed in the methods section) (Gibbons, 2002; Houkamau & Sibley, 2019), it is not surprising that this dominant conception by respondents was recorded. Māori were under-represented in this study and therefore having more statistically reflective input by Māori respondents in this study may alter the overall findings and highlight discrepancies between cultural conceptions.

This conception that 'nature' is something of which neither humans, nor human influence or activities, are a part which was evident in this study, has attracted interest from within the field of ecopsychology. For example, ecopsychologists Fox (1984); Roszak (1992); Metzner (1999) label modern mental disconnects between humans and 'nature' as a form of ecological unconsciousness. Furthermore, Metzner (1993) argues that there is a psyche within the Western culture that is characterized by a dissociative split between spirit and 'nature' or psychic alienation from the natural world. Ecopsychology is described as a discipline that *"bridges our culture's long-standing, historical gulf between the psychological and the ecological…"* (Roszak, 1992, p. 2) the goal being to "heal the fundamental alienation between the person and 'nature'" (Roszak, 1992, p. 6). Therefore, if applied more widely to environmental sustainability, ecopsychology theories could offer a potential opportunity to understand better and to work towards solutions to the dualistic perspectives that were reported in this study. To address these dualistic perspectives, it would be useful for environmental management practitioners to work alongside disciplines such as ecopsychology to help to remove the conceived divide between humans and human activities and 'nature'. Addressing this divide is arguably of upmost importance in the study region because the rate of urbanization and human influence and activity is increasing rapidly through urban sprawl (Auckland Council, 2018c), which is resulting in fewer areas that would be considered free from humans and human influence. If this trajectory continues, a consequential impact could be that 'nature', as viewed by over half of the respondents in this study, will no longer exist in Tāmaki Makaurau Auckland.

This prospect has serious implications for environmental management efforts but also could have health and wellbeing impacts for the population given the fact that there is widespread research highlighting the beneficial human health and wellbeing impacts of 'nature' (as outlined in the meta-analysis of 143 studies undertaken by Twohig-Bennett & Jones (2018)). Therefore, it is important to consider the human- 'nature' relationship from an interdisciplinary perspective to be able to address sustainability issues.

This study was part of a broader research project exploring the relationship between humans and 'nature'. This finding indicating that humans and 'nature' are separate from one another is consistent with the findings from our other study (Fehnker *et al.,* 2022b) whereby the majority of respondents (the same respondents who took part in this study) indicated that despite feeling some level of connectedness with 'nature', that they viewed an overall distinction between themselves and 'nature'. Furthermore, given the perceived separation between humans and 'nature' as indicated by this respondent group, further research was conducted to understand how respondents subsequently enacted their 'connections' to 'nature'. Similarly, we further explored what influenced these connections. Therefore, the findings from this study provided a foundation for the remainder of our research project exploring connections between humans and 'nature'.

2.5.4 METHODOLOGICAL LIMITATIONS

This study provides valuable new insight into human conceptions of 'nature' however it is acknowledged that due to time restraints, some themes would have benefited from deeper analysis and respondent interrogation (e.g., themes five, six and seven and the smaller themes identified that were referenced by less than 5.0% of respondents). It is important to recognize that the wording of the question asked to respondents ("*please tell me in a few words what you think 'nature' is")* may itself have had different meanings across respondents. For example, respondents may have been unsure if the question was seeking what they believe the definition of the word 'nature' is or whether it was seeking what 'nature' means to them personally.

Furthermore, we are unsure if the aspects that respondents associated with 'nature' were the only aspects they associate and were those that came to mind first when partaking in this survey and therefore may not necessarily mean that they do not associate other aspects they may have not mentioned, with 'nature'. Respondents may have also answered differently to this survey based on context, e.g., being outdoors versus being inside, being at the beach or being in the forest. We acknowledge that this study was undertaken with a predominantly European population (as outlined in the methods) and therefore could have produced entirely different findings if it was undertaken in another location with other cultures. Despite an analysis to test whether varying demographics responded differently regarding conceptions of, or associations with, 'nature' finding no difference, this is purely speculative and not conclusive given that this study did not have statistically reflective representations of ethnicities and age groups from the Auckland region. If statistically representative demographic responses were captured, more conclusive findings could have been produced and thus this would be recommended for future research.

Lastly, it is important to acknowledge that there may be various levels of response bias in self-reporting surveys, particularly as it is difficult to avoid not targeting specifically those who have an interest in 'nature' based topics. Therefore, the findings from this study are to be treated as suggestive and speculative but could be followed on by further research employing different wording of the questions and in different contexts.

2.5.5 NEXT STEPS

Simberloff (2014) argues that 'nature' is at risk of becoming a meaningless panchreston; specifically, "*a term that means so many different things to different people that it is useless as a theoretical framework or explanatory device*". Taking this into consideration, it is important to acknowledge that although there are some dominant conceptions of 'nature' as highlighted by this study, there may be no universal conception of 'nature'. Therefore, understanding and acknowledging dominating conceptions of 'nature' is important because whoever determines the ruling narratives about 'nature' will potentially determine how society manages 'nature' (Soulé & Lease, 1995). The ruling narrative around 'nature' can perpetuate itself by continuing to shape and to reinforce the ongoing conceptions and subsequent treatment of 'nature'. As illustrated by the responses in this study, respondents hold various conceptions of 'nature'. The dominant ones are recognized widely but other conceptions and associations that may result from respondents' experiences with 'nature' or personal relationships with 'nature' are an important consideration for sustainability research. These experiences and relationships might be paramount in determining how people behave towards 'nature' and the value that 'nature' holds in their lives. Therefore, we strongly encourage further research gives consideration more directly to how knowledge of conceptions of and associations with 'nature' could be applied to more practically in terms of education, practice, policy, and planning for more effective environmental management outcomes.

The findings highlight that there is a diversity in conceptions of, and associations with, 'nature' amongst the Tāmaki Makaurau population and therefore environmental management policy, planning, communications, and research in the region should consider encompassing the full spectra of conceptions and associations evident. Without doing this, the findings from this study suggest that there may potentially be fragmented understandings of what the term is meant to entail and ultimately may have an impact on the practical outcomes of environmental management agendas. Furthermore, given that the dominating perspectives in the study region see humans and human influence and activities as being not part of 'nature' and that 'nature' is something specific – e.g., mostly flora and fauna – there is a conceived disconnect in Tāmaki Makaurau between people and 'nature', which may result in people not making the link between harming 'nature' and the subsequent impact it will have on themselves or their community (Roszak *et al.,* 1995; Schultz, 2002). Identifying with very specific associations with 'nature' that are separate from people can result in narrow borders being constructed around certain elements of 'nature' that are considered more 'nature' than others. The outcome of this type of approach is that programs that aim to address 'nature' in its broadest sense may fail because there is a potential disconnect between what the term is intended to mean and how it is received.

2.6 CONCLUSION

Findings from this study provide insight into the dominant conceptions of 'nature' across the respondent group (and potentially the region) which can contribute to addressing a gap in environmental management literature both in Aotearoa New Zealand, where no empirical research such as this study has taken place, and internationally, where empirical research is scarce. Furthermore, despite this study being an exploratory case study, the findings suggest that it may be beneficial for environmental management practitioners to consider a potentially broad range of conceptions of 'nature' in projects, policy, and planning. Although our findings suggest that conceptions are dominated by a few primary conceptualizations, the variation in

responses revealed from self-reported investigation highlights that understanding 'nature' in its entirety is complex and that 'nature' can encompass several different aspects and can be conceptualized in several different ways. Future research could further explore how these conceptualizations could be applied in practice to environmental management projects, policy, and planning.

Kureethadam (2017) argues that the conceptual root causes of current ecological crises occurring across the world are the philosophical arguments around humans' place in 'nature'. Therefore, the burden rests on sustainability scientists, environmental managers, ecologists, and conservationists to work across disciplines to help to shift these perspectives. Otherwise, without a new set of values, we could see a worsening of the ecological crisis that threatens our life on Earth (White, 1967; Paterson, 2006). This shift in perspectives must include closing the gap between 'nature' and humans to achieve a more interconnected and holistic perspective. To address this, we recommend that more empirical research be undertaken using inductive approaches to explore conceptions of 'nature' among the lay public in various contexts so that diverse conceptions can be explored in greater depth. We suggest that future research also should attempt to understand the drivers of contemporary conceptions of 'nature', ideally seeking reflection from survey respondents as to what they feel influenced their conceptualizations. Beyond the research, environmental managers are suggested to challenge the dominating conceptions that see humans and human influence/activities as not a part of 'nature' and to try to encourage people towards a more interconnected view of humans and 'nature'. Alongside this, environmental management practitioners should consider that the issues that face conservation and protection of vulnerable species and habitats on Earth may arise from narrow definitions and conceptions of 'nature' which views 'nature' as certain aspects and not others, and that 'nature' is something separate from humans, further perpetuating the divide that is argued to be the main driver behind the ecological crises facing the world today (Beery *et al.,* 2015; Haila, 2000; Vining *et al.,* 2008; Zylstra *et al.,* 2014). Thus, focusing efforts on educating the lay population toward a more interconnected view of 'nature' may be key to a flourishing planet Earth.

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CHAPTER 3 - CONCEPTUALISATIONS OF 'CONNECTIONS TO 'NATURE''

This chapter is an article that is published in the *Australasian Journal of Environmental Management*. Minor formatting and grammatical changes have been made to ensure consistency across the thesis.

The article is titled:

Exploring Conceptualisations of 'Connections to Nature' from an Environmental Management Perspective: A Case Study in Tāmaki Makaurau Auckland, Aotearoa New Zealand

Authors: Lissy Fehnker, Diane Pearson and Peter J. Howland. The completed statement of contribution form for this article, indicating the percentage of each authors contribution is in Appendix 2.

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3.1 ABSTRACT

Disconnect between humans and 'nature' has been considered a driver of contemporary environmental crises. This has resulted in environmental managers calling for society to 're-connect' with 'nature' for future sustainability. However, conceptualizations of 'connections to 'nature'' are fragmented in theoretical terms and practical application, as empirical research in environmental management literature exploring lay people's conceptualizations of their personal 'connections to 'nature'' is scarce. This raises a key issue: if environmental managers do not know what they are aiming for, how can it be effective? This study responds to the empirical gap by exploring what a 'connection to 'nature'' means to lay individuals. Just under 1,000 respondents from Tāmaki Makaurau Auckland, Aotearoa New Zealand engaged in the study. Results suggest that lay conceptualizations of 'connections to 'nature'' range across nine dimensions – cognitive, affective, experiential, philosophical, spiritual, material, wellbeing, cultural, or that it is a 'hippie term'. Diversity of conceptualizations among the respondent group suggests that empirical exploration of the way that people conceptualize their 'connections to 'nature'' is beneficial. These understandings could prove vital for more efficient sustainability actions to achieve more effective outcomes. The findings advance discourse on human-'nature' connections in environmental management literature.

3.2 INTRODUCTION

Understanding the relationship between humans and the natural world has been of interest to scholars and philosophers over the past century. Leopold (1949) encouraged the consideration of the human-'nature' relationship through his theory of land ethics, stressing that if people see themselves as part of 'nature', they are more likely to practice a degree of stewardship towards

it, arguing that "*when we see land as a community to which we belong, we may begin to use it with love and respect"(*Leopold, 1949, p. xviii). These ideas were expanded upon during the 20th century with the growth of the environmental movement. For example, Edward O. Wilson's biophilia hypothesis (Wilson, 1984) postulated that humans had innate affective and cognitive 'connections to 'nature'' and that this is important to consider in conservation sciences.

As we progress through the 21st century, there continues to be a growing interest in how humans interact with 'nature' and the idea that society must 'connect with 'nature'' for future environmental management outcomes, given that human disconnect from 'nature' is argued to be a key driver behind unsustainable behaviours (Pyle, 1993; Zylstra, Knight, Esler, & Le Grange, 2014; Beery, Jönsson, & Elmberg, 2015; Dorninger, Abson, Fischer & Von Wehrden, 2017). However, in literature on human-'nature' connections, the definition of a 'connection to 'nature'' tends to vary based on the interests of or pre-definition by the researcher. This has resulted in a fragmented theoretical discussion so that there is little coherence on what the notion actually means (Zylstra *et al.,* 2014; Ives *et al.,* 2018). For example, Ives *et al.,* (2018, p. 1389) argue, after conducting a meta-analysis of research across 475 publications that considered human-'nature' connection, that "*the literature is fragmented across disciplinary boundaries, resulting in low coherence in the ways central concepts are understood and applied*". Through their analysis, Ives *et al.,* (2018) identified five dimensions of human-'nature' connections conceptualised across literature - cognitive, experiential, affective, followed by philosophical and material. Similarly, Zylstra *et al.,* (2014, p. 119) discuss that "*the expression [connection to 'nature'] is often used haphazardly without the clarity of the process involved, the practical outcomes desired, and/or the relevance to conservation".*

This fragmentation and haphazard use of the term 'connection to 'nature'' is further illustrated in multi-disciplinary publications where authors attempt to define the term. For example, Restall & Conrad (2015, p. 264) define a 'connection to 'nature'' as being primarily concerned with understanding how people identify themselves with the natural environment and the relationships they form with 'nature'. Encompassing a more multi-dimensional perception, Zylstra *et al.,* (2014, p. 119) discuss a 'connection with 'nature'' as being "*a stable state of consciousness comprising of symbiotic cognitive, affective and experiential traits that reflect, through consistent attitudes and behaviours, a sustained awareness of the interrelatedness between oneself and the rest of 'nature'*". Nisbet, Zelenski & Murphy (2008) consider a 'connection to 'nature'' as being feelings and thoughts that include an appreciative understanding of the interconnectedness of life, as well as experiences and behaviours that exhibit action and agency toward the environment. Similarly, Kals, Schumacher & Montada (1999) describe a connection to 'nature' as a pleasant feeling of inclination toward 'nature' such as feelings of oneness and love. Mayer & Frantz (2004, p. 503) describe a connection to 'nature' as "*feeling emotionally connected to the natural world"*, while Schultz (2002, p. 67) argues that a connection to 'nature' is when "*an individual includes 'nature' within his/her cognitive representation of self".*

Besides the lack of clarity within the international literature about what a 'connection to 'nature'' means theoretically, there has been little empirical research exploring, or categorising, the ways in which lay people conceptualize or enact their 'connections to 'nature''. In acknowledging this gap there have been recent calls for research to help clarify the definition of a 'connection to 'nature''. For example, Salazar, Monroe, Jordan, Ardoin & Beery (2021) held workshops with 22 environmental researchers and practitioners with shared interests in the topic of human-'nature' connection. Their aim was to collectively identify potential research opportunities for future exploration to advance understandings of human-'nature' connections. The top research priority identified was that the 'umbrella' term 'connection to 'nature'' needs to be further clarified and defined. Similarly, Abson *et al.,* (2017) argued the

importance of increasing empirical research on the potentially varying 'connections to 'nature'', in the context of how enhancing 'connections to 'nature'' can have benefit for sustainability outcomes.

Consequently, the aim of this study was to quantify and categorise the way that a group of lay individuals within Tāmaki Makaurau Auckland conceptualise their 'connections to 'nature''. At present, there has been no empirical research in Aotearoa New Zealand exploring these notions. Acquiring a better understanding of what people conceptualise as a 'connection to 'nature'' has potential to assist with developing more targeted approaches to help maintain or reconnect people to 'nature' in ways that resonate with individuals (Vining, Merrick & Kalnicky, 2008). Therefore, this study can generate new information that can provide insight for on-ground environmental management practice and policy in the Tāmaki Makaurau Auckland region.

3.3 METHODS

3.3.1 STUDY LOCATION

Tāmaki Makaurau Auckland, in the northern region of the North Island, is Aotearoa New Zealand's largest city. In a country that is renowned for its natural beauty, Tāmaki Makaurau Auckland faces considerable challenges associated with managing urban growth to accommodate an expanding population and maintaining important natural characteristics for which Aotearoa New Zealand is admired.

Tāmaki Makaurau Auckland is home to a population of approximately 1.6 million, accounting for 33.0% of Aotearoa New Zealand's population (StatisticsNZ, 2019). Aotearoa New Zealand is considered a Western country (World Population Review, 2020). However, the country's tangata whenua (original inhabitants) are Māori. Colonization took place around the 19th century, resulting in a strong European influence and customs that reflect those of the European settlers who emigrated to the country (Gibbons, 2002). Now, Tāmaki Makaurau Auckland is considered one of the most ethnically diverse cities in the world containing approximately 180 different ethnicities (Auckland Transport Events and Economic Development, 2017). The largest ethnicity is NZ European/Pākehā[17], representing 53.5% of the Tāmaki Makaurau Auckland region. This is followed by Asian (28.2%), Pacific peoples (15.5%), Māori (11.5%), MELAA[18] (2.3%) and other ethnicities (1.1%) (Statistics NZ, 2018).

Tāmaki Makaurau Auckland has a diverse natural landscape, ranging from coastlines, native forest, freshwater systems, volcanoes, estuaries, harbours, and islands. However, the region is facing environmental challenges due to increased population growth. This has resulted in pressures on the natural environment prompting freshwater quality issues, habitat degradation, species loss, biosecurity threats, soil degradation and urban run-off into the marine environment (Auckland Council, 2015, 2018).

[17] Pākehā is the term used for any non-Māori European person.

[18] Middle Eastern/Latin American/African.

3.3.2 DATA COLLECTION

Attempts to isolate, distil, and refine the 'connection to 'nature'' has only gained momentum since the turn of the millennium (Dutcher, Finley, Luloff & Buttolph, 2007). Research investigating 'connections to 'nature'' often uses quantitative measures. The most prominent include the Inclusion of Nature in Self by (Schultz, 2002), the Connectedness to Nature Scale by Mayer and Frantz (2004), the Nature Relatedness Scale by Nisbet *et al.*, (2008), and the New Ecological Paradigm by Dunlap & Van Liere (2014).

In this study acknowledgment is given to Wilson's (1984) argument that science can tend to reduce and oversimplify, condense, and abstract when considering the complexities behind the connections between humans and 'nature'. Therefore, a qualitative research approach encompassing both open-ended questions within an online survey and interviews was used to alleviate potential restrictions on respondents' capacity to reflect on, and articulate, their own personal 'connections to 'nature'' in contrast to the constraints involved with structured questions.

The study was conducted in 2019. As a first step in the study process, an online survey was employed, and thereafter interviews were conducted. To recruit respondents for the online survey, Facebook's advertising feature was used to target individuals residing in the Tāmaki Makaurau Auckland region who were over the age of 16. Respondents under 16 years of age were excluded from the study due to human ethics requirements. Using the Facebook advertising feature, an invitation to take part in the study appeared on individuals' Facebook news feeds at random. Invitations to Facebook community groups were also circulated through an anonymous account. The advertisement was revised several times to ensure it did not target 'pro-'nature'' people, instead asking people to *"have your say on 'nature'-related topics*". A small token of appreciation was offered to respondents who completed the survey by providing them the opportunity to go into a draw to win a $50.00 NZD shopping voucher. To further promote the research, posters were placed in public areas and the online survey was advertised through a mail drop to approximately 1,000 dwellings across the Tāmaki Makaurau Auckland region with specific focus on locations where there was less access to internet services. Respondents were also able to request a physical copy of the questionnaire with a free postage return envelope if they did not have internet access. The online survey was hosted by Qualtrics™. Respondents were first asked to read and agree with the respondent information sheet. This study was part of a larger research project, therefore the survey contained 37 questions, one of which was related to this study (as well as demographic questions to check that the sample was as representative as possible of the Tāmaki Makaurau Auckland population). Respondents were asked "*can you please explain in a few words what a 'connection to 'nature'' means to you*". Instructions emphasised that there were no right or wrong answers. Respondents were given a free response text box.

Further interviews took place after the online survey. These were carried out to compensate for the potential bias from the internet sample. To recruit respondents for this method, the lead researcher approached people in public places over multiple days and times of days such as beaches, parks, markets, and urban centres, deliberately targeting individuals who looked over 16 years of age. Once the interview commenced, the respondent was asked their age to ensure that they were over 16 (to meet human ethics requirements). The interview was conducted 'on the spot' and lasted approximately 20 minutes. The interview contained the same questions to the online survey. Respondents were given as much time as they needed to explain their responses.

These interviews were further supplemented with in depth, longer interviews to interrogate themes that arose from the online survey and previous interviews, in detail. In depth interviews allowed the interviewees to answer the questions at leisure and allowed the researcher to ask further questions where necessary to clarify some responses. To recruit respondents for these interviews, the Facebook advertising feature was used to advertise the research and those who were interested in partaking in the interview were asked to contact the lead researcher. A $20.00NZD cash voucher was also offered to encourage participation. In total, four individuals contacted the lead researcher and these interviews lasted approximately one hour and were conducted over Skype and telephone.

3.3.3 DATA ANALYSIS

Content analysis was used to code the free text data from the online survey and interviews and group it into categories and themes. Both a deductive approach (applying pre-existing codes that were generated through a pilot study and insight from Ives *et al.,* (2018)'s five identified 'connection to 'nature'' dimensions) and an inductive approach (developing codes during data analysis) were used to develop initial categories (Elo & Kyngas, 2008). Coding was completed by the lead researcher and reviewed by an independent colleague. Any discrepancies were dealt with by mutual agreement. The categories were then grouped into overarching themes (Table 3.2). The themes were non-mutually exclusive as respondents sometimes referenced more than one category/theme. Since this was an exploratory case study rather than a more focused exploration of demographic the results are not grouped or analysed against demographic values per se, but some trends that were identified are reported upon.

3.3.4 RESPONDENTS

In total, 990 respondents took part in the study. Of this, 956 non-random respondents took part via the online survey, a convenience sample of 30 respondents took part in the structured interviews, and a convenience sample of four respondents took part in the semi-structured interviews. Respondents either took part in the online survey or an interview, not both. Based on the large sample via the online survey from non-random respondents, a noted limitation is that there is a response bias toward those who have internet connections and who are active on social media as this was the main form of survey advertisement. Similarly, we acknowledge that it is difficult to avoid the fact that people who are more engaged/interested with 'nature' would have been more likely to take part in the survey and therefore there may be a level of sampling bias toward this group of people. If this had been a random sample from the Tāmaki Makaurau Auckland region, then this sample would be large enough to reject a hypothesis of zero correlation with a p-value <0.05 (significance level) and 90.0% power provided the true correlation between variables was at least $r= 0.11$. However, since this is a non-random and convenience sample, it is important that any conclusions about the population be treated with caution. Demographic data were collected to ensure that a broad range of age groups, ethnicities and genders were captured (Table 3.1). However, it is important to note that some ethnicities were over-represented (e.g., NZ European/Pākehā by 27.9%, Māori by 1.5%), and others were under-represented (e.g., Pacific Peoples by 9.5%, Asian by 18.7%, MELAA by 0.3%) (StatisticsNZ, 2018). The gender split of respondents was 47.7% male, 51.2% female and 0.5% non-binary, which is closely representative of the gender split in the region (StatisticsNZ,

2018). To ensure even coverage of genders, during the live Facebook advertisement of the online survey the targeting had to change to male only as initially there was a dominant response from females. Age of respondents ranged from 16 – 20 to 81 – 90. Age groups were not reflective of the age split associated with the Tāmaki Makaurau Auckland population with some age groups being over-represented in the research (age group 16 – 20 by 6.3%, age group 21 – 30 by 9.7%, age group 31 – 40 by 4.5%, age group 41 – 50% by 2.3%, age group 51 – 60 by 2.9%) and under-represented in others (age group 61 – 70 by 1.4%, age group 71 – 80 by 2.6%, age group 81 – 90 by 1.0%, age group 91 + by 1.4% as no respondents in this age group engaged in the research) (StatisticsNZ, 2018).

TABLE 3.1 DEMOGRAPHICS OF RESPONDENTS

Demographics	**Percentage of respondents**
Ethnicity	
NZ Pākehā/European	81.4
NZ Māori	13.0
Asian	9.5
Pacific Peoples	6.0
MELAA[19]	2.0
Other	1.3
Prefer not to disclose	0.6
No data	0.4
Total[20]	**114.3**
Age group	
16-20	12.9
21-30	25.8
31-40	19.3
41-50	15.6
51-60	15.2
61-70	7.3
71-80	2.6
81-90	0.4
91+	0.0
I prefer not to disclose	0.3
No data	0.5
Total	**100.0**
Gender	
Male	47.7
Female	51.2
Non-binary	0.5
No data	0.6
Total	**100.0**

3.3.5 ETHICS

This research followed the Massey University human ethics guidelines and procedure and was granted ethics approval before the online survey was circulated and before any interviews took place (Ethics Approval Number: 4000020091). The ethics was considered 'low-risk' as it involved human participants over the age of 16 years, did not target vulnerable groups and did not include questions that were likely to cause irrational behaviours or reactions.

[19] Middle Eastern, Latin American, African

[20] Total adds up to over 100.0% as respondents could select more than one ethnicity

3.4 RESULTS AND DISCUSSION

The result of the content analysis is outlined in Table 3.2. The results are not presented by data collection method (e.g., online survey or interview) as no differences were identified in responses based on how the respondent engaged in the study.

In total, nine themes of 'connections to 'nature'' were identified as being referenced by respondents. Table 3.2 shows the percentage of respondents that referenced each theme. Due to the subjectivity of coding, it is impossible to identify all potential codes within a set of open-ended responses. Accordingly, the most effective representation of themes within such a set of responses is to establish the percentage of respondents that referenced each theme as opposed to making any attempt to calculate percentages of overall comments (which would require an objective and consistent way of calculating the overall number of comments).

TABLE 3.2 CONCEPTUALIZATIONS OF 'CONNECTIONS TO 'NATURE''

Themes/Categories	**Percentage of respondents**
Theme 1 – Cognitive connection	52.9
Category 1.1. – Beliefs [pro-'nature']	24.8
Category 1.2. – Knowledge	21.0
Category 1.3. – Attitudes/Behaviours [toward 'nature']	7.1
Theme 2 – Affective/Emotional connection	49.6
Category 2.1. – Positive feelings toward/about 'nature'	34.4
Category 2.2. – Connectedness to something greater than the self	10.0
Category 2.3. – Emotional attachment	3.6
Category 2.4. – Connectedness to oneself	1.5
Theme 3 – Experiential/Physical connection	37.0
Category 3.1. – Experiences or exposure to 'nature'	32.0
Category 3.2. – Sensory experience (sound, smell)	4.9
Theme 4 – Philosophical connection	7.5
Category 4.1. – Oneness with 'nature'	4.3
Category 4.2. – Primal human state	1.3
Category 4.3. – Humans are 'nature'	1.1
Category 4.4. – 'Living'	0.7
Theme 5 – Spiritual connection	4.4
Category 5.1. – General 'spiritual connection'	2.8
Category 5.2. – Connecting with God	0.8
Category 5.3. – Having awareness of God's input / creation	0.4
Category 5.4. – Participating in spiritual practices	0.4
Theme 6 – Material connection	4.3
Category 6.1. – Utilizing 'nature''s services	3.2
Category 6.2. – Utilizing 'nature' as a recreational resource	1.0
Category 6.3. – Utilizing 'nature' as an economical resource	0.1
Theme 7 – Wellbeing connection	2.9
Theme 8 – Cultural connection	1.7
Theme 9 – Hippie term	0.3
Other	1.5

Respondents referenced on average to 1.6 themes, with five themes being the most referenced by any one respondent, and one being the least. This may reflect the fact that for some respondents' conceptualisations of 'connections to 'nature'' are multi-dimensional rather than being one-dimensional and therefore not something that can be assigned to one category or be tightly defined. This supports statements made by Ives *et al.*, (2018) who discussed that people may have conflicting 'connections to 'nature'' or that some 'connections to 'nature'' may

overlap with others (for example, experiential connections may shape emotional connections, etc.). However, due to the subjectivity of coding and it being impossible to identify all potential codes among open-ended responses, this finding is to be treated with caution. We therefore suggest that future research examines this in more detail using a different methodological approach specifically designed for testing this.

The results show that self-reported conceptualizations of a 'connection to 'nature'' within the study population ranged across three dominant themes – cognitive, affective, and experiential. This is consistent with the way 'connections to 'nature'' have tended to be conceptualized in other studies as highlighted by Ives *et al.,* (2018). As discussed earlier, in their meta-analysis of 475 publications Ives *et al.,* (2018) found that 'connections to 'nature'' are mostly identified as either cognitive connections (e.g., beliefs, knowledge, actions – such as in Schultz, Shriver, Tabanico & Khazian (2004)), affinitive connections (e.g., emotional - such as in Mayer & Frantz (2004)) or experiential/physical connections (e.g., experiences in 'nature' – such as in Rosa & Collado (2019)). Popular scales aimed at 'measuring' individuals 'connection to 'nature'' also tend to focus on the cognitive, affective, and experiential dimension of the connection (e.g., Connectedness to Nature Scale by Mayer & Frantz (2004) or the Nature Relatedness Scale by Nisbet *et al.,* (2008)). Given that our finding concurs with the level of emphasis on these 'connection to 'nature'' conceptualisations, we can endorse these scales as a way to effectively, albeit broadly, understand people's 'connections to 'nature''. However, given our wider findings we suggest that in some contexts just focusing on these mechanisms for quantifying 'connections to 'nature'' may exclude the other six conceptualisations identified in this study, and fail to acknowledge the multi-dimensional perspectives that can also be evident.

Viewing the components of individual themes can help to highlight the diversity of categories within our themes and provide some information that might be able to guide the process of facilitating 'connections to 'nature''. Firstly, within the cognitive 'connection to 'nature'' theme, a category was identified related to holding beliefs about 'nature'. A 'connection to 'nature'' in this category is conceptualised by one respondent as *"…a feeling that we have a duty to protect it*". This is aligned to Kellert's (1993) proposed 'moralistic' biophilic value which encompasses an ethical concern about 'nature'. Beliefs such as this which centre around a concern about 'nature' are likely to translate into pro-'nature' behaviours given that beliefs are effective indicators of future behaviours (Stern, Dietz, Abel, Guagnano & Kalof, 1999). Therefore, this is a useful finding from an environmental management perspective as it suggests that if environmental managers work on supporting people who hold conceptualisations such as this, there may be beneficial environmental sustainability outcomes.

The second conceptualisation within the cognitive connection theme is that a 'connection to 'nature'' involves 'knowledge about 'nature''. This is illustrated by a respondent who described a 'connection to 'nature'' as *"…having some knowledge of the living things in your environment, and regular observation of those living things, noticing changes, observing behaviours, being interested…".* This may suggest that 'connections to 'nature'' can be prompted through increasing environmental knowledge – for example through school or university curriculums, or an increase of environmental-based educational programmes for adults facilitated by either local governments or environmental organisations. From an environmental management perspective, this finding is particularly relevant as it has been suggested that knowledge about 'nature' translates into pro-environmental attitudes (Osman, Jusoh & Amlus, 2014; Liu, Teng & Han, 2020).

The third conceptualization within the cognitive theme is that a 'connection to 'nature'' is one's 'attitudes/behaviours toward 'nature''. This conceptualization is illustrated by a respondent who described that a 'connection to 'nature'' for them means "*planting trees and undertaking beach*

clean-ups". This finding is unexpected as the common pathway discussed in human-'nature'connection research is that an increased 'connection to 'nature'' leads to greater pro-'nature' attitudes/behaviours (Whitburn, Linklater & Abrahamse, 2019). This finding suggests that the pathway may be the other way round e.g., that pro-'nature' attitudes/behaviours lead to, or are perceived as, a 'connection to 'nature'' – or that these are mutually reinforcing. Furthermore, research suggests that determinants of pro-'nature' attitudes and behaviours are subjective knowledge about 'nature' (Lévy-Leboyer, Bonnes, Chase & Ferreira-Marques, 1996), interplays between socio-demographic factors, psychological factors, habits and contextual factors (Blankenberg & Alhusen, 2018), personal values, moral obligation, attitudes and subjective norms (Bhattacharyya, Biswas & Moyeen, 2020) and environmental concern (Balundė, Perlaviciute & Steg, 2019; Kautish & Sharma, 2019). However, this finding suggests that pro-'nature' attitudes and behaviours could be prompted by the perception that this is a way to 'connect with 'nature''. Furthermore, considering Ajzen (1991)'s theory of planned behaviour, this finding may suggest these respondents may engage in these behaviours into the future, resulting in positive outcomes for environmental sustainability.

The second dominant theme identified is the conceptualization that a 'connection to 'nature'' is affective. The theme circulates around modalities such as 'nature' evoking positive emotional responses or attachments. Highlighting this perspective is a respondent who stated that a 'connection to 'nature'' is [when it] "*evokes pleasure or emotion from a place or piece of 'nature', i.e., a nice walk, favourite beach, walk in the bush*". Another respondent also fits with this line of thinking by discussing that a connection to 'nature' is "*a feeling of unity, communion, with one's surroundings*". This finding may support ideas behind the biophilia hypothesis (Fromm, 1964; Wilson, 1984), which postulates that humans have a deep connection with 'nature' that results from their evolution in natural environments. This affinity is believed to remain in our modern psychology, and is further suggested as being the reason why humans have positive emotional responses to natural environments (over artificial, man-made environments) (Wilson, 1984; Kellert & Wilson, 1993; Barbiero, 2011). Other researchers such as Hinds & Sparks (2008); Barbiero (2011); Marczak & Sorokowski (2018); Berto *et al.,* (2018) have also argued that people displaying affective 'connections to 'nature'' supports the biophilia hypothesis. Investigating affective connections between humans and 'nature' is also argued to be a way to 'measure' biophilia (for example see Rice & Torquati (2013)). Furthermore, affective 'connections to 'nature'' align particularly with Kellert's (1993)'s 'humanistic' biophilic value which encompasses a strong emotional attachment and 'love' for 'nature'. Affective 'connections to 'nature'' have been shown to be a strong predictor of 'nature'-protective behaviour by Kals *et al.,* (1999); Müller, Kals & Pansa (2009); Marczak & Sorokowski (2018) and thus this finding is relevant for environmental management. However, if the biophilic hypothesis is accepted, it may be difficult to prompt affective 'connections to 'nature'' as they are considered innate.

As indicated above, 'nature' exposure may not be an essential component of feeling a 'connection to 'nature''. Nevertheless, the experiential/physical dimension emerged as the third key theme. Here a respondent discusses that a 'connection to 'nature'' for them is *"time spent in stillness and silence in a forest or a deserted beach".* Focusing on just sound, another respondent describes a connection to 'nature' as "*listening to the sounds 'nature' provides*". Several key researchers such as Pyle (1993); Mayer & Frantz (2004); Louv (2006); Keniger, Gaston, Irvine & Fuller (2013); Soga & Gaston (2016) who explore 'connections to 'nature'' focus on this physical and experiential dimension. Similarly, the experiential/physical connection to 'nature' is the conceptualization which is most focussed on when promoting the concept of 'connect with 'nature'' to the lay public. For example, the International Union for Conservation of 'nature''s #'nature'forall programme focuses on connecting people to 'nature' through spending time in 'nature'. Similarly, the United Nation's World Environment Day in 2017 had

the overarching theme of 'connecting people to 'nature'' promoting people to go outside. This finding supports the extensive empirical research that suggests that spending time outdoors/in 'nature' supports 'connections to 'nature'' (e.g., Kals, Schumacher & Montanda, 1999; Mayer, Frantz, Bruehlman-Senecal & Dolliver, 2008; Vining, Merrick & Price, 2008; Nisbet, Zelenski & Murphy, 2009; Zelensky & Nisbet, 2014; Prevot, Cheval, Raymond & Cosquer, 2018; Fretwell & Grieg, 2019). Therefore, for environmental management it would be effective to continue supporting experiential 'connections to 'nature'' through prompting individuals to spend more time outdoors, exposed to 'nature', or through bringing more 'nature' back into urban environments. For example, workstreams such as these are common in the study location – Aotearoa New Zealand, where spending time in 'nature' to 'connect' children to 'nature' is promoted by the national Department of Conservation (2011). Similarly, the current Environment Aotearoa (2019) report published by Aotearoa New Zealand's Ministry for the Environment refers to 'connections to 'nature'' as being experiences outdoors in 'nature'. Likewise, the region's local authority, Auckland Council, published an article to prompt people to go outdoors to 'connect with 'nature'' during the COVID19 pandemic[21] (Auckland Council, 2020). Despite this, considering our findings that suggest a 'connection to 'nature'' may be conceptualised as a cognitive or affinitive connection, instead of only focusing on physical/experiential 'connections to 'nature'', it may also be effective for organisations and environmental managers to also focus on prompting and/or supporting cognitive connections or affective 'connections to 'nature'' alongside experiential connections. In spite of this, there are numerous opportunities to further support experiential 'connections to 'nature'' through processes such as urban planning, for example ensuring easy accessibility to 'nature' for populations living in urban areas.

After the three dominant themes discussed above, there were also six smaller themes which were identified. Although referenced by less than 10.0% of the respondents each, they continue to provide interesting insight into the divergent conceptualisations of 'connections to 'nature'' (and potentially the population of Tāmaki Makaurau Auckland).

The conceptualization of a 'connection to 'nature'' being a philosophical connection was predominantly illustrated through comments from respondents that alluded to the 'oneness' between humans and 'nature'. For example, respondent nine describes a 'connection to 'nature'' to them as being "*when you feel deep in your soul that you are one with the surroundings of the natural environment…*". This conceptualization of a 'oneness' echoes that of Eastern religious philosophies such as Buddhism, Daoism and Hinduism which views humans and 'nature' as interconnected (Davis, Green & Reed, 2009).

The conceptualization that a 'connection to 'nature'' is a spiritual connection is illustrated by a respondent describing a 'connection to 'nature'' as being "*when you connect with 'nature' on a spiritual level…".* Each person may have their own definition of 'spiritual', thus the term 'spirituality' can range across various meanings, and we can only speculate specifically what respondents mean by this. For example, Sharma, Charak & Sharma (2009) discuss spirituality as meaning either feeling connected to the universe, experiencing transcendence, encountering limitless love, personal wholeness or having a relationship with the divine. The theoretical conceptualization of a 'connection to 'nature'' being a spiritual connection was not identified by Ives *et al.,* (2018). It is speculated that this is due to the complexity of the term 'spiritual' and again, that empirical research on conceptualisations of 'connection to 'nature'' are scarce.

[21] During the height of the COVID19 pandemic in March 2020, Aotearoa New Zealand's response was a public lockdown for a duration of four weeks where people were only able to leave their dwellings for exercise or collecting essential items.

An interesting avenue of future research could investigate specifically what is meant by connecting to 'nature' 'spiritually'.

The conceptualization that a 'connection to 'nature'' is a material connection is illustrated by a respondent who describes a connection to 'nature' as being when 'nature' "*provides food, air and entertainment*". This conceptualization most strongly encapsulates notions of anthropocentric values and the associated belief that environmental services and/or material values are human-centred and are there to meet human ends (Kellert, 1993; Burchett, 2014). Despite this, such conceptualizations that 'nature' provides life-supporting systems should logically be a powerful motivation for pro-environmental attitudes as humans can see the direct benefit on themselves (Kopnina, Washington, Taylor & Piccolo, 2018).

The final, and smallest three themes that were identified from respondents' conceptualizations of a 'connection to 'nature'' include health and wellbeing, cultural connection, and lastly, the results of this study identified a small percentage of people that believe a connection to 'nature' is just a 'hippie term'.

The conceptualization of a 'connection to 'nature'' being when 'nature' has positive influences on their general wellbeing ranged from emotional, spiritual to physical wellbeing. One respondent described the connection as "*when we recognise the positive influence 'nature' can have on us both physically and mentally*". This perception of a 'nature' connection was expected, given that it is well-known that connecting to 'nature' has positive influences on health and well-being (for example, see a recent review by Pritchard, Richardson, Sheffield & McEwan (2020)). From an environmental management perspective, this may be useful as people are more likely to care for 'nature' if they see a direct benefit for their general well-being (Kopnina *et al.,* 2018).

The cohort of respondents who reported a cultural connection was expected, given the Māori representation in the study (13.0% of all respondents). Māori make up 11.5% of the Tāmaki Makaurau Auckland population and were the first settlers of Aotearoa New Zealand. Mātauranga Māori, the Māori worldview of whakapapa encompasses ancestral lineage and how it links to ecosystems. Māori tend to understand the whole natural system through their whakapapa (Harmsworth & Awatere, 2013). A Māori respondent encompasses this perception in their response by stating that a connection to 'nature' is "*something that all Māori have*" or another Māori respondent describing connecting to 'nature' as being "*through my whakapapa – seeing how I fit or connect*". Although the aim of this study was to explore conceptualisations of 'connections to 'nature'' across the sample group without analysing whether conceptualisations changed across age groups, ethnicity or gender, an initial analysis found that a higher percentage of respondents identifying as Māori referenced the cultural connection theme. For example, through splitting responses into ethnicity segments, it was found that of all the codes assigned to responses given by those who identified as Māori, 6.1% fall under the 'cultural connection' theme. This is compared to codes assigned to responses given by other ethnicities, where on average 0.5% fall under the 'cultural connection' theme. This supports the theory of 'kincentric ecology' by Salmón (2000) that indigenous people's 'connection to 'nature'' is deeply rooted in their culture. However, as the ethnicity split in this sample group was not representative of the Tāmaki Makaurau Auckland ethnicity split, this finding is speculative only and it is recommended that future research explores this further using a representative sample of ethnicities from the Tāmaki Makaurau Auckland region.

The final theme identified was that a connection to 'nature' is a 'hippie term'. This conceptualisation is reflected in responses such as that by a respondent who described a connection to 'nature' as being "*a hippie stoner term to describe why they hate science*". It is only

possible to speculate as to what has prompted this conceptualization as no other information was provided by the few who answered the survey in this way, but to explore this view further would be an interesting avenue of future research. However, it is interesting to note that this conceptualisation was also highlighted by Fretwell & Greig (2019) who investigated self-reported 'connections to 'nature''. Similarly, to this study, they too identified a small group of people describing it as 'a hippie term/rubbish'.

Despite there being a gap in empirical research on personal conceptualizations of 'connections to 'nature'' the findings of this study generally concur with what little has been documented from research in this area. For example, Fretwell & Greig (2019) conducted a study which investigated the relationship between 'connections to 'nature'' and personal well-being and environmental awareness. In addition to using the Nature Relatedness Scale (Nisbet *et al.,* 2008) to measure their respondent's connection to 'nature', they also aimed to understand what their respondents thought a 'connection to 'nature'' was. In total, 156 of their respondents answered a free-text question seeking an explanation of what 'connection to 'nature'' meant to them. The authors identified 10 themes of responses. For example, like the findings of this study, were themes relating to cognitive connections, affective connections, experiential connections, spiritual connections, and health and wellbeing connections. Furthermore, Cosquer, Raymond & Prevot-Julliard (2012) undertook research aiming to understand whether participation in citizen-science programs influences individual's knowledge and beliefs about biodiversity. Through this, they identified various dimensions as to how respondents connected to 'nature' by the ways in which they talked about their experience in the programme. For example, the participants displayed six types of 'connections', including cognitive, affective, aesthetic, utilitarian, anthropomorphic and lastly substitutive.

There is however, one previous study was that was found to have inconsistent findings to those from this study. Tillmann, Button, Coen & Gilliland (2019) who undertook research exploring 'connection to 'nature'' conceptualizations amongst primary school aged children (6 – 9 years) using focus group discussions, had a dominant finding that a 'connection to 'nature'' was conceptualised by the child respondents as commonly being physical experiences in 'nature', instead of being cognitive or affective. This finding may highlight that conceptualisations may differ from children to adulthood and would be an interesting avenue for future research.

Overall, the findings of this study give credence to the fact that it is relevant to study conceptualizations empirically, across lay people, to understand the complexity and diversity of the notion in practice. Despite acknowledgment by Zylstra *et al.,* (2014); Ives *et al.,* (2018); Salazar *et al.,* (2021) that the term 'connection to 'nature'' lacks clear theoretical definition, very little empirical research has been undertaken to explore this notion from an environmental management perspective. The findings of this study suggest that conceptualisations of 'connections to 'nature'' may be diverse across population groups and that there are several less prominent conceptualisations that people hold beyond the three dominating themes identified. Therefore, future environmental management programmes aiming to 're-connect' people with 'nature' must acknowledge the varying ways that people may conceptualise their connections, otherwise, pre-defining the notion or assuming that the notion is consistent across a study population may be missing important dimensions to the human-'nature'connection and this could impact the effectiveness of 'reconnecting' people to 'nature' for sustainability outcomes. In Tāmaki Makaurau Auckland this could be done through taking insight from the findings of this study as a first step and consider ways in which cognitive, affective, and experiential 'connections to 'nature'' could be supported and facilitated such as through education programmes, urban planning processes, etc. However, as the sample group was not representative in terms of age or ethnicity, we would suggest that future research explores

whether conceptualisations change across different demographic categories. From there, multidisciplinary research could then focus on how the findings could be translated into specific practical management outcomes for both government agencies and non-government organisations.

Despite the divergent conceptualisations captured and the recommendation for environmental managers to consider these, the findings suggest conceptualisations of a 'connection to 'nature'' can be broadly allocated to three principal themes (cognitive, affective, and experiential). Therefore, utilizing scales which similarly measure 'connections to 'nature'' in these dimensions (e.g., Connectedness to Nature Scale by Mayer & Frantz (2004) or the Nature Relatedness Scale by Nisbet *et al.*, (2008)) may be sufficient more broadly to assess 'connections to 'nature''. Subsequently, the findings from this study support the use of these tools to broadly understand 'connections to 'nature'' in various contexts.

3.4.1 LIMITATIONS

One of the limitations of this study is that the conceptualizations of a person's 'connection to 'nature'' was treated as a static phenomenon, e.g., reflective of how that respondent reported thinking and feeling at the time of the study. We did not interrogate these conceptualizations further to explore whether the respondents' perception was influenced by any external factors and/or whether various 'connections to 'nature'' overlap with one another. As mentioned, on completion of data analysis, it was found that respondents referenced on average 1.6 themes, but due to the subjectivity of coding we treated this finding with caution and suggest that future research analyse whether respondent's conceptualisations overlap across multiple themes. Ives *et al.*, (2018) highlight that dimensions of 'connections to 'nature'' do not operate in isolation and use examples from other studies to illustrate this, for example, that experiential connections shape cognitive connections or that affective connections influence experiential connections. We agree this is possible and our analysis may support their assertation, however, these interactions need to be examined in more sociological depth.

Secondly, as this study was undertaken in a predominantly urban region, conceptualisations may differ in regions that are considered rural. Similarly, various cultural differences in other regions may produce entirely different findings.

Lastly, as mentioned, the aim of this study was to provide an overview as to how a sample of Tāmaki Makaurau Auckland's population collectively conceptualise a 'connection to 'nature''. This was to be able to inform wider community environmental management rather than more specific targeted approaches that look at individual sub-groups within the community. This means that we did not set out to specifically investigate whether, or how, conceptualizations differ across various age groups, ethnicities, or genders. We acknowledge that this could be seen as a limitation with the findings but investigating this would require a more targeted survey approach to ensure a representative sample. It would be interesting to know more about how demographic factors influence the conceptualisations particularly if environmental management policy and practice is to be more targeted at these groups, therefore this could be an area of further research that could be explored into the future.

3.5 CONCLUSION

Empirically exploring what the notion 'connection to 'nature'' means to people is under-researched and not fully considered in an environmental management context. This is a significant oversight, as it is difficult to achieve 're-connections' to 'nature' if there is little clarity on what the notion actually means. Furthermore, it has been argued that there is little coherence on what the notion 'connection to 'nature'' specifically entails theoretically (Zylstra *et al.,* 2014; Ives *et al.,* 2018). This study set out to address these gaps by empirically exploring conceptualisations of 'connections to 'nature'' with a set of respondents (n = 990) in Tāmaki Makaurau Auckland, Aotearoa New Zealand as a novel first step to inform environmental management. The findings suggest that 'connection to 'nature'' can be principally categorised into three dominant broad themes (cognitive, affective, and experiential); this is consistent with previous research. However, this study also demonstrates that lay conceptualizations of a 'connection to 'nature'' can also be multi-dimensional and are more diverse with responses ranging across nine themes - cognitive, affective, experiential, philosophical, spiritual, material, wellbeing, cultural and a 'hippie term', with sometimes multiple categories within themes, and with some people referring to more than one theme in their response.

Previous literature has found strong relationships between 'connections to 'nature'' and pro-'nature' attitudes and beliefs (e.g., as outlined in a meta-analysis by Whitburn *et al.,* (2019)). Therefore, being able to increase 'connections to 'nature'' within a given population is important if attitudes towards the environment are to change and degradation of 'nature' be prevented. However, to do this, environmental managers must understand what the potentially divergent 'connections to 'nature'' are across a population to ensure that the full spectra of connections are encompassed in environmental management projects and policy. For environmental management within Tāmaki Makaurau Auckland, this would ideally mean considering how best to re-connect people with 'nature' by recognising the nine themes and the multi-dimensionality between, and within themes. However, given that the findings of this study identify cognitive, affective, and experiential as dominant themes of conceptualisations of 'connections to 'nature'', this study lends support to the idea that in situations where there are limited resources, approaches could be targeted towards projects that focused on fostering and sustaining these conceptualisations as a priority. Although approaches that concentrate effort on just these connections may not capture all conceptualisations, they could potentially be able to deliver effective outcomes that benefit environmental management.

The findings of this study relate specifically to the city of Tāmaki Makaurau Auckland and its sample population and although it may be possible to extrapolate the results to other similar areas. We recommend future research that explores lay conceptualizations of a 'connection to 'nature'' in other regions and situations so that empirical understandings of the diversity and complexity of human-'nature'relationships continue to evolve in environmental management literature. To fully understand this phenomenon the research needs to be undertaken with input from expertise in disciplines such as sociology, psychology, anthropology, evolutionary psychology, and sustainability, with a focus on how the findings can be applied towards management practice.

The more we understand about human 'connections to 'nature'', the better environmental management programmes can be at reconnecting people with 'nature'. Being able to recognise and encompass the diverse ways in which people connect with 'nature' allows environmental managers to take an important step towards more effective targeting of programmes to lead to more positive environmental outcomes.

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CHAPTER 4 - PATHWAYS AND BARRIERS TO 'CONNECTIONS TO NATURE'

This chapter is an article that is accepted subject to its second review with the *Australasian Journal of Environmental Management*. This chapter includes the most recent version of the article. Minor formatting and grammatical changes have been made to ensure consistency across the thesis.

The article is titled:

Self-Reported Pathways and Barriers to 'Connections to Nature'': A Case Study in Tāmaki Makaurau Auckland, Aotearoa New Zealand

Authors: Lissy Fehnker, Diane Pearson and Peter J. Howland. The completed statement of contribution form for this article, indicating the percentage of each authors contribution is in Appendix 2.

4.1 ABSTRACT

Empirical research exploring what increases an individual's connection to 'nature' is growing, however research seeking respondents to self-report what they feel acts as a barrier or pathway to their connection to 'nature' is scarce. Previous empirical literature suggests a link between 'connections to 'nature'' and pro-'nature' actions. Therefore, understanding what acts as a barrier or pathway to people's connection to 'nature' can provide insight as to what may promote, or hinder, pro-'nature' actions. Consequently, a cross-sectional qualitative study was undertaken with 976 respondents from Tāmaki Makaurau Auckland, Aotearoa New Zealand to explore self-reported perceptions of what acts as a barrier or pathway towards their 'connections to 'nature''. The findings suggest that respondents perceive modern society modalities such as 'life takes over', 'urban life' etc., as being barriers to their 'connections to 'nature''. Being exposed to 'nature', was perceived as a pathway to prompting, and/or sustaining their 'connections to 'nature''. These learnings highlight the benefit of exploring perceived influences on 'connections to 'nature'' and the findings can be applied to improve the human-'nature' connection and therefore potentially increase pro-'nature' actions. The findings also provide practical actions for environmental managers by advising as to how the human-'nature' connection can be supported through practice and planning.

4.2 INTRODUCTION

The attitudes and behavioural actions that humans exhibit both individually and collectively can be attributed to being one of the primary causes behind the degradation of the natural world. Given that the goals of environmental management are to understand the complex mechanisms that lead to environmental degradation and to work to halt and reverse the deterioration of the natural world, it is beneficial to understand the key drivers behind these attitudes and actions.

Empirical literature has strongly suggested a link between feelings of connection with 'nature' and pro-'nature' actions (for a full review see a meta-analysis conducted by Whitburn, Linklater

& Abrahamse (2019)). Therefore, it is useful to further understand what is perceived by individuals to either prompt and/or sustain their feelings of connection with 'nature', or what is perceived as a barrier. By deepening these understandings, environmental managers can work toward designing interventions to enhance human-'nature' connections and thus increase people's likelihood to engage in pro-'nature' actions (Richardson *et al.,* 2020).

Exploring the human-'nature' connection is not new in empirical research which spans across numerous disciplines such as psychology, sociology, or geography (Ives *et al.,* 2018). Given the link between increased feelings of connection with 'nature' and pro-'nature' actions (Whitburn *et al.,* 2019) and improved health and wellbeing (Capaldi, Dopko & Zelenski, 2014; Franco, Shanahan & Fuller, 2017; Martin *et al.,* 2020; Pritchard, Richardson, Sheffield & McEwan, 2020), research seeking to understand what activities can increase feelings of connection to 'nature' to achieve environmental sustainability and health and wellbeing outcomes has significantly increased. Most commonly this is done by deliberately engaging respondents in certain interventions such as conservation education programmes, exposing them to natural environments/scenes, and then testing whether their feelings of connection to 'nature' changes, and if so, to what degree (for example see Vining, Merrick & Kalnicky, 2008; Mayer, Frantz, Bruehlman-Senecal & Dolliver, 2008; Cosquer, Raymond & Prevot-Julliard, 2012; Liefländer, Fröhlich, Bogner & Schultz, 2013; Kals, Schumacher & Montada, 2016; Fretwell & Greig, 2019; Nisbet, Zelenski & Grandpierre, 2019)). However, on the contrary, empirical research seeking to understand what decreases people's connection to 'nature' or acts as a barrier to people's feeling of connection to 'nature' is scarce. Despite this, scholars have long speculated that the increase in urbanisation and modern ways of living has acted as a barrier to people's feeling of connection to 'nature' (for example see Orr, 1993; Shepard, 1993; Metzner, 1993; Pyle, 1993; Roszak, Gomes & Kanner, 1995). Tools used to measure feelings of connection with 'nature' are predominantly scales that have been developed from the psychological discipline such as the Nature Relatedness Scale (Nisbet, Zelenski, & Murphy, 2008), Connectedness to Nature Scale (Mayer & Frantz, 2004), Inclusion of Nature in Self scale (Schultz, 2002) and the Emotional Affinity toward 'nature' scale (Kals, Schumacher, & Montada, 1999).

Despite this increased emphasis over the past decade seeking to test what can increase people's feelings of connection to 'nature' through the use of specific interventions, there is a gap in research which seeks respondents to reflect on, and then report, the perceived factors that they feel act as a pathway to their connection to 'nature' (e.g., what prompts, increases or sustains their connection), or those which are viewed as barriers to their connection to 'nature'. This gap has been highlighted by authors such as Lumber *et al.,* (2017); Ives *et al.,* (2018); Richardson *et al.,* (2020); Salazar, Monroe, Jordan, Ardoin & Beery (2021) and thus all call for greater emphasis to understand these notions to increase knowledge on the dynamics and complexity of human-'nature' connections. The current gap in research could be considered problematic, as there may be pathways or barriers that are perceived by people of which researchers are not aware of and thus mean that opportunities for potential interventions to improve the human-'nature' connection and subsequent pro-'nature' actions or health and wellbeing benefits are missed. For example, Lumber *et al.,* (2017) call attention to the fact that 'connections to 'nature'' are extremely subjective and are formed through numerous experiences, thus making the development of specific pathways which increase/prompt/sustain 'connections to 'nature'' difficult. Therefore, there is significant merit in undertaking empirical research which allows for respondents to self-report their subjective thoughts, feelings and beliefs relating to what are perceived as being pathways or barriers to their connection to 'nature'. Increasing this knowledge can help environmental managers understand what tangible actions they can promote to encourage stronger 'connections to 'nature'' which could result in pro-'nature'

actions (Lumber *et al.,* 2017; Ives *et al.,* 2018; Richardson *et al.,* 2020; Salazar, Monroe, Jordan, Ardoin, & Beery, 2021).

Consequently, the key focus of the study outlined in this paper is to address the gap in empirical literature from an environmental management perspective and translate the findings into practical management actions. We use a sample group of 976 respondents from the Tāmaki Makaurau Auckland population to provide an important, albeit partial, empirical insight into self-reported perceived influences on personal 'connections to 'nature'' with specific focus on what are perceived as pathways or barriers to 'connections to 'nature''. Through providing this insight, we propose recommendations for future environmental management initiatives spanning across practice and planning, with particular emphasis on the study location – Tāmaki Makaurau Auckland, Aotearoa New Zealand. The study is relevant in the Tāmaki Makaurau Auckland context, as understanding the complex and dynamic human-'nature' connections, is urgent in this region as the natural environment continues to face challenges due to continuing population growth (Auckland Council, 2018a).

4.3 METHODS

4.3.1 ETHICS

This research followed the Massey University human ethics guidelines and procedure and was granted ethics approval before the online survey was circulated and before any interviews took place (Ethics Approval Number: 4000020091). The ethics was considered 'low-risk' as it involved human participants over the age of 16 years, did not target vulnerable groups and did not include questions that were likely to cause irrational behaviours or reactions.

4.3.2 STUDY LOCATION

Tāmaki Makaurau Auckland is a city on the North Island of Aotearoa New Zealand. The country's tangata whenua (original people of the land) are Māori. Foundational colonization took place in the mid-late 19th century, and this has resulted in a strong European (particularly British) influence in the country since then (Gibbons, 2002). The Tāmaki Makaurau Auckland region contains the largest urban area of the country and is home to a population of approximately 1.6 million people. This accounts for 33.0% of Aotearoa New Zealand's population (StatisticsNZ, 2019). The rate of population growth in Tāmaki Makaurau Auckland is increasing rapidly and is driven by international and domestic migration and urbanization. A projected 70.0% of all further development in the region is expected to occur in the urban municipality of Tāmaki Makaurau Auckland over the next 50 years (Auckland Council, 2018b). This future development puts increasing pressure on the local natural environment resulting in issues relating to freshwater quality, habitat degradation, species loss, biosecurity threats, soil degradation and urban run-off into the marine environment (Auckland Council, 2015, 2018b). Tāmaki Makaurau Auckland is culturally diverse but 53.5% of the population identify as NZ European/Pākehā[22], the next highest ethnicity is Asian at 28.2%, followed by 15.5 % Pacific peoples and 11.5% Māori (Statistics NZ, 2018).

[22] Pākehā is a Māori term for New Zealanders of European descent or any non-Māori New Zealander.

4.3.3 DESIGN AND PROCEDURE

Online surveys and interviews were undertaken to explore the self-reported perceptions of what are considered pathways or barriers to 'connections to 'nature''. As a first step, the online survey was employed and thereafter interviews were conducted. To recruit respondents for the online survey the advertising feature in Facebook was utilized to target individuals residing in the Tāmaki Makaurau Auckland region who were over the age of 16. Using the Facebook advertising feature, an invitation to partake in the research appeared on individuals' Facebook news feeds at random. Invitations to Facebook community groups were circulated through an anonymous account. The advertisement was revised several times to ensure it did not just target 'pro-'nature'' people. However, we acknowledge that it is difficult to avoid the fact that people who are more engaged with 'nature' would have been more likely to partake in the survey and therefore there may be a level of sampling bias toward this group of people. To avoid this the advertisement tried to attract people by asking them to "*have your say on 'nature'-related topics*".

The opportunity to take part in a draw to win a $50.00NZD shopping voucher was offered to maximize response rate. The study was also promoted by advertisement posters being placed strategically in public areas and through a mail drop of promotional material to approximately 1,000 dwellings with specific focus on areas of Tāmaki Makaurau Auckland which had low internet uptake. Respondents were also able to request a physical copy of the survey with a free postage return envelope in the situation that they did not have internet access. The online survey was hosted by Qualtrics™ and respondents were first asked to read and agree with the respondent information sheet. As this study was part of a larger research project, the survey contained 37 questions, of which four were related to this study (as well as demographic questions).

Further individual interviews were conducted after the online survey. These interviews had the same questions as the online survey but were carried out to ensure that the responses received through the online survey were representative of any person selected at random, and to compensate for the potential sampling bias from the heavy online input to produce data which is as robust as possible (Ponto, 2015). Potential respondents for these interviews were approached in public places e.g., beaches, parks, and markets in the Tāmaki Makaurau Auckland area. Interviews were conducted on the spot and lasted approximately 20-minutes. When initially approaching potential participants, a conscious effort was made to approach only people who looked over the age of 16 years due to human ethics requirements that prevent the questioning of minors. Once they agreed to participate in the research, participants were asked their age to further ensure that they were over 16 years of age. Respondents were also asked if they lived in Tāmaki Makaurau Auckland prior to commencing the interview as the aim was to sample residents only.

These interviews were supplemented further by in-depth, longer interviews. Participants for these interviews were sought via a Facebook advertising post and were given a $20.00NZD cash voucher for their time. The interviews lasted approximately one hour. The aim of these interviews was to ensure that even if a participant was interviewed in their own time in their own home (the interviews were conducted over Skype or telephone) and given as much time as required to respond and to discuss their perspectives, no other dominating themes would emerge based on this different context. Therefore, these interviews were not conducted to draw new conclusions, but to ensure the data was as robust as possible.

All interviews were recorded and transcribed by the lead researcher. Informed consent by respondents was provided by reading and agreeing to the participant information sheet and consent form (online survey) or by signing the consent form (interviews).

4.3.4 RESPONDENTS

In total, 976 respondents took part in the study via the online survey (n = 942), structured interviews (n = 30), semi-structured interviews (n = 4). Respondents either took part in the online survey or interviews, not both. This sample of 976 respondents would be big enough to reject a hypothesis of zero correlation with a p-value of <0.05 significance level with a power of 90.0 percent provided the true correlation between variables was at least 0.11 had this study been a random sample from the Tāmaki Makaurau Auckland region. As this study was a convenience sample of volunteers versus random, it is important to acknowledge that this is an exploratory study only.

Respondents represented a range of ethnicities, age groups and genders (Table 4.1). Some ethnicities were over-represented (e.g., NZ European/Pākehā by 27.9%, Māori by 1.5%), and others were under-represented (e.g., Pacific Peoples by 9.5%, Asian by 18.7%, MELAA by 0.3%) compared to the regional ethnicity split (StatisticsNZ, 2018). The gender split of respondents was 47.7% male, 51.2% female and 0.5% non-binary, which is closely representative of the gender makeup of the region (Statistics NZ, 2018). During the live Facebook advertisement of the online survey the targeting had to change to male only as we initially had a dominating response from females. Age of respondents ranged from the youngest cohort being 16 – 20 and the oldest cohort being 81 – 90. The most common age group who engaged in the research were those between 21 – 30 (25.8%), followed by those in age group 31 – 40 (19.3%), age group 41 – 50 (15.6%), age group 51 – 60 (15.2%), age group 16 – 20 (12.9%), age group 61 – 70 (7.3%), age group 71 – 80 (2.6%), and lastly age group 81 – 90 (0.4%). Three people preferred not to disclose their age group (0.3%). Five respondents have no data associated with them as the four semi-structured interviews were not asked for their age group, and one person who engaged with the online survey provided no response. Age groups were not reflective of the Tāmaki Makaurau Auckland (Statistics NZ, 2018).

TABLE 4.1 DEMOGRAPHICS OF RESPONDENTS

Demographics	**Percentage of respondents**
Ethnicity	
NZ Pākehā/European	81.4
NZ Māori	13.0
Asian	9.5
Pacific Peoples	6.0
MELAA[23]	2.0
Other	1.3
Prefer not to disclose	0.6
No data	0.4
Total[24]	**114.3**
Age group	
16-20	12.9
21-30	25.8
31-40	19.3

[23] Middle Eastern, Latin American, African

[24] Total adds up to over 100.0% as respondents could select more than one ethnicity

41-50	15.6
51-60	15.2
61-70	7.3
71-80	2.6
81-90	0.4
91+	0.0
I prefer not to disclose	0.3
No data	0.5
Total	**100.0**
Gender	
Male	47.7
Female	51.2
Non-binary	0.5
No data	0.6
Total	**100.0**

Given the high response rate to this research by those who engaged in an online capacity and undertook the Qualtrics™ based survey, a limitation that should be noted is that there is a level of response bias towards individuals who have access to the internet and actively engage in social media.

4.3.5 SELF-REPORT MEASURES

In the online survey and interviews, respondents were asked to select 'yes', 'no', 'sometimes' as to whether they felt they had a connection to 'nature'. To identify the perceived pathways or barriers to 'connections to 'nature'', respondents were asked to describe why (respondents who selected 'yes' (n = 659)), or why not (respondents who selected 'no' (n = 24)), or why they only sometimes (respondents who selected 'sometimes' (n = 212)), they had the connection to 'nature' described. Respondents who said they were 'unsure' (n = 81) were given the opportunity to add comments. Respondents were given a free-text box to write their answer or were given as much time needed to respond in the interviews. The survey reiterated several times that there was no right or wrong answer and was seeking the respondents' subjective thoughts, beliefs, and feelings.

4.3.6 DATA ANALYSIS

The responses to the online survey and transcribed responses to the interviews were exported to Microsoft Excel. To perform data analysis, the processes of content analysis was employed (Berelson, 1952) which is a technique which has become prevalent within the field of environmental management (Cox, 2015). Content analysis allows for research to generate tangible outcomes to develop management actions (Leedy & Ormrod, 2011). This is done through analysing qualitative data and transforming it into quantitative data (Cox, 2015) by following a coding process to generate categories, with the aim of 'describing the meaning' of the data to generate theoretical relationships (Merriam, 2009; Roudgarmi, 2011). Coding was subsequently reviewed by an independent colleague. Any discrepancies were addressed through mutual agreement. The categories were then grouped into overarching themes (Table 4.2 and Table 4.3).

4.4 RESULTS

The results of the content analysis are outlined in both Table 4.2 and Table 4.3. Due to the subjectivity of coding, it is impossible to identify all potential codes within a set of open-ended responses. Accordingly, the most effective representation of themes within such a set of responses is to establish the percentage of respondents that referenced each theme. This is opposed to any attempt to calculate percentages of overall comments (which would require an objective and absolute measurement of all comments). For example, the frequencies (%) on both Table 4.2 and Table 4.3 were calculated based on the number of respondents who selected either 'yes', 'no', 'sometimes' or 'unsure' and provided comments. Therefore, for Table 4.2, a total of 952 respondents selected either 'yes', 'sometimes', or 'unsure' and provided comments on factors that are perceived pathways to 'connections to 'nature'' (e.g., factors that sustain and/or prompt their connection), and in Table 4.3 a total of 317 respondents selected 'no', 'sometimes' or 'unsure' and provided comments on factors that are perceived to be barriers to 'connections to 'nature''. Themes were not mutually exclusive, as some responses referenced multiple categories. For example, if a respondent who discussed that being outside in 'nature' prompts their connection to 'nature' and that the positive emotions 'nature' evokes for them in that setting also increases their connection to 'nature', their response would be included in both theme one and theme three in Table 4.2.

Firstly, our findings suggest that there are 14 perceived pathways which prompt/sustain 'connections to 'nature'' (Table 4.2). The most common pathway reported by respondents was exposure to 'nature' or being outdoors (38.4%). This was followed by the perception that cognitive influences likewise prompted and/or sustained personal 'connections to 'nature'' (23.1%). This included (pro-environmental) beliefs, knowledge (e.g., having knowledge about aspects of 'nature' such as flora/fauna, or weather systems etc.,) or attitudes (e.g., pro-environmental attitudes). Next, respondents reported that positive affections, such as 'nature' engendering positive emotional states, prompted and/or sustained personal 'connections to 'nature'' (18.9%). Lastly, respondents reported that health and wellbeing benefits arising from interacting with 'nature' prompted and/or sustained personal 'connections to 'nature'' (18.8%). Lesser themes reported were historical reasons (e.g., how they were raised, where they grew up), work/study reasons (e.g., they work/study in an environmental related field), philosophical ideas about human's place in 'nature' (e.g., evolutionary instincts), enhancement of spirituality, life supporting (e.g., 'nature' supports human life), material/service dependence (e.g., dependence on services such as air, food, etc.,), culture (e.g., part of respondents culture is to be connected to 'nature'), influence of other sources (e.g., how other members in society connect with 'nature'), owning a pet and psychedelic drug use.

Secondly, our findings suggest four perceived barriers to 'connections to 'nature'' (Table 4.3). Most commonly respondents reported modern societal factors as being a dominant barrier to their personal 'connections to 'nature'' (41.3%). The term 'modern societal factors' is used to describe notions that respondents' referred to as 'modern demands', 'time pressures', 'residence constraints', 'modern lifestyle pressures', 'urban life', or 'life takes over'.

Five smaller perceived barriers were identified by less than 1.0% of respondents respectively, including the perception that the respondents were not 'hippies', age (e.g., not young enough), that 'nature' evokes a negative emotion, professional reasons, or that lack of knowledge about 'nature' acts as a barrier to connect with it.

Aside from the reported pathways or barriers discussed above, an interesting finding emerged that a cohort of respondents indicated they their 'connections to 'nature'' were unstable, for

example that a connection to 'nature' can change based on context or time (8.3% of all respondents who engaged in the study).

TABLE 4.2 PERCEIVED PATHWAYS THAT SUSTAIN OR PROMPT 'CONNECTIONS TO 'NATURE''

Theme	Frequency (%)
Theme 1 – Exposure to, or experience in, 'nature'	38.4
Theme 2 – Increasing attitudes, beliefs, or knowledge about 'nature'	23.1
Theme 3 – Experiencing increased positive emotions from 'nature'[25]	18.9
Theme 4 – Experiencing health and wellbeing benefits from/by 'nature'[26]	18.8
Theme 5 – Historical reasons	8.6
Theme 6 – Work or study reasons	4.4
Theme 7 – Ability of 'nature' to enhance spirituality	3.4
Theme 8 – Having philosophical ideas about human's place in 'nature'	2.5
Theme 9 – Material and/or service dependence on 'nature'	1.7
Theme 10 – Recognising the life supporting capacity of 'nature'	1.7
Theme 11 – Culture	1.5
Theme 12 – External influences	0.7
Theme 13 – Owning a pet	0.7
Theme 14 – Taking psychedelic drugs	0.3

TABLE 4.3 PERCEIVED BARRIERS TO 'CONNECTIONS TO 'NATURE''

Theme	Frequency (%)
Theme 1 – Modern societal factors	41.3
Theme 2 – 'nature' evokes a negative emotion	0.9
Theme 3 – The belief that 'I'm not a 'hippie''	0.9
Theme 4 – Lack of knowledge about 'nature'	0.6
Theme 5 – Professional reasons	0.3
Theme 6 – Being too old	0.3

4.5 DISCUSSION

The findings from this study have identified 14 self-reported pathways to 'connections to 'nature'' and six reported barriers to 'connections to 'nature''. These insights can be used to support interventions that environmental managers could design and implement to strengthen people's 'connections to 'nature'' and thus engender greater pro-'nature' actions across the population.

Firstly, our study suggests that modern societal factors are the most perceived barriers to 'connections to 'nature''. This therefore provides a valuable insight into the impact of 21st century living and people's relationships with 'nature' and provides evidence to back up

[25] NB: Respondents who referenced this theme did not necessary reference having to be in 'nature'/exposed to 'nature' for the increased emotions to occur. For example, some respondents referenced feeling increased positive emotions about 'nature' when watching a 'nature' documentary.

[26] NB: Like the above, it was not necessary for all respondents to be in 'nature'/exposed to 'nature' for the health and wellbeing benefits to occur.

theoretical discussions by scholars such as Orr, 1993; Shepard, 1993; Metzner, 1993; Pyle, 1993; Roszak *et al.,* 1995 who discuss the implications of modern societal factors on individuals' 'connections to 'nature'' stemming from the rise in consumerism, technology, globalisation, and the quickening pace of life.

Within this theme, respondents gave indeterminate responses regarding their perceived barriers to connection to 'nature' and referred to (including, but not limited to) 'modern demands', 'time pressures', 'residence constraints', 'modern lifestyle pressures', 'urban life', or 'life takes over'. Although we can only speculate what is meant by these terms, the idea of general 'modern living' and how this may act as a barrier to a personal connection to 'nature' has been theorised in cross-disciplinary literature previously. For example, Keniger, Gaston, Irvine & Fuller (2013) discuss how throughout pre-industrial/pre-capitalist history, humans immediately relied on, and thus had to directly engage with, non-human 'nature' phenomena for their sustenance. This reliance and constant engagement generated and sustained a range of intimate and constant connections with 'nature'. However, modern society has effectively freed, or distanced, many communities and individuals from such direct 'nature' experiences premised on this reliance and therefore fundamentally shifted the way in which people connect with 'nature'. From consistently working, being in, and thus directly engaging and consuming perceived natural phenomena, many are now only seeking 'nature' interactions episodically and for recreational purposes. The contemporary rise of technology and its capabilities, consumerism, overpopulation, economic hardship, and compulsions to live and work in highly urbanised environments, have generally resulted in diminished perceived connections with 'nature' in the developed world (Pyle, 1993). Through this development both technologically and culturally, historical ways of living, such as living off the land and relying on locally produced goods, have especially become effectively redundant for the majority of people in developed nations (Seppelt & Cumming, 2016). This technological and cultural development that we now see in the modern society has undoubtedly provided a basis for economic development. However, it is argued that this technological and cultural development has pushed away these historical ways of living, removing us from our intricate connection with 'nature' (Seppelt & Cumming, 2016).

Despite Aotearoa New Zealand ranking highly regarding several wellbeing indicators on the OECD Better Life Index, the indicator associated with work-life balance scored below average – for example of all 40 OECD countries, Aotearoa New Zealand ranks 29th (OECD, 2020). Furthermore, the population of Aotearoa New Zealand have been shown to work longer hours on average per capita compared to other OECD countries – for example 15.0% of the population works over 50 hours per week compared to the average of 11.0% (OECD, 2020). Stress associated with work-life is also thought to be further increasing as measured through anxiety levels amongst employees as part of the annual Workplace Wellness report by Business NZ (2019). This being the case it is perhaps only to be expected that respondents felt that specific modern societal modalities such as 'life takes over' act as barriers to their 'connections to 'nature''. Furthermore, given the recent speed and intensity of urbanization of the Tāmaki Makaurau Auckland region (Auckland Council, 2018a, b; Silva, 2018) it is not surprising that Tāmaki Makaurau Auckland based respondents feel that 'urban life' or 'residence constraints' (e.g., living too far away from 'nature') contribute to reducing their connection to 'nature' and this is likely to increase given the future development trends. For example, over the next 30 years, it is expected that 40.0% of future development will occur outside the current urban boundary, meaning that around 15,000 hectares of rural land will be converted to urban (Auckland Council, 2018b). Furthermore, in response to the National Policy Statement – Urban Development, developed by central Government to address the housing crisis in

Aotearoa New Zealand (Ministry for Social Development, 2021), Auckland Council will be allowing greater intensification of housing in the urban area.

In terms of understanding what are perceived as pathways to 'connections to 'nature'' (e.g., prompting, increasing, or sustaining connections), the findings identified 14 variables and/or factors as reported by the respondents. We treat these as 'pathways' to 'connections to 'nature'', as aligned with discussions by Lumber *et al.,* (2017 pp. 2) who define pathways as being the "*factors [and different indicators] which facilitate increased connection to 'nature'*".

Firstly, the findings suggest that exposure to 'nature' is a key pathway to 'connections to 'nature''. This empirical finding compliments research which has shown that exposure to 'nature' increases an individual's connection to 'nature' through planned interventions such as deliberately engaging respondents in activities outdoors (e.g., Mayer *et al.,* 2008; Rosa, Profice & Collado, 2018; Nisbet *et al.,* 2019; Fretwell & Greig, 2019), as our findings suggest that individuals similarly recognise and observe that interacting with 'nature' increases their connection to 'nature'. This highlights the importance of ensuring accessibility to 'nature' for people as a pathway to prompt, increase or sustain their 'connections to 'nature'' and therefore potentially to help engender their pro-'nature' actions. The importance of exposure to 'nature' is recognised by the United Nations, whose report *Harmony with 'nature'* (2013) discusses the influence that physical distance from 'nature', through situations like urbanisation, can have on an individual's overall connection to 'nature' due to lack of exposure to it. In a local context, the finding is worrying as Tāmaki Makaurau Auckland is considered to have the largest urban area in Aotearoa New Zealand with a further 40.0% of all future development occurring outside existing urban boundaries resulting in urban expansion being the main trend for the region over the next 50 years (Auckland Council, 2018; Silva, 2018). Alongside this, Khajehzadeh & Vale (2016) who explored time-use in various settings found that the population of Aotearoa New Zealand spend slightly more time at home indoors than other countries studied, spending 68.9% of the day indoors (compared to the average of 64.9%). Thus, there are potential implications for future environmental sustainability as ongoing urbanization of the Tāmaki Makaurau Auckland isthmus area will continuously result in less opportunities for people to spend time in, or be exposed to, 'nature' potentially implicating their 'connections to 'nature''. The result being that based on the strongly suggested link between 'connections to 'nature'' and pro-'nature' actions (Whitburn *et al.,* 2019), there may be a decrease in the population engaging in pro-'nature' actions.

The second pathway reported by respondents was cognitive aspects (including having increased knowledge about 'nature', beliefs about 'nature' and attitudes toward 'nature'), which is consistent with a study by Liefländer *et al.,* (2013). In this study they investigated how specific environmental education can increase experiences and perceptions of connectedness across a range of age cohorts and found that increased levels of knowledge increased feelings of personal 'connections to 'nature''. This could mean that increasing general environmental education amongst the lay population, either being through government agencies or organisations, could further support personal 'connections to 'nature''.

The third pathway reported by respondents was the increased positive emotions derived from 'nature' (either physically, or in other ways e.g., watching 'nature' on TV). This finding is consistent with the range of literature that highlights that feeling happy results in 'connections to 'nature'' (and similarly visa-versa) (for a full review see Capaldi *et al.,* (2014)). This was closely followed by the cohort of respondents who discuss the health and wellbeing benefits experiences when connecting to 'nature' as being what prompts and sustains their personal 'connections to 'nature''. Despite extensive literature theoretically and empirically exploring the pathway of

'connections to 'nature'' and subsequent health and wellbeing benefits (for a recent meta-analysis see Twohig-Bennett & Jones (2018)), there is little research that has explored the pathway of health and wellbeing benefits derived from 'nature' connections subsequently prompting and sustaining personal 'connections to 'nature''. Despite this, these two findings elaborate the benefit of environmental management practitioners and health practitioners and/or psychologists working closely. The findings may suggest that supporting individuals' personal 'connections to 'nature'' has benefit for both disciplines.

Considering the key findings from our study that the most reported pathway to 'connections to 'nature'' is exposure to/experience in 'nature', but that a key barrier is modern societal factors, the interest lies in facilitating deliberate active close contact with 'nature' in a range of contexts so that people are exposed to 'nature' as much as possible even when pre-occupied with aspects of modern society living such as living in urban areas, limited time for recreation, consistent interaction with technology, etc. Environmental managers could therefore work alongside other disciplines such as recreation, outdoor education, etc., to design programmes such as outdoor workshops or retreat activities, ecotourism, environmental festivals, or community gardening. Other common practices which have been empirically shown to increase feelings of connection to 'nature' include forest bathing, which has become popular in Japan (Miyazaki, 2018), urban foraging (Martin, 2018), or ecological restoration projects (Cosquer *et al.,* 2012). On a practical level this would be easily achievable and would require limited resourcing. For example, active participation in activities such as these could be prompted through Auckland Council and environmental organisations maintaining a community calendar of annual events and working alongside businesses to commit to including activities such as these within work hours for employees. Further, environmental managers in the region could undertake further research as to which activities are most effective at prompting 'connections to 'nature'' and work with Auckland Council, environmental organisations, and businesses to implement such activities.

To ensure that access to 'nature' is possible in indirect ways which do not require much time and effort from people given that this was considered a major barrier, adding natural features and settings in urban areas such as plants and animals would ensure that there are consistent opportunities to experience 'nature' regardless of location or context. Currently, Auckland Council, the regional authority, has developed two key strategies to ensure access to 'nature' in urban areas. One strategy is the Urban Ngahere (forest) Strategy (Auckland Council, 2018c) which was developed to ensure that alongside growth and development in the region, there remains a clear framework for the management of Tāmaki Makaurau Auckland's forest and to increase total forest area. The other strategy the City Centre Masterplan (2020) which is aimed at creating a network of open and green spaces in the city centre. This deliberate design of 'nature'-connecting habitats has been recognised as being a core strategy to combat disconnection from 'nature' generated through the extinction of outdoor and 'nature'-based experiences that tend to dominate urban dwellers (Soga & Gaston, 2016). This proactive approach from Auckland Council is a positive step towards prompting individuals to spend time in 'nature'. Furthermore, integrating biophilic design principles (e.g., integrating 'nature' into buildings both directly and indirectly) into the remaining urban architecture alongside open spaces could further help people connect with 'nature' (Totaforti, 2020). This further ensures that people do not necessarily have to leave the urban environment to connect with 'nature'.

There are also multiple opportunities for planning processes in the Tāmaki Makaurau Auckland region to acknowledge the importance of retaining easy access to 'nature' to prompt and sustain people's 'connections to 'nature''. This could result in greater emphasis on

retaining open spaces and 'nature' areas within the urban environment for increased accessibility to 'nature' for the population. It is important to acknowledge that research from the planning discipline in Aotearoa New Zealand has placed much emphasis on understanding how different age groups interact/access 'nature', and therefore considering the findings from this research about the benefits of exposure to 'nature' for connections in the context of the specific findings that have emerged from other researchers (e.g., Freeman, Stein, Hand & Van Heezik, 2018; Freeman, Waters, Buttery & Van Heezik, 2019; Freeman *et al.,* 2019; Freeman, Buttery & Van Heezik, 2021) would be recommended when applying the findings to a planning context. Overall, we posit that ensuring access to 'nature' is everywhere, could help to offset the perceived barrier of modern societal factors on 'connections to 'nature''.

Lastly, an interesting finding which emerged from this research is 8.3% of respondents perceive their connection to 'nature' as being unstable and that it can change dependent on context (e.g., what activities they are currently engaging in, whether they are outdoors, whether they are in Tāmaki Makaurau Auckland or not, etc). This is consistent with research by Nisbet *et al.,* (2008) who through their development and testing of the Nature Relatedness Scale which assesses affective, cognitive, and experiential aspects of people's connection to 'nature', concluded that 'nature' connections are not completely fixed. Thus, this finding further highlights those self-reported influences on 'connections to 'nature'' can be extremely subjective and requires further research such as that undertaken in this study.

In summary, the findings of this study suggest that what influences 'connections to 'nature'' are complex with many social and environmental factors coming into play and therefore a multidisciplinary approach needs to be taken to address the implications of these complexities. It is important that environmental managers work with psychologists, sociologists and/or anthropologists to address the challenges of removing some of the barriers to 'connections to 'nature''. Furthermore, bringing people closer to 'nature' to sustain personal 'connections to 'nature'' involves collaboration amongst recreational practitioners, urban designers, planners, architects, landscape architects and landscape ecologists working alongside environmental managers.

We identified further perceived barriers and perceived prompts of personal 'connections to 'nature'' that our respondents reported, however, the focus of this article was to discuss the dominant findings. We would however suggest that future research analyses these smaller themes more in-depth and/or investigates whether these themes are apparent if replicating this study.

4.6 CONCLUSION

This exploratory study filled a gap in research by exploring self-reported pathways and barriers to 'connections to 'nature'' and has provided new understanding for environmental management in Tāmaki Makaurau Auckland, and globally. Through employment of an online survey, structured and non-structured interviews with sample group of 976 respondents, we identified that a dominant perceived barrier of 'connections to 'nature'' are modern societal modalities. Conversely exposure to 'nature' or time spent outdoors was identified by respondents as being a pathway to their connection to 'nature' by either prompting and/or sustaining their connection. This gives a better insight into what may underpin 'disconnections' and what can be done to facilitate more stronger 'connections to 'nature'' into the future. These findings are particularly relevant to environmental management given the widely suggested link between 'connections to 'nature'' and pro-environmental perspectives or actions

(Whitburn *et al.,* 2019). Therefore, it is important that agencies, organisations, researchers, or businesses who strive towards environmental sustainability, consider deploying several diverse strategies to promote active close contact with 'nature' through facilitating outdoor events/activities and for urban planners to place greater emphasis on bringing natural environments into urban environments to prompt 'connections to 'nature''. We postulate that by increasing access to 'nature' in a range of contexts, this could offset the perception that modern societal modalities are a barrier to 'connections to 'nature''. However, we acknowledge that perceptions such as this are complex and based on several factors that may be out of the control of environmental managers. Despite providing recommendations as to how pathways to 'connections to 'nature'' could be implemented, future research and application of certain interventions will require multidisciplinary approaches and collaboration between a range of stakeholders, planners, and scientists across the spectrum of social and physical science to facilitate a society that has a strong connection to 'nature'.

Although this study has provided valuable new insight into understanding 'connections to 'nature'' in environmental management there is still more work to be done to address gaps in knowledge and develop strategies from which better decision making for environmental sustainability targets can be achieved. It is suggested that future research reproduces this study in other contexts (e.g., both in developed and developing regions) from an environmental management perspective to increase the empirical understanding of perceived pathways and barriers to 'connections to 'nature'' which can further support more efficient environmental management outcomes.

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CHAPTER 5 - INTERCONNECTEDNESS WITH 'NATURE' AND PRO-'NATURE' BELIEFS

This chapter is an article that is published in the *Australian Geographer*. Minor formatting and grammatical changes have been made to ensure consistency across the thesis.

The article is titled:

Inclusion of Nature in Self and Pro-Nature Beliefs: Utilizing Psychological Scales in Environmental Management to Further Understand if Interconnectedness with Nature Supports Sustainable Outcomes – A Case Study in Tāmaki Makaurau Auckland, Aotearoa New Zealand

Authors: Lissy Fehnker, Diane Pearson and Peter J. Howland. The completed statement of contribution form for this article, indicating the percentage of each authors contribution is in Appendix 2.

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5.1 ABSTRACT

It has been asserted that to overcome 'nature' degradation, environmental management practitioners need to understand the complex ways in which people view themselves in relation to 'nature' as this influences their beliefs and, subsequently their actions, toward 'nature'. To examine this assertion, this study empirically explored how 960 subjects in Tāmaki Makaurau Auckland, Aotearoa New Zealand reported themselves in relation to 'nature', and whether the way in which respondents viewed themselves in relation to 'nature' influenced their pro-'nature' beliefs. Results suggested that most respondents perceive some degree of connectedness with 'nature' despite viewing an overall distinction between themselves and 'nature'. Results further indicate that respondents who perceived complete interconnectedness with 'nature' were more likely to hold pro-'nature' beliefs. Conversely, respondents who perceived a complete separation between self and 'nature' were less likely to hold pro-'nature' beliefs. The findings suggest that positive environmental management outcomes may be more achievable if environmental managers focus on increasing individuals' feelings of interconnectedness with 'nature' to prompt and/or enhance pro-'nature' beliefs. Furthermore, the study calls attention to the merit of significantly increased deployment of psychological scales in environmental management contexts, which are currently lacking, to understand the potentially divergent ways in which people relate to 'nature' which may contribute to more effective environmental management programmes and policy.

5.2 INTRODUCTION

Human actions and activities, particularly in urban Western countries, are degrading 'nature' at an unprecedented rate. This has grave consequences for the Earth's long-term sustainability in terms of the on-going, necessary provisioning of natural capital and ecosystem services.

As humans, particularly those from urban Western countries, are the primary driver behind the degradation of 'nature', most of the environmental management approaches that have been developed to address these issues rely upon people changing their actions to more environmentally sustainable ones and having respectful relationships with 'nature'. However, the human relationship to 'nature' is influenced largely by the ideas, and attitudes that various societies have about 'nature' and this changes across geographic, social, and cultural contexts (Glaeser, 2001). The result being that all humans are socialised to think about 'nature', and their place in 'nature', in particular ways which differ from one another (Head *et al.,* 2005). Therefore, it is inappropriate to expect people to change their actions without environmental managers and geographers, first having a fundamental understanding of the potential complexities and differences across people's relationship with 'nature' (Schultz, 2002; Abson *et al.,* 2017). Particularly so, as the interface and relationship between humans and 'nature' is one of the major themes of both geography and environmental management disciplines (Clark, 2010).

Over the past few decades, the interest in the human-'nature' relationship has risen significantly stemming from the contrasting beliefs about 'nature' and humans' relationship with 'nature' across Eastern and Western contexts. For example, intertwined across a wide range of historical Western contexts is a dominating conceptualisation of humans being positioned separate from, and superior to, 'nature'. According to authors such as White (1967); Barber (2004) and Seaman (2009) this was due to the widespread adoption of Judeo-Christian doctrines which promoted the view of dualism between humans and 'nature', and that humans were dominant over 'nature'. The later Greek philosophy movement, which arose in the sixth century BC; inherited the body of knowledge which was guided by these Judeo-Christian doctrines and resulted in philosophers such as Plato, Aristotle, Francis Bacon, and Descartes holding a view of 'nature' as being something that exists separate from, and outside of, humanity (Seaman, 2009). In direct contradiction to these views, historical philosophies of the East viewed an overall interconnectedness between humans and 'nature' tightly rooted in spirituality (Callicott & Ames, 1989). For example, the three dominating philosophy systems of the East – Hinduism, Buddhism and Daoism all viewed humans as intertwined and interdependent from 'nature' (Tanwar, 2016; Rajeev, 2012; Xianlin, Zhongxin & Ikeda, 2001; Liu, 2016). More contemporary philosphers from the 20th century challenged the dominating Western tenets and tended to align their beliefs more with Eastern views of the human-'nature' relationship and developed theories that supported the overall view that humans and 'nature' are interconnected. For example, Aldo Leopold (1949)'s theory of land ethics, Arne Naess (1973)'s theory of deep ecology, James Lovelock (1979)'s Gaia theory, Edward O. Wilson (1984)'s biophilia hypothesis, Pyle (1993)'s theory of extinction of experience, and Richard Louv (2006)'s theory of the 'nature' deficit disorder, to name a few.

Theories such as these and the fundamentally differing perceptions of 'nature' across time and space resulted in the examination of the human-'nature' relationship occupying scholars from disciplines such as geography and environmental management over the past couple of decades (Adams, 2004). For example, two decades ago the Association of American Geographers Conference heavily focussed on dismantling the 'social construction of 'nature'' resulting in numerous scholars from both geography and environmental management considering how the

human-'nature' relationship and social constructs of 'nature' in relation to humans can play a meaningful role in alleviating environmental issues (Demeritt, 2002). This has seen increased empirical research exploring whether feelings of connection with 'nature' result in pro-conservation or 'nature' actions – of which empirical research has similarly strongly suggested a positive correlation (for recent meta-analyses, see Whitburn, Linklater & Abrahamse (2019) and Barragan-Jason *et al.,* (2021)). Furthermore, there has been a heavy focus on understanding whether connecting people to 'nature' has an impact on people's health and wellbeing, of which literature suggests a strong correlation (Coon *et al.,* 2011; Capaldi, Dopko & Zelenski, 2014; Pritchard, Richardson, Sheffield & McEwan, 2020).

To measure levels of connection with 'nature', empirical research relies heavily on psychological scales that have been developed. Examples of these include the 'Connectedness to 'nature' Scale' (Mayer & Frantz, 2004) which measures connectedness to 'nature' by the strength in which an individual is emotionally attached to 'nature', the 'Nature Relatedness Scale' (Nisbet, Zelenski & Murphy, 2008) which measures 'connections to 'nature'' by the levels of fascination or interest in 'nature' or desire to have 'nature' contact, and the 'Emotional Affinity towards 'nature'' (Kals, Schumacher & Montada, 2016) which measures 'connections to 'nature'' by the levels of love or emotional attachment an individual has toward 'nature'. Focusing specifically on how individuals view themselves in relation to 'nature', Schultz (2002) developed the 'Inclusion of Nature in Self Scale' (INSS) which is used to determine whether people feel separate from or interconnected with 'nature'. In contrast to other scales which rely on respondents to read, and react to statements or questions, the INSS is presented in a visual format, which makes it very concise and potentially easy to effectively administer across various language and cultural contexts (Figure 5.1). Alongside these scales, are scales developed to test, or measure, individual's pro-'nature'/environment beliefs or perspectives. For example, the New Ecological Paradigm (NEP) which is a sociological scale developed by Catton, Riley & Dunlap (1980) which was subsequently updated by Dunlap, Van Liere, Mertig & Jones (2000) that contains a series of statements aiming to predominantly capture an individual's level of concern for 'nature' (section 5.3.3). Secondly, the Anthropocentric and Ecocentric Attitudes Scale by Gagnon Thompson & Barton (1994) which aims to capture general apathy toward 'nature', and thirdly, the Value Orientations Scale developed by Stern, Dietz & Kalof (1993) measuring concern for 'nature' through the sliding scale of levels of self-interest an individual displays. Therefore, using scales such as these alongside scales to measure levels of connection to 'nature' can provide insight as to whether 'connections to 'nature'' are correlated with pro-'nature'/environment beliefs or perspectives (e.g., see Whitburn *et al.,* 2019) reviewed 37 studies who have done this and Barragan-Jason *et al.,* (2021) who reviewed 147 studies which have done this).

In Australasia, recently there has been increasing recognition amongst scientists and policy makers that issues facing 'nature' have significant, and difficult to trace social dimensions (Head, 2017), despite this, exploring these dimensions was undervalued a decade ago (Head *et al.,* 2005). Examining and understanding these understandings are crucial, because the way in which 'nature', and our place in 'nature' is conceptualised, becomes embedded in legislation and institutions (Head, 2017). Furthermore, as argued by geographers such as Instone (2004), McManus (2006) and Waitt, *et al.* (2006) it is pivotal to understand how 'nature' is perceived in terms of how much it is included in our social and/or human world to address the dominating view of a human/'nature' divide which underpins ecological degradation.

Therefore, to bring effective environmental change and management, environmental practitioners need to increase current understandings of people's relationships with 'nature', namely, how people view themselves in relation to 'nature', and whether they view themselves

as separate from, or interconnected with, 'nature'. Furthermore, it is important to understand whether the way people view themselves in relation to 'nature' has any bearing on their beliefs about 'nature', given that beliefs are widely argued to translate into actions (Kaiser, Ranney, Hartig & Bowler, 1999; Kaiser & Gutscher, 2003; Halpenny, 2010). We posit that by gaining better understanding of these relationships in environmental management we can contribute to the conundrum of how we can shift towards a more sustainable society and stop the rates of degradation of 'nature' that we see in contemporary times.

As all the scales mentioned above were developed from the psychological discipline, their use has predominantly stayed within psychological research (e.g., as outlined in a meta-analysis by Ives *et al.,* (2017)). This is a significant omission, as disciplines such as geography and environmental management which deals with how human-'nature'interactions influence environmental sustainability, requires a deep and urgent understanding of the complex drivers behind human actions to mitigate the degradation of 'nature' around the world stemming from human actions (Gifford, Steg & Reser, 2011; Rentfrow, 2014). This means that there is considerable benefit to be had from integrating psychological approaches into the development of environmental management strategies. Consequently, we undertook a study in Tāmaki Makaurau Auckland, Aotearoa New Zealand employing the INSS and the NEP. The aim being to apply these scales to provide a deeper understanding as to how individuals view themselves in relation to 'nature' and whether this influences their pro-'nature' beliefs and thus address a recognised gap in the application of these scales in an environmental management context.

The INSS was inspired from scales developed in psychology to measure interpersonal closeness and human relationships (such as that by Aron, Aron, Tudor & Nelson, 1991; Aron, Aron & Smollan; 1992). According to Aron *et al.,* (1991) and Aron *et al.,* (1992), central aspects in interpersonal relationships are the feelings of closeness, affection, intimacy, empathy, and a deep level of knowledge about the other person. The existence of these factors between people frequently translates into a willingness to care for each other. Schultz (2002) hypothesized that similar degrees of intimate knowledge, affection and empathetic caring would be applicable to the human-'nature'relationship and thus used interpersonal relationship aspects to inform the development of the INSS.

The INSS has rarely (if at all) been employed in Australasian environmental or geographical literature, as due to the scale being operationalized in the psychology discipline, its use over the past decade has predominantly stayed in this discipline (for example Davis, Green & Reed, 2009; Bruni & Schultz, 2010; Martin *et al.,* 2020; McConnell & Jacobs, 2020). Despite this, the relevance and usefulness of the INSS for disciplines such as environmental management and/or sustainability was noted in a recent paper by Salazar, Monroe, Jordan, Ardoin & Beery (2021) who ran workshops with 22 researchers (ranging from psychology to education and environmental studies selected based on publications and scholarly reputation) that had previously been engaged in research relating to the human-'nature'connections and/or relationships. An outcome of the workshop was the identification of eight tools that have been useful for practitioners to assess 'connections to 'nature'' – of which the INSS was one. We employed the INSS alongside the NEP scale as it is the most popular scale employed to capture pro-'nature' beliefs (Cruz & Manata, 2020) and the statements were deemed most applicable to an Australasian context. Pro-'nature' beliefs (versus actions) were researched as previous literature has suggested that beliefs can be effective indicators of future actions (Kaiser *et al.,* 1999; Kaiser & Gutscher, 2003; Halpenny, 2010).

By examining these concepts in Tāmaki Makaurau Auckland insight can be determined that could be useful for increasing the acknowledgment of the human-'nature' connection in environmental management practice, policy, and planning within the region.

5.3 METHODS

5.3.1 ETHICS

Ethics approval was granted prior to commencing the study through Massey University, Aotearoa New Zealand. The research was considered low risk.

5.3.2 STUDY LOCATION CONTEXT

The study was conducted in Tāmaki Makaurau Auckland, Aotearoa New Zealand. The region is home to a population of approximately 1.6 million, accounting for over 30.0% of New Zealand's population (Statistics NZ, 2018). Tāmaki Makaurau Auckland is an interesting location in which to conduct this case study as it is one of the fastest growing urban regions in New Zealand (Auckland Council, 2018) and as a primate city is under considerable environmental pressures from increasing urban development, both expansive and in-fill. New Zealand is considered a Western country (World Population Review, 2020), although the country's tangata whenua (original people of the land) are Māori. Significant European colonization took place from the 1840s onwards century, resulting in a strong British societal influence in the country (Gibbons, 2002). In present times, just over 70.0% of the population identifies as NZ European/Pākehā ethnicity (StatisticsNZ, 2018). Despite this, Tāmaki Makaurau Auckland is one of the most ethnically diverse cities in the world being home to 180 ethnicities (Auckland Unlimited, 2020).

5.3.3 DESIGN AND PROCEDURE

To conduct the analyses required for this study an online survey was created within the Qualtrics platform. Respondents were asked demographic questions and then asked approximately 10 questions which related to other areas of the broader research project of which this study was apart. These related to the respondent's conceptions of 'nature', 'connections to 'nature'', and perceived barriers/promotors of perceived 'connections to 'nature''. Respondents were then asked to respond to the INSS scale. The INSS presents seven pairs of circles. One circle in the pair is labelled 'self' and the other is labelled 'nature'. The circles begin separate, and gradually move closer, overlapping, until they become one circle (Figure 5). In discussing the scale from one end to the other, Schultz, Shriver, Tabanico, and Khazian (2004), state that "*at one extreme, is the individual who believes that (s)he is separate from 'nature' (A) […] at the other end of that continuum is the individual that believes that (s)he is […] part of 'nature' (G)*" (pp. 32). Respondents were therefore asked to select which pair of circles best represents how they view themselves in relation to 'nature'.

Secondly, respondents were asked to indicate how strongly they agreed or disagreed with seven statements derived from the NEP via a Likert-scale with five options (strongly agree, somewhat

agree, neither agree nor disagree, somewhat disagree, strongly disagree) that we presented to capture pro-'nature' beliefs. The statements were as follows:

1. Humans should have the right to modify 'nature', even if it has negative impacts on 'nature'.
2. At present, mainstream human economic activities (e.g., production and farming practices) and social activities (e.g., growth of cities and populations) are having negative impacts on 'nature'.
3. Whenever possible, humans should take the opportunities to behave in sustainable ways, to ensure 'nature' is protected and enhanced.
4. Plants and animals have as much right to exist as humans do.
5. I view humans as the top of the hierarchy within 'nature'.
6. I am worried about the state of 'nature' around the world.
7. The current emphasis at national and global levels to protect and enhance 'nature' is over-exaggerated.

Despite the statements used in this study taking insight from the NEP, some statements were altered or combined, for perceived clarity, consistency with the language of the rest of the online survey, and to work more effectively in the Aotearoa New Zealand context (see Table 5.1 for further detail).

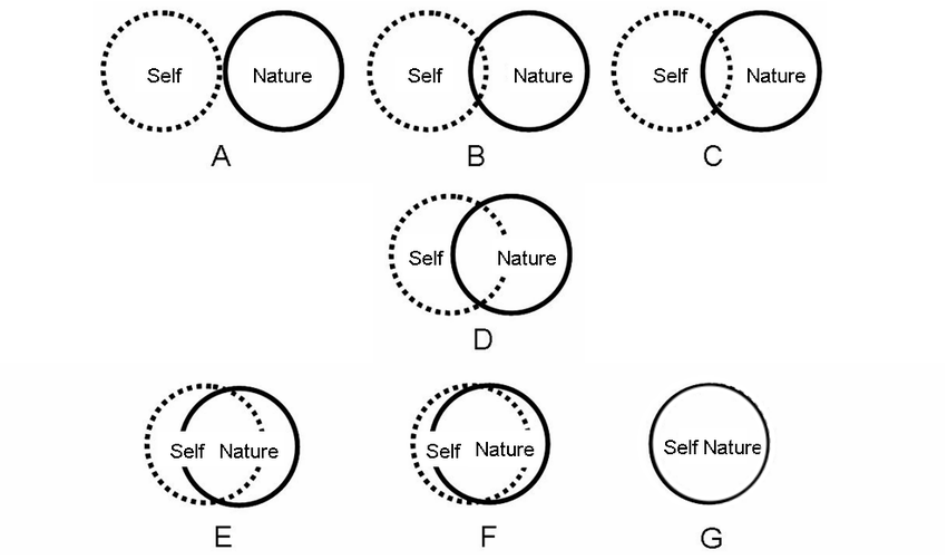

FIGURE 5.1 INCLUSION OF NATURE IN SELF SCALE (SCHULTZ, 2002)

Participants were initially presented with an information sheet on commencement of the survey and were asked to confirm their consent before taking part. Recruitment of respondents was predominantly through employing Facebook advertising features and by circulating the survey in community Facebook groups from an anonymous Facebook account. To avoid bias to those who had social media accounts and internet connections, the lead researcher hung up posters in public areas and conducted 1,000 mail drops. Participants were given a contact e-mail address and phone number so they could request a copy of the survey and a free postage return envelope in case they had no access to a computer or internet connection. To maximize response rate, it was advertised that respondents would go into the draw to win one of four $50 NZD shopping vouchers for taking part.

Facebook advertising was the most successful mechanism for participant recruitment, yielding 98.0% of the total responses. This was expected given that social networking sites have gained popularity across the world, with the use of Facebook being particularly noteworthy (Forgasz, Tan, Leder & Mcleod, 2017). The remaining 2.0% of respondents came from circulating the survey in Facebook community groups from an anonymous account (1.0%) and 1.0% from mail drops and hanging up posters in public areas. Moreover, at the conclusion of the study, 100.0% of responses were via the online survey and no participants requested a physical copy of the survey.

Advertisement of the survey was kept as neutral as possible to avoid the targeting and recruitment of ''nature'-inclined' people only through wording the research invitation as "*have your say on 'nature'-related topics*". However, we acknowledge that it is difficult to avoid the fact that people who are more engaged with 'nature' would have been more likely to partake in the survey and therefore there may be a level of sampling bias toward this group of people. Another important limitation to acknowledge is that based on the responses to the survey being entirely online (versus those seeking a physical copy in response to mail drops or posters being seen in public places) there is a bias towards individuals who have access to the internet and actively engage in social media.

5.3.4 SAMPLE SIZE

In total, 960 participants took part in the study via the online survey. Had this sample had been a random one from the Auckland region, then this sample would be large enough to reject a hypothesis of zero correlation with a p-value <0.05 (significance level) and a 90.0% power provided the true correlation between variables was at least r= 0.11. However, because this sample is a convenience sample of volunteers rather than a random sample, it is important to acknowledge that any conclusions about the population must be treated with appropriate caution.

The gender split, age group split, and ethnicity split of respondents are outlined in Figure 5.3, Figure 5.4, Figure 5.5. Our gender sample is closely representative of the gender split in the region (StatisticsNZ, 2018). The targeting of online survey advertisement had to be altered three quarters of the way through the recruitment process due to the high volume of female participants. Initially targeting settings were set to attract different genders, but in the last quarter of the survey period the targeting setting was changed to attract only males. Age groups were not reflective of the Auckland age split (StatisticsNZ, 2018) and spread from age group 16 – 20 to 81 – 90. The minimum age of participants was 16 years of age due to human ethics requirements. Some ethnicities were over-represented compared to Tāmaki Makaurau Auckland statistics (e.g., NZ European/Pākehā[27] by 29.0%, Māori by 1.8%), and under-represented in others (e.g., Pacific Peoples by 9.8%, Asian by 18.8%, MELAA[28] by 0.5%) (Statistics NZ, 2018).

[27] Pākehā is a Māori term for New Zealanders of European descent.

[28] Middle Eastern, Latin America, African

5.3.5 DATA ANALYSIS

To reflect responses to the INSS, the number of responses to each selection was divided by the total number of respondents (Figure 5.2). The results of this reflect that 1.7% (n = 16) respondents selected A, 4.5% (n = 41) selected B, 12.5% (n = 120) selected C, 29.9% (n = 287) selected D, 19.6% (n = 188) selected E, 13.3% (n = 128) selected F and lastly 18.8% (n = 180) selected G.

To determine whether responses to the INSS changed across different ethnicity, age or gender groups, responses were grouped into the various demographic groups and frequency of each response to the INSS was divided by the group total (Figure 5.3, Figure 5.4 and Figure 5.5).

To measure a respondent's level of pro-'nature' beliefs, each respondent was given a score based on their responses to the NEP statements. The highest score per statement (indicating high pro-'nature' beliefs) was five[29]. As there were seven questions, the highest possible score overall that a respondent could be allocated was 35, with the lowest possible being seven.

To determine whether responses to the NEP statements changed based on the different INSS responses, scores from each respondent were grouped into INSS segments (e.g., A, B, C, D, E, F, G). The scores were added up across each respondent and were then grouped into three categories; high pro-'nature' beliefs (e.g., respondents with total scores of 29-35), medium pro-'nature' beliefs (respondents with total scores of 21 – 28) and low pro-'nature' beliefs (respondents with total scores of 13 – 20) (Figure 5.6) (taking insight from an approach that was used in research by New South Wales Environment Protection Authority (1997)).

5.4 RESULTS

The breakdown of responses to the INSS is presented in Figure 5.2. This shows that 79.6% of respondents perceive some (albeit varying) connectedness to 'nature' as they selected circle pairs which presented differing degrees of overlap (circle pairs B, C, D, E, and F), 1.7% of respondents perceived a complete separation between self and 'nature' (circle pair A) and 18.8% perceive complete interconnectedness with 'nature' (circle pair G).

Overall, the most common selected pair of circles was D (29.9%).

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[29] Humans should have the right to modify 'nature' even if it has negative impacts on 'nature' (Strongly disagree = highest pro-'nature', score 5)

At present, mainstream human economic activities (e.g., production and farming practices) and social activities (e.g., growth of cities and populations) are having negative impacts on 'nature' (Strongly agree = highest pro-'nature', score 5)

Plants and animals have as much right to exist as humans do (Strongly agree = highest pro-'nature', score 5)

I view humans as the top of the hierarchy within 'nature' (Strongly disagree = highest pro-'nature', score 5)

I am worried about the state of 'nature' around the world (Strongly agree = highest pro-'nature', score 5)

The current emphasis at national and global levels to protect and enhance 'nature' is over-exaggerated (Strongly disagree = highest pro-'nature', score 5)

Wherever possible, humans should take the opportunities to behave in sustainable ways, to ensure 'nature' is protected and enhanced (Strongly agree = highest pro-'nature', score 5)

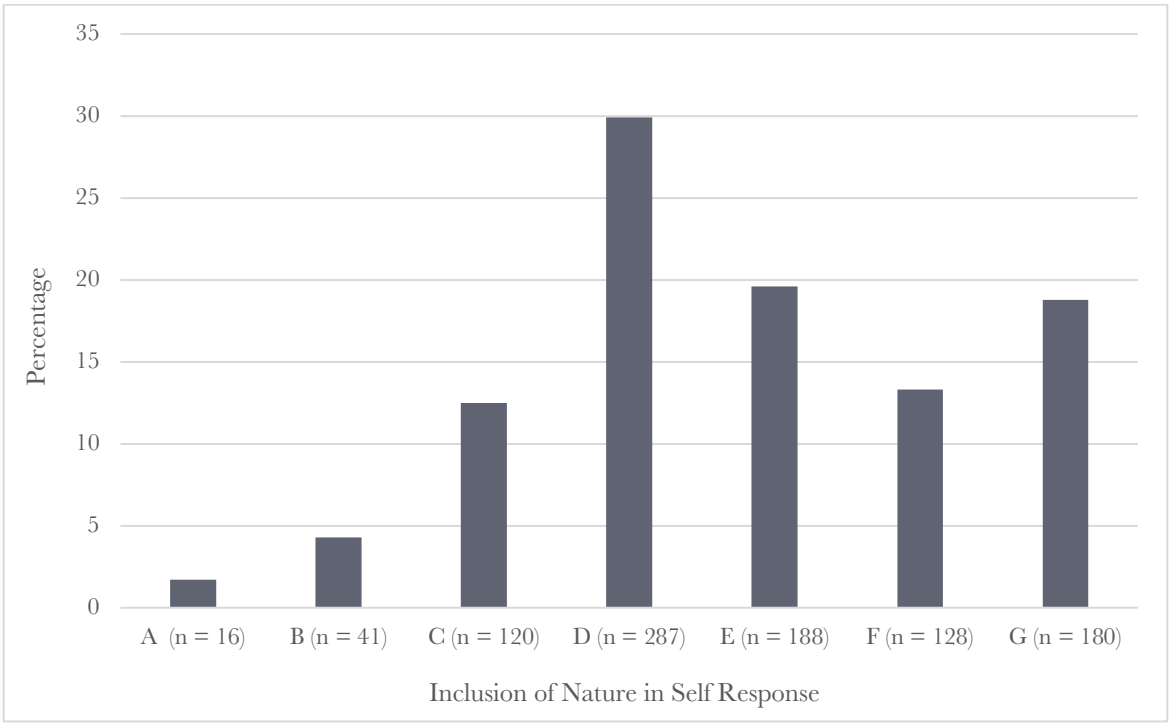

FIGURE 5.2 INCLUSION OF NATURE IN SELF RESPONDENT RESPONSES

Relationship between ethnicity and INSS responses is presented in Figure 5.3, age and INSS responses in Figure 5.4, and gender and INSS responses in Figure 5.5. The results suggest that respondents in age group 81-90 were more likely to select INSS responses indicating perceived interconnectedness with 'nature' with 75.0% of the respondents selecting G, compared to other segments which were 25.0 and lower. On the contrary, respondents aged 16-20 were least likely to select INSS responses indicating perceived interconnectedness with 'nature' with 10.1% of the respondents selecting G, compared to other age groups which were 16.5% or higher. Respondents in the age group 51-60 were most likely to select A, indicating perceived separation with 'nature'. However, as the age split for each age group was not reflective of the Auckland age split (and as the sample is non-random) these findings are indicative only.

The findings also suggest that those identifying as Māori were slightly more likely to view themselves as interconnected with 'nature' as 26.6% selected G compared to other ethnicities where less than 22.2% selected G. Given that Māori are the indigenous culture of Aotearoa New Zealand and New Zealand European/Pākehā are the largest ethnic cohort of the region, of most interest is the differing perspectives between Māori and New Zealand European/Pākehā respondents. For example, 19.0% of respondents identifying as New Zealand European/Pākehā selected G compared to 26.6% of Māori respondents. In contrast, respondents identifying as Asian were least likely to select INSS responses indicating perceived interconnectedness with 'nature' with only 9.3% selecting G compared to other ethnicity groups where 15.0% and above selected G. Respondents identifying as MELAA did not select A at all. However, it is important to note that ethnicities were not mutually exclusive, as respondents could select more than one ethnicity that they identified with. This has resulted in some INSS responses being counted toward more than one ethnicity for some respondents. Furthermore, ethnicities were not representative of the Tāmaki Makaurau Auckland ethnicity split and thus the finding is suggestive only.

There was little difference on INSS scores based on respondents' gender. Despite significant changes being evident across male and female to non-binary, only five non-binary respondents engaged with the research, therefore the finding is likely not representative and therefore it is not possible to draw any conclusions.

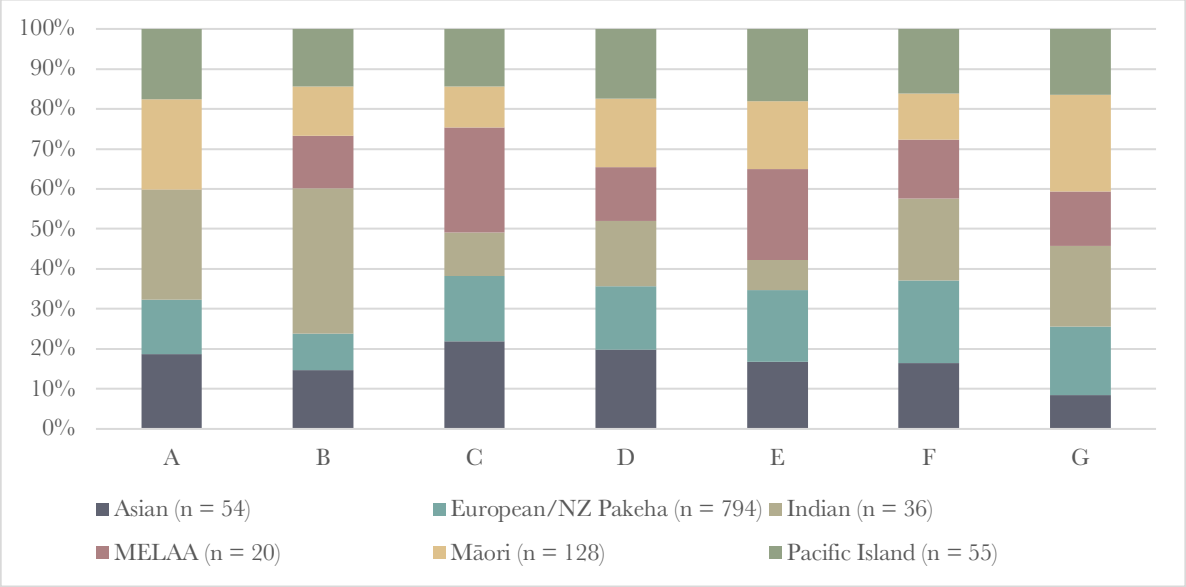

FIGURE 5.3 INCLUSION OF NATURE IN SELF SEGMENTS CORRELATED WITH RESPONDENT ETHNICITY

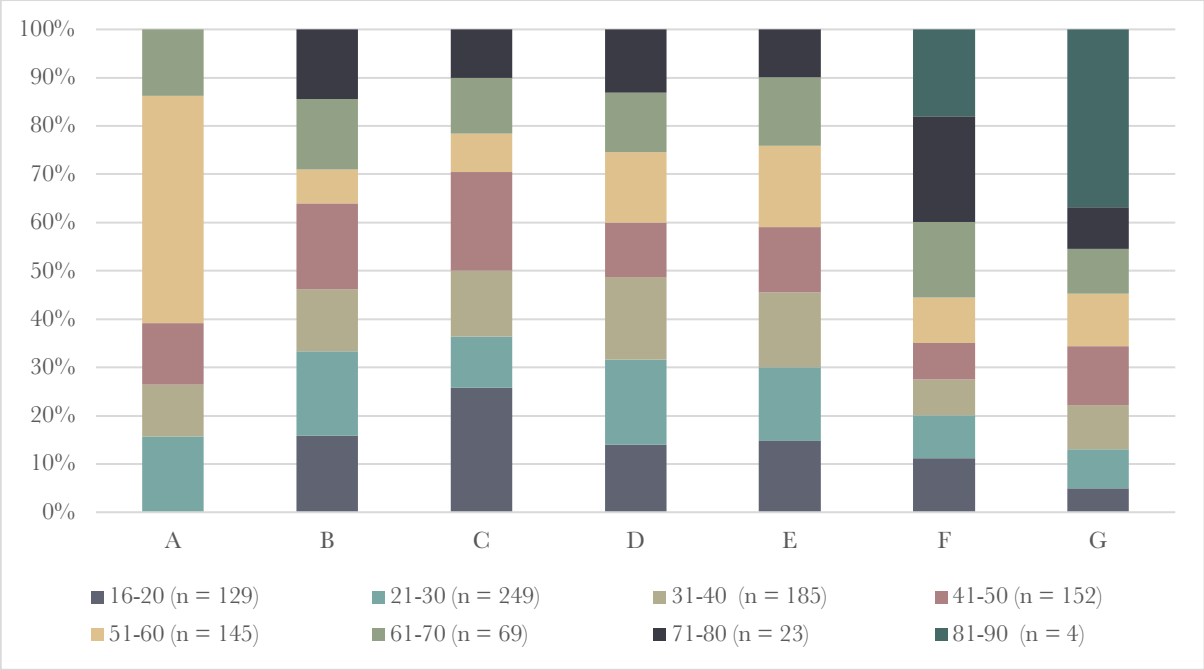

FIGURE 5.4 INCLUSION OF NATURE IN SELF SEGMENTS CORRELATED WITH RESPONDENT AGE

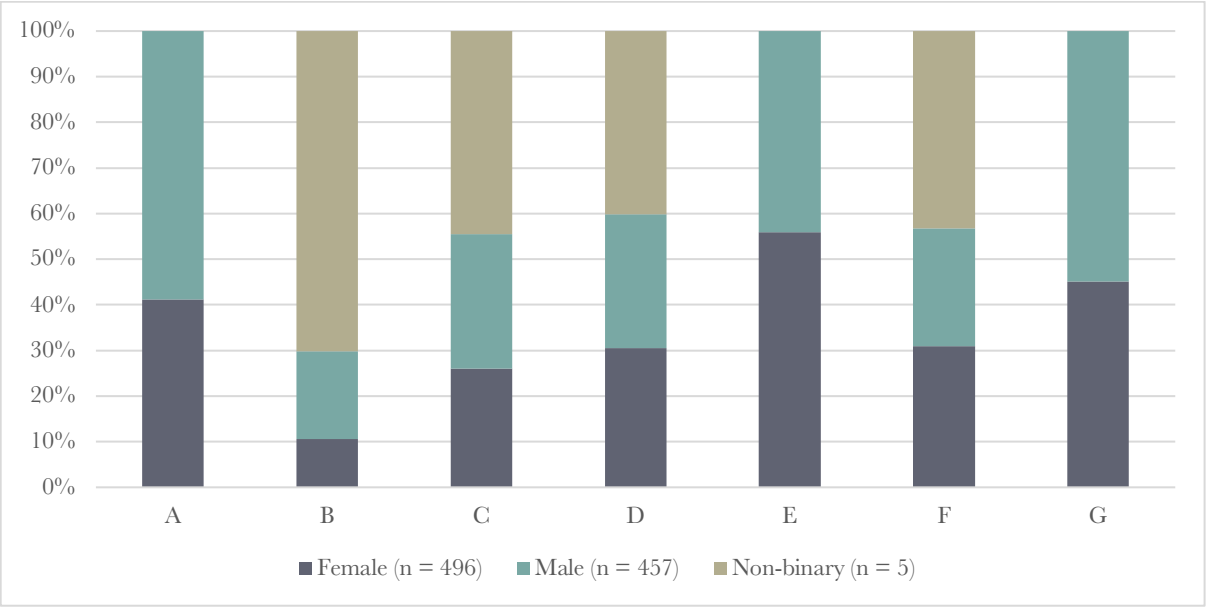

FIGURE 5.5 INCLUSION OF NATURE IN SELF SEGMENT CORRELATED WITH RESPONDENT GENDER

The results from the correlation between the INSS and NEP statements are presented in Figure 5.6. The findings suggest that those who view a complete separation with 'nature' (A) were most likely to have low pro-'nature' beliefs. On the contrary those who perceived complete interconnectedness with 'nature' (G) were most likely to have high pro-'nature' beliefs. In general, high pro-'nature' beliefs increased gradually as INSS increased from A to G.

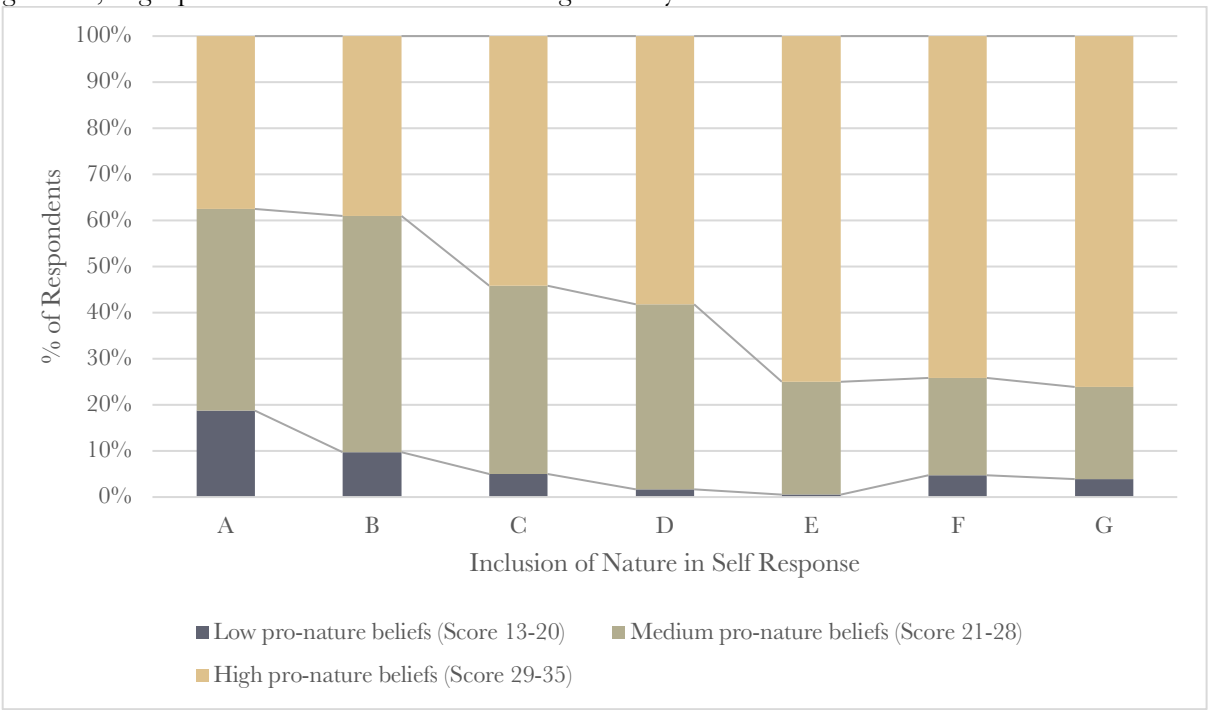

FIGURE 5.6 INCLUSION OF NATURE IN SELF SEGMENTS & PRO-'NATURE' BELIEFS

5.5 DISCUSSION

The key findings from this study were firstly, that most respondents (98.4%) perceive a connectedness between self and 'nature' varying from a small amount (e.g., pair B), to a full interconnectedness with 'nature' (e.g., pair G). However, we argue that the selection of circle pairs B, C, D, E, and F which did not reflect a complete interconnectedness with 'nature' but contained some overlap, reflects a view by respondents that there is a distinction between self and 'nature' based on the pairs of circles having fixed borders indicating each circle is an isolated entity from the other.

The second key finding is that respondents who selected G reflecting complete interconnectedness with 'nature' (two circles become one), displayed higher pro-'nature' beliefs based on their responses to the NEP statements. Overall, pro-'nature' beliefs gradually increased as INSS responses increased from A to G. Lastly, young respondents (aged 16 – 20) were less likely to perceive interconnectedness with 'nature' (G), respondents identifying as Māori were most likely to perceive an interconnectedness with 'nature', and responses to the INSS did not change across gender groups.

Taking light from the Value-Belief-Norm theory developed and tested by Stern, Dietz, Abel, Guagnanon & Kalof (1999) indicating that an individual's beliefs stem from their values and worldviews, our findings suggest that the way in which an individual views themselves in relation to 'nature' influences their beliefs about 'nature'. This provides evidence in support of the original intention behind the development of the INSS, of which Schultz (2002) postulated that understanding how people feel in relation to 'nature' would be useful for environmental sustainability. This logic specifically relates to the idea that if one feels more connected with 'nature' then the result is a greater desire to empathetically care for 'nature', and this subsequently leads to a commitment to protect 'nature' – in that order (Aron, Melinat, Aron, Vallone & Bator, 2016; Schultz, 2002) of which our findings support. The reasoning for this pathway is summarised well by Roszak, Gomes & Kanner (1995, p. 12) in their broader discussions on ecopsychology arguing that *"if the self is expanded to include the natural world, action leading to destruction of this world will be experienced as self-destruction"* (p12). Our findings also support findings from other empirical research who employed the INSS and found a correlation between responses to the scale and pro-'nature' beliefs/actions (however not necessarily employing the NEP) such as those included in meta-analyses by Whitburn *et al.,* (2019) and Barragan-Jason *et al.,* (2021).

Despite the high percentage of respondents who reported some degree of connectedness (B, C, D, E, F), or full interconnectedness (G), respondents were not further interrogated as to what they perceived the overlap to signify and thus it is difficult to analyse further all the implications of these varying degrees of overlap. When developing the INSS, Schultz (2002, p. 67) conceptualised the tool as understanding "*the extent to which an individual includes 'nature' within his/her cognitive representation of self*". However, it is unclear if this is how the tool was understood by respondents. This challenge with the INSS should be further investigated, as albeit being perceived as a somewhat obvious barrier when analysing results derived from the INSS, has not been picked up by other researchers who have critiqued the INSS (e.g., Martin & Czellar, 2016). We use this opportunity however to put forward our argument that despite the varying levels of connectedness displayed by the respondents who selected circle pairs B, C, D, E and F, that respondents view themselves, and 'nature', as two distinct entities which are connected yet separate from one another (as opposed to those who selected G which is where two circles become one with no borders). This is due to these circle pairs which despite indicate an overlap, have fixed borders which differentiate between 'self' and 'nature' and keep each circle

separate within an overlap. This assumption is supported by literature by Baumeister (1987); Fiske, Kitayama, Markus & Nisbett (1998); Schultz (2002); Frantz, Mayer, Norton & Rock (2005) that postulate that Western cultures tend to emphasize an idea of 'independent self' or 'free entities' which are separate from 'nature'. This social construction of 'nature' being separate from humans was brought about by early thinking and theories from the Historical West (Johnson & Murton, 2007). Therefore, this finding is expected since Aotearoa New Zealand is a Western country. Additionally, there was an over-representation in the respondent group amongst those identify as NZ European/Pākehā (as discussed above) (World Population Review, 2020).

As a large percentage of respondents view themselves and 'nature' as two distinct entities, this has potential to be problematic from an environmental management perspective. It is discussed by ecopsychologists Roszak *et al.*, (1995), that having a perception that 'nature' is to some degree separate from the self makes it easier for people to harm 'nature' without feeling any distress or concern that their actions will have any negative impact on themselves. Identifying in this way is of particular concern when considering respondents who selected A on the INSS and thus saw themselves as distinct from 'nature' most likely to have low pro-'nature' beliefs. This underlying logic is similar to that which Schultz (2002) was exploring when he developed the INSS. He identified the pathway of those who have lower INSS scores (e.g., A) as being one towards actions more likely to care for themselves and thus demonstrated a stronger commitment to protecting the self (instead of 'nature'). From an environmental management perspective, which seeks to understand the human-'nature' relationship/connection and how this may drive subsequent actions, this finding suggests that more emphasis must be on this line of thinking, further exploring how these perspectives came about, or how to shift them for sustainability outcomes.

The survey revealed that the most dominant selected pair of circles within the INSS was D – a 50.0% overlap between 'nature' and self. It is not possible to conclude with a logical explanation as to why this was, but it appears to indicate that despite the view that self and 'nature' are two distinct entities, there is still a perceived significant degree of interconnectedness between the two. However, without further questioning it is difficult to explore the grounded meanings of this halfway status because there is uncertainty around what the overlap signified to respondents. We do however also speculate that it may be due to the assumption by respondents that when partaking in a scale type questions on surveys, the middle response represents what is normal. Therefore, if a respondent considers themselves as normal, they will often select the middle response (Price, Jhangiani, Chiang, Leighton & Cuttler, 2015).

The study identified some relationship between respondent age and ethnicity with INSS scores. Firstly, our results showed that the oldest respondent age cohort (81 – 90) were more likely to select G. However, this age cohort was only made up of four respondents and therefore this finding should be treated with extreme caution. Nevertheless, Freeman, Waters, Buttery & Van Heezik (2019) discuss that older people having an increased connectedness with 'nature' is due to this age group likely being fully retired with more available time to engage with 'nature'. Frequent experiences with 'nature' are then suggested to increase 'nature' connectedness (Richardson, Cormack, Mcrobert & Underhill, 2016) and therefore our finding would be expected. Despite this, the age cohort 51-60 was most likely to select A, however, this may again be due to age imbalance in sampling. In contrast, the youngest respondent age cohort (16 – 20) were less likely to select G. Empirical literature that explores how INSS may be influenced by age is scarce, however, the findings is aligned with literature that presents the idea that younger people in the Western world are more disconnected to 'nature' due to

spending more time indoors and engaged with the technological world instead of a natural one (Vanderbeck & Johnson, 2000; Louv, 2006; Zaradic & Pergams, 2007).

We found no difference in INSS scores based on respondent's gender. This aligns with research by Di Fabio & Rosen (2019) who despite employing a different 'nature' connectedness scale similarly found no gender differences. Furthermore, as identified by Di Fabio & Rosen (2019), there is an existing gap in international empirical literature regarding whether there are differences across gender and connectedness to 'nature'. Therefore, this finding provides evidence that gender may not influence an individual's feeling of connectedness with 'nature'.

Our sample of ethnicities was not an accurate representation of Tāmaki Makaurau Auckland's ethnic demographics; however, we did investigate the data to explore whether there were differences as to how the indigenous culture of Tāmaki Makaurau Auckland (Māori) view themselves in relation to 'nature' compared to the largest ethnic group (New Zealand European/Pākehā). The analysis found that those identifying with Māori were more likely to select G compared to NZ European/Pākehā. Of all participants identifying as Māori, 27.0% selected G, compared to those identifying as NZ European/Pākehā where 19.0% selected G. Both NZ European/Pākehā respondents and Māori respondents were over-represented in this study, and we acknowledge that if the sample group was reflective of the ethnicity split of the region, the findings may have been different. However, this finding was expected as it is commonly recognised that Māori have an interconnected, holistic, and mutually constitutive view of 'nature' and humans and recognize the connection between the health of 'nature' on people's spiritual and cultural well-being. It has been widely documented that Māori spirituality is strongly rooted in valuing unity with 'nature' (Lockhart, Houkamau, Sibley & Osborne, 2019). This is underpinned by the concept of mauri – a life force which connects all living and non-living things (Patterson, 1998; Harmsworth & Awatere, 2013). There is no single word for 'ecosystem' in te reo Māori (Māori language). Instead, terms such as whakapapa (ancestral lineage) are used to understand the perspective of what an ecosystem is. From a traditional Māori perspective, the universe is a series of genealogical webs that go back generations. The concept of whakapapa places Māori with all flora, fauna and natural resources through established bonds (Harmsworth & Awatere, 2013). Not surprisingly, it has been shown that Māori tend to value 'nature' more than Europeans do (Cowie, Greaves, Milfont, Houkamau & Sibley, 2016).

By comparison, respondents identifying as Asian were least likely to select G with only 9.3% selecting G compared to other ethnicity groups where 15.0% and above selected G. Further, respondents identifying as MELAA did not select A at all. However, it is important to note that the cohort of respondents identifying as Asian were under-represented in the sample group. Despite this, the cohort of respondents identifying as MELAA were only under-represented by 0.5%, and therefore this finding may provide evidence to the fact that these ethnicities are unlikely to view themselves as separate from 'nature'. This would align with research by Wilhelm-Rechmann *et al.,* (2014) who employed the INSS in South Africa and found that African people were most likely to score high on the INSS (e.g., circle pairs E, F or G). However, research investigating connectedness to 'nature' is scarce in developing countries (Rosa, Profice & Collado, 2018) and therefore more research would be strongly recommended to test whether this is finding is supported.

Based on the finding that perceived interconnectedness with 'nature' across our respondents is related to high pro-'nature' beliefs we suggest that from an environmental management perspective it is worth focusing efforts on determining and implementing approaches that can bring about a shift in the perceptions of people towards increased feelings of interconnectedness

with 'nature'. Adopting this line of thinking, it could be assumed that if environmental management approaches can make people feel more at one with 'nature', then it is possible to encourage pro-'nature' beliefs and subsequent actions that result in more beneficial outcomes for 'nature'. This idea is also consistent with those of Abson *et al.,* (2017); Ives, Freeth & Fischer (2020); Riechers *et al.,* (2021), that posit that environmental sustainability practitioners should have a stronger focus on identifying and working on an individual's deep leverage points if wanting to bring about effective change. This would involve specifically, trying to understand the underpinning values and worldviews of people which ultimately shape the way and how people behave and then developing strategies and mechanism to try to change these values and views.

Achieving sustainability transitions such as shifting the way individuals view themselves in relation to 'nature' is undoubtedly complex and requires significant political and social structural change (Avelino *et al.,* 2016). Furthermore, to challenge this perceived separation between 'nature' and people, requires the unpicking and challenging of a range of concepts which inherently assume their distinction. This ranges from notions such as that there exists a 'wild' or 'wilderness', the way in which 'nature' is presented as being reserves and parks in maps, drawing a line to separate the 'pure' 'nature' from society on the outside (Head, 2017). Therefore, the perceived separation can be difficult to challenge, as it is deeply embedded in social and material structures including environmental management practices (Castree, 2014, Waitt *et al.,* 2006) and consequently future research to support environmental management would be recommended to focus specifically on how this can be addressed across a range of social structures with emphasis on practical recommendations. Furthermore, if using the approach of increasing interconnectedness with 'nature' to increase pro-'nature' beliefs and/or actions, important questions must be considered such as *who* has the power to initiate a change in thinking and *who* will be empowered to do so. This is because not all individuals will have the capacity, nor desire, to change their ways of thinking (Avelino & Wittmayer, 2015). For example, in Aotearoa New Zealand, it is argued that national research, education and public policy currently excludes Māori experiences and knowledge, therefore asserting influences on knowledge systems (Lee-Morgan & Hutchings, 2016). Similarly, as noted by Ngurra *et al.,* (2019), in Australia the Indigenous peoples' 'connections to 'nature'' continue to be neglected from policy and planning. Thus initiating change would require a range of inputs across disciplines from cultural studies, sociology, geography, and environmental management. Furthermore, increasing levels of interconnectedness with 'nature' is not the only solution to achieve greater environmental sustainability, as there are other barriers for engagement in pro-'nature' practices such as economic barriers, lack of awareness/education, or inconvenience (Horhota, Asman, Stratton, & Halfacre, 2014; Sheoran & Kumar, 2020) and therefore increasing interconnectedness may be considered just one piece (albeit a crucial one) of the puzzle to encourage sustainable actions along with other socio-economic tools.

Despite the complexities, we believe that there would be benefit in environmental managers considering how to integrate key teachings from environmental philosophies into their decision making. This means greater acknowledgement of philosophies that place emphasis on the interconnectedness between humans and 'nature' such as deep ecology - which recognises that humans are intertwined with 'nature' (Næss, 2017), land ethics – prompting humans to understand that land is part of their community (Leopold, 1949), spiritual ecology – which recognises the spiritual interconnectedness humans have with 'nature' (Macy *et al.,* 2013), biophilia – promoting an innate affinitive and cognitive connection to 'nature' (Wilson, 1984), and Gaiasm – which views humans and 'nature' as part of an connecting organism (Lovelock, 1979). There are also Eastern world perspectives of the human-'nature' relationship that view 'nature' as an integral part of an individual such as those within Buddhism, Taoism and

Hinduism (Callicott & Ames, 1989; Barnhart, 1997), of which have been identified as being useful to consider and integrate into Western environmental management approaches to prompt widespread interconnectedness with 'nature' (White, 1967; Sarabhai, 2010; Donde, 2014; Zagonari, 2020).

In Aotearoa New Zealand, based on our findings indicating that respondents who identify as Māori were more likely to feel interconnected with 'nature', it could be beneficial to draw on ideas from Mātauranga Māori (Māori worldviews and knowledge) with particular focus on how Māori view themselves in relation to 'nature' and emphasise this more within the wider New Zealand culture and practice regarding environmental management. In an Aotearoa New Zealand context, what we are suggesting is not new as literature is rich with discussion as to how Mātauranga Māori can be applied in environmental management practice and policy such as stronger partnership with Māori and understanding Māori philosophical thought (e.g., Tipa, Harmsworth, Williams & Kitson, 2016; Lockhart *et al.,* 2019; Mcallister *et al.,* 2020). However, we use our findings to further highlight the importance of environmental management practitioners in Aotearoa New Zealand encouraging people to feel interconnected with 'nature' by integrating traditional Māori cultural beliefs and perspectives in environmental education, projects, policies, and legislations. It is important to approach Mātauranga Māori from an environmental psychology perspective and by involving appropriate Māori leadership in the advancement of ideas, as shifting people to a greater sense of empathetic interconnectedness with 'nature' utilising these cultural perspectives requires respectful collaboration. Through this multi-disciplinary collaboration, practical activities could be generated that could help to change the way people view themselves in relation to 'nature' to an overall greater feeling of interconnectedness.

Our study has demonstrated the value of taking an integrated approach to environmental management by employing psychological scales to understand the human-'nature' relationship and how certain feelings of interconnectedness can promote pro-'nature' beliefs. However, there are some limitations that need to be acknowledged. Firstly, as discussed, respondents may have perceived the overlaps between circle pairs B, C, D, E and G differently from one another. For example, the overlap may signify a spiritual overlap to one respondent but may signify an emotional or experiential overlap to another. Exploring this overlap further would have been useful and we would strongly recommend this for future research employing the INSS. Secondly, despite the varying degrees of overlap in the five circle pairs (B, C, D, E and F), we assume that this still reflects an overall view by respondents that supports the idea that there is a distinction between self and 'nature' based on these pairs of circles having fixed, albeit varying, borders indicating that each circle is an isolated entity from the other (as opposed to G). Future research utilizing the INSS is recommended to clarify with respondents if this was how it was interpreted from their perspective. Third, as the ethnicity and age split were not representative of the Tāmaki Makaurau Auckland population, it is not possible to draw conclusive findings as to whether INSS changes across age or ethnicity, instead, we could only provide suggestive findings which complimented our main findings. Therefore, if future research is primarily interested in how responses differ across demographic groups, then representative age and ethnicity groups should be sought. This would mean that there could not be such a heavy reliance on data collection methods such as social media to attract respondents as this potentially limits input from older people who do not engage in social media as much as younger people and would require purposely visiting specific cultural locations to ensure all ethnicities are represented.

5.6 CONCLUSION

The findings of this study suggested that a dominating perspective across the respondent group sampled was that there was some degree of connectedness to 'nature', but in our view, the results still signified an overall perception that self and 'nature' remained two distinct, albeit varyingly connected, entities which was unsurprising given the dominating Western cultural influence in the study location. Through utilizing statements which we developed based on the NEP to capture pro-'nature' beliefs alongside the INSS, it was found that respondents who perceived a complete separation between self and 'nature' were more likely to have low pro-'nature' beliefs. This finding is concerning from an environmental management perspective, as it suggests that a perceived separation between self and 'nature' may have implications for future sustainability. Conversely, respondents who perceived an interconnectedness held high pro-'nature' beliefs. This finding highlights the benefit of utilizing the INSS in environmental management as it can provide crucial insights into the complexity of how people view themselves in relation to 'nature' and thus help to find management pathways that promote pro-'nature' beliefs.

Overall, this study has contributed to an empirical gap in environmental literature through utilizing the INSS to understand how people report their view of themselves in relation to 'nature' from an environmental management perspective. Furthermore, the study contributes to an empirical gap by employing the INSS alongside statements developed based on the NEP to try to better understand what may influence people's beliefs. Despite great emphasis from environmental management on activities over the past decade which have aimed to change people's actions to more sustainable ones by promoting reductions in emissions, engaging in more recycling, treating other species with respect, etc., we argue that there is a case for devoting a greater focus within environmental management on understanding the underlying beliefs and worldviews that people hold to contribute to the efforts to achieve future environmental sustainability. Through understanding these deeper perspectives, ways to determine widespread transformational change can be identified. With more emphasis on changing beliefs, values and views and thus prompting people to feel interconnectedness with 'nature', we would expect to see a natural progression of society transitioning to one that recognises the inherent connection between people and 'nature' and therefore acknowledging that harming 'nature' is in effect, harming themselves. However, addressing this would involve the unpicking and challenging of a range of concepts which inherently assume their distinction and further require deep, structural changes as to how emphasis could be placed on increasing feelings of interconnectedness with 'nature' across the population. Despite this, Aotearoa New Zealand is in a relatively unique position in which the Mātauranga Māori view of interconnectedness between humans and 'nature' is being increasingly being integrated into environmental research and policy and therefore this is an important first step but more work is to be done to understand how environmental practitioners can dissolve the perceived separation between people and 'nature'. However, given that human activities have been implicated in the vast majority of contemporary environmental problems, it might be expected that research effort into those activities and the attitudes from which they stem would be strongly supported by funding agencies, and of central interest to environmental scientists (Lead *et al.,* 2005) and therefore we hope that this research has highlighted that there is much room in environmental management to integrate other disciplinary tools to understand the complexities of the human-'nature' relationship for future environmental sustainability.

5.7 SUPPLEMENTARY INFORMATION

TABLE 5.1 SUPPLEMENTARY INFORMATION REGARDING ALTERATION OF NEP STATEMENTS

Statement used in this study	**Statement by Catton *et al.,* (1980) of which this study's statement was based off**	**And/or**	**Revised statement by Dunlap and Van Liere (2014) of which this study's statement was based off**	**Comments**
Humans should have the right to modify nature, even if it has negative impacts on nature.			Humans have the right to modify the natural environment to suit their needs.	We switched the term 'natural environment' to 'nature' for consistency across the survey which only used the term 'nature'. The statement text was slightly altered e.g., adding "…even if it has negative impacts on nature" to further understand if respondents felt that it was acceptable for nature to be harmed to meet human needs.
At present, mainstream human economic activities (i.e., production and farming practices) and social activities (i.e. growth of cities and populations) are having negative impacts on nature.	Mankind is severely abusing the environment. There are limits to growth beyond which our industrialized society cannot expand. To maintain a healthy economy we will have to develop a "steady-state" economy where industrial growth is controlled.		Humans are seriously abusing the environment. The balance of nature is strong enough to cope with the impacts of modern industrial nations.	Again, the term 'environment' was swapped to 'nature' for consistency. Keeping in line with the notion of industrialization, we wanted to refer to economic and social activities for specificity. Use of examples in brackets were included so ensure the respondent was clear as to which activities we were referring to.
Whenever possible, humans should take the opportunities to behave in sustainable ways, to ensure nature is protected and enhanced.	The balance of nature is very delicate and easily upset. When humans interfere with nature it often produces disastrous consequences. Humans must live in harmony with nature in order to survive.		The Earth is like a spaceship with limited room and resources. The balance of nature is very delicate and easily upset. If things continue on their present course, we will soon experience a major ecological catastrophe. When humans interfere with nature it often produces disastrous consequences.	We created a statement to reflect the aim of multiple statements from both the original, and revised NEP. We make specific reference to 'protected and enhanced' as this is terminology used in Aotearoa New Zealand's policy and legislation. We used the term 'sustainable' as we felt it was a term that is becoming more commonly used in nature related discourses.
Plants and animals have as much right to exist as humans do.	Plants and animals exist primarily to be used by humans.		Plants and animals have as much right as humans to exist.	We based this statement directly off the revised NEP statement.

I view humans as the top of the hierarchy within nature.	Mankind was created to rule over the rest of nature.	Humans were meant to rule over the rest of nature.	We re-wrote this statement to include reference to hierarchy instead of 'rule over' as we were interested in the ways in which respondents viewed themselves in relation to nature versus whether they felt there was an element of control over nature they had.
I am worried about the state of nature around the world.	We are approaching the limit of the number of people that Earth can support. The balance of nature is very delicate and easily upset. When humans interfere with nature it often produces disastrous consequences. The Earth is like a spaceship with only limited room and resources. Mankind is severely abusing the environment.	Humans are seriously abusing the environment. We are approaching the limit of the number of people that Earth can support. If things continue their present course, we will soon experience a major ecological catastrophe. The Earth is like a spaceship with very limited room and resources.	Again, we replaced the term 'environment' with 'nature' for consistency. We further felt that simplifying the NEP statements was necessary into one broader statement to capture general concern by respondents and to ensure the survey length was not too long.
The current emphasis at national and global levels to protect and enhance nature is over-exaggerated.		The so-called "ecological crisis" facing humankind has been greatly exaggerated.	Again, we replaced 'ecological' with 'nature' for consistency. We further replaced 'so-called' with 'current emphases' for clarity.

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CHAPTER 6 - SYNTHESIS AND CONCLUSION

In this final chapter, the key findings are summarised by research objective and synthesised in terms of their contribution to environmental management. How the results can inform environmental management is discussed and their relevance for planning, policy/strategy, and practice in Tāmaki Makaurau Auckland are explored. Thereafter limitations that were encountered in this research are acknowledged, followed by recommendations for future research. Lastly, the final conclusion for the thesis is presented.

Note: the use of the term's 'nature' and 'connection to 'nature'' in single inverted commas in this chapter intends to portray the term as defined by the dominant conceptualisations uncovered in chapter two and three.

6.1 RESEARCH FINDINGS AND THESIS CONTRIBUTION

The research undertaken towards this PhD aimed to investigate beliefs about 'nature', specifically 'nature' conceptualisations and connections with the purpose of trying to determine insights that could be used to assist environmental management. An important goal of the research was to increase knowledge into the human-'nature' relationship that can be used to develop stronger, more holistic approaches to address 'nature' degradation in Aotearoa New Zealand and contribute to environmental management literature globally. In total, 997 volunteer respondents from Tāmaki Makaurau Auckland engaged in the research. The four research objectives that chapters two to five addressed were as follows:

Research Objective 1: To identify the ways in which 'nature' is conceptualised and what the most common aspects associated with 'nature' is by the public in Tāmaki Makaurau Auckland,

Research Objective 2: To identify how 'connections to 'nature'' are conceptualised by the public in Tāmaki Makaurau Auckland,

Research Objective 3: To understand self-reported pathways and barriers to 'connections to 'nature'' by the public in Tāmaki Makaurau Auckland, and,

Research Objective 4: To explore how the public in Tāmaki Makaurau Auckland view themselves in relation to 'nature' and determine whether there are correlations between interconnectedness with 'nature' and pro-'nature' beliefs.

6.1.1 CONTRIBUTION BY RESEARCH OBJECTIVE

6.1.1.1 IDENTIFICATON OF THE WAYS IN WHICH 'NATURE' IS CONCEPTUALISED AND DETERMINING THE MOST COMMON ASPECTS ASSOCIATED WITH 'NATURE'

The findings from this aspect of the study contributed to answering the question - what is 'nature' and/or what does 'nature' mean to people? Despite the growing consensus since the

1970s within the scientific community that we must protect 'nature'; numerous authors such as Simberloff, 2014; Beery, Jönsson & Elmberg, 2015; Ives *et al.,* 2017; Ducarme & Couvet, 2020 have stated that the term still lacks clear definition. There has been a small amount of empirical research which has sought to explore conceptions of 'nature', however, the research predominantly applied deductive approaches. Therefore, an important novel aspect of this research is that it applied an inductive approach. This has provided a deeper insight into conceptualisations of 'nature' by allowing respondents to self-report their conceptualisations in an open-ended, qualitative context.

To identify the ways in which the sample group conceptualise 'nature' and which aspects are commonly associated with 'nature', the question *"please can you tell me in a few words what you think 'nature' is?"* was asked with a total of 997 respondents providing commentary (online survey n = 963; structured interview n = 30; semi-structured interview n = 4). Through the process of content analysis, 17 non-mutually exclusive, yet divergent, conceptualisations of 'nature' were identified and a keyword search across all responses identified 63 aspects that respondents associated with 'nature'.

Of the 17 themes identified, the most common conceptualisation of 'nature' was that 'nature' is something of which neither humans, nor human influence or activities are a part (n = 58.1%). This was followed by the conceptualisation that 'nature' is a personal feeling or experience (n = 38.0%), that 'nature' is the outdoors (n = 19.0%) and that 'nature' is a resource (n = 14.5%). These were followed by a further 13 themes which were referenced by less than 12.0 percent of respondents. Of the 63 aspects that respondents referenced, most fell into overall themes of 'flora' (n = 57.7%) or 'fauna' (n = 40.3%).

The key finding that emerged, e.g., that 'nature' is something of which neither humans, nor human influence are a part, is problematic for environmental management as it is widely argued that perceived separation between humans and 'nature' underpins the global crisis facing 'nature' (Haila, 2000; Vining, Merrick, & Kalnicky, 2008; Zylstra, Knight, Esler, & Le Grange, 2014; Beery *et al.,* 2015). Furthermore, the finding reflecting that the most common associated aspects with 'nature' are 'flora' and 'fauna', are similarly problematic as this could result in long term implications for environmental management as it may lead to some aspects of 'nature' receiving more conservation and attention than others. These findings highlight the need for environmental managers to work on shifting conceptualisations of 'nature' to a more interconnected view encompassing humans and to ensure that all aspects of 'nature' receive attention in conservation efforts.

6.1.1.2 IDENTIFYING HOW A 'CONNECTION TO 'NATURE'' IS CONCEPTUALISED

Despite the calls to 'reconnect' people with 'nature' for future environmental sustainability, there is little clarity as to what the phrase means. The result being that the term 'connection to 'nature'' is used haphazardly across literature entailing vagueness as to what it means theoretically and in practice. This has been highlighted by authors such as Restall & Conrad, (2015); Ives *et al.,* (2017); Salazar, Monroe, Jordan, Ardoin & Beery, (2021). The findings from this study therefore provided significant insight into the varied conceptualisations of 'connections to 'nature'', acting as a novel first step address a knowledge gap that has clear benefits for environmental management.

To understand how the sample group of respondents conceptualise 'connections to 'nature'', the question *"please can you tell me in a few words what a connection to 'nature' means to you?"* was asked to the sample group with a total of 990 respondents (online survey n = 956; structured interview n = 30; semi-structured interview n = 4) providing commentary.

The process of content analysis identified nine themes of 'connection to 'nature''. Most commonly, was the reported conceptualisation that a 'connection to 'nature'' is a cognitive connection (n = 52.9%), an affective/emotional connection (n = 49.6%) or that it is an experiential/physical connection (n = 37.0%).

This research has thus contributed to providing some insight as to what the term may mean to people and provides credibility to the fact that there is not one set or universal definition of a 'connection to 'nature'' based on the range of conceptualisations identified. This highlights the importance of environmental managers acknowledging, and further considering how to support the spectra of 'connections to 'nature'' that people hold and what they may mean for environmental sustainability. As the dominant conceptualisations were that a 'connection to 'nature'' is either cognitive or affective, this suggests that alongside common programmes/strategies which seek to 'connect' people to 'nature' via physical means (e.g., going outside) it would be beneficial to place similar emphasis on how to facilitate cognitive or affective 'connections to 'nature''. Notwithstanding this, the findings do support the use of scales which are commonly used in literature such as the Connectedness to Nature Scale by Mayer & Frantz (2004) or the Nature Relatedness Scale by Nisbet *et al.,* (2008) which focus on cognitive and affective dimensions of 'connections to 'nature''.

6.1.1.3 UNDERSTANDING SELF-REPORTED BARRIERS AND PATHWAYS TO 'CONNECTIONS TO 'NATURE''

Despite the increased emphasis over the past decade seeking to test what can increase people's feelings of 'connection to 'nature'' through the use of specific interventions, there is a gap in research that seeks respondents to reflect and report on the factors they perceive acts as pathways or barriers to their 'connections to 'nature'' (e.g., what prompts, increases, sustains and/or challenges or inhibits their connection). Thus, this study helped to address a gap which has been identified by Lumber *et al.,* 2017; Ives *et al.,* 2018; Richardson *et al.,* 2020; Salazar *et al.,* 2021 and provided knowledge that can help environmental managers understand what tangible actions they can promote to encourage stronger 'connections to 'nature''. This is important, as previous empirical literature strongly suggests a link between increased feelings of connection to 'nature' and pro-'nature' actions (Whitburn, Linklater & Abrahamse, 2019).

To achieve this research objective, respondents were asked to discuss why, why not, or why they only sometimes, had a 'connection to 'nature'' (based on their response to the question "*do you have a connection to 'nature'?*"). Of all the 997 respondents that answered that question, 976 respondents provided further commentary (online survey n = 942; structured interview n = 30; semi-structured interview n = 4).

The process of content analysis identified a total of six perceived barriers to respondents' 'connections to 'nature'', and 14 pathways to 'connections to 'nature''. In sum, 'modern societal modalities' (n = 41.3%) were most referenced as acting as barriers, while physically experiencing or being exposed to 'nature' was identified as the most common pathway (n = 38.4%). This was followed by cognitive reasons (e.g., having certain knowledge, beliefs, or

attitudes toward 'nature') (n = 23.1%), emotional reasons (n = 18.9%) and health and wellbeing reasons (n = 18.8%) as pathways to 'connections to 'nature''.

These findings highlight firstly, the importance of environmental management considering perceived barriers or pathways to 'connections to 'nature'' given that 'connections to 'nature'' are widely reported to translate into pro-'nature' actions (Whitburn, *et al.,* 2019) and this therefore this provides insight into what could potentially be influencing actions toward 'nature'. Secondly, the findings highlight that as the region's urban landscape grows, 'nature' needs to be accessible to the population in a large range of contexts to maintain their 'connections to 'nature'' and mitigate the common perception that modern societal modalities are a barrier. Overall, the findings provide options for potential interventions to improve the human-'nature'connection in Tāmaki Makaurau Auckland and highlight that exploring these notions in greater depth is beneficial in environmental management.

6.1.1.4 EXPLORING HOW PEOPLE VIEW THEMSELVES IN RELATION TO 'NATURE' AND DETERMINE WHETHER THERE ARE CORRELATIONS BETWEEN INTERCONNECTEDNESS WITH 'NATURE' AND PRO-'NATURE' BELIEFS.

It is inappropriate to expect people to change their actions without environmental managers first having a fundamental understanding of the potential complexities and differences across people's relationship with 'nature' – for example if they feel interconnected with 'nature' or separate from it (Schultz, 2002; Abson *et al.,* 2017). Therefore, this research explored how people view themselves in relation to 'nature' using a psychological scale (the Inclusion of Nature in Self Scale (INSS) by Schultz (2002)) alongside statements derived from the New Ecological Paradigm (NEP) by Catton, Riley & Dunlap (1980) and Dunlap, Van Liere, Mertig & Jones (2000) to explore whether interconnectedness with 'nature' translates into pro-'nature' beliefs. This research demonstrated the value of taking an integrated approach to environmental management by employing psychological scales to understand the human-'nature'relationship and how certain feelings of interconnectedness can promote pro-'nature' beliefs.

The results suggested that most respondents (98.4%) perceive varying levels of connectedness between self and 'nature' from a small amount (e.g., pair B – 4.3%), to a full interconnectedness with 'nature' (e.g., pair G – 18.8%) which gained insight into how differently people view themselves in relation to 'nature'. However, I argued that the selection of circle pairs B, C, D, E, and F which did not reflect a complete interconnectedness with 'nature' but contained some overlap, reflects a view by respondents that there is a distinction between self and 'nature' based on the pairs of circles having fixed borders indicating each circle is an isolated entity from the other.

Secondly, results suggested that there was no difference in perspectives based on gender, but the oldest age group of respondents (81 – 90) were most likely to report interconnectedness with 'nature'. On the contrary the youngest age group of respondents (16 – 20) were less likely to report interconnectedness with 'nature'. Respondents who identify as Māori were more likely to report a complete interconnectedness with 'nature'. Third, results suggested that the more interconnected a respondent felt with 'nature', the more likely they were to display high pro-'nature' beliefs and on the contrary, the less interconnected with 'nature' a respondent felt, resulted in lower pro-'nature' beliefs.

The findings call attention to the dominating reported belief that 'nature' is separate from the self, again, resulting in concerns for environmental management efforts as it is widely argued that perceived separation between self and 'nature' underpins the global crisis facing 'nature' (Haila, 2000; Vining *et al.*, 2008; Zylstra *et al.*, 2014; Beery *et al.*, 2015). Furthermore, the findings reflect that there may be differences in feelings of connectedness to 'nature' based on age group or ethnicity which prompts consideration as to how different environmental sustainability approaches may need to be tailored across different age groups and ethnicities. Overall, the research highlights that from an environmental management perspective it is worth focusing efforts on determining and implementing approaches that can bring about a shift in the perceptions of people towards increased feelings of interconnectedness with 'nature'. Adopting this line of thinking, it could be assumed that if environmental management approaches can make people feel less separated and thus 'more at one' with 'nature', then it would be more possible to encourage pro-'nature' beliefs and subsequent actions that result in more beneficial outcomes for 'nature'.

6.1.2 OVERALL CONTRIBUTION TO ENVIRONMENTAL MANAGEMENT

6.1.2.1 ENVIRONMENTAL MANAGEMENT IN AOTEAROA NEW ZEALAND

The research outlined in this thesis, albeit exploratory, provides new insights into self-reported individual beliefs relating to 'nature' through addressing the four research objectives. The findings from the research have indicated characteristics about the Tāmaki Makaurau Auckland population that were previously not known. Specifically, the research has uncovered that most of the respondent group – and thus by inference the general population – conceptualise 'nature' as being something of which humans nor human influence/activities are not a part, and that similarly mostly view 'nature' as separate from themselves. Secondly, the research uncovered that 'nature' is mostly considered to be flora and fauna, and that there are several ways in which people connect to 'nature' but that most connect to 'nature' cognitively or affectively. Third, the research has shown that most individuals perceive modern societal factors as a barrier to their connection to 'nature', while exposure to 'nature' is widely regarded as a key pathway to their connections. Lastly, that increased feelings of interconnectedness with 'nature' correlated with higher pro-'nature' beliefs.

As outlined in section 1.6.2.2, there has been a growing acknowledgment in Aotearoa New Zealand around the importance of understanding the human-nature relationship by Government agencies, and academics/researchers. The findings from this research have complimented the work being done and have provided valuable insight into beliefs about 'nature' – specifically 'nature' conceptualisations and connections for the first time. Thus, the findings contribute new knowledge that can be useful for regional environmental managers and can therefore enable agencies such as Auckland Council, or other environmental organisations in the region to consider varying beliefs relating to 'nature' and in the first instance generate apposite questions that the key findings provoke; such as how to support people to feel more interconnected with 'nature', how to broaden the dominating conceptualisation of 'nature' away from just flora and fauna, and how to consider and support the several dimensions of how people enact their 'connections to 'nature''. Indeed, it is crucial that emphasis should be on ensuring accessibility or exposure to 'nature' to prompt 'connections to 'nature'' as it is crucial

to mitigate the barriers of modern life on people's connections. This emphasis can be integrated into planning, policy/strategy and practice which is discussed in the following section.

6.1.2.2 ENVIRONMENTAL MANAGEMENT INTERNATIONALLY

Internationally, the research in this thesis has contributed towards filling some important gaps in literature as identified in chapters two, three, four and five. Specifically, the research has contributed to the small, but growing body of research which has sought to understand lay-conceptualisations of 'nature', and conceptualisations of 'connections to 'nature''. The research has also provided insight into the perceived, self-reported pathways and barriers to 'connections to 'nature'' which is currently under-researched internationally, and has shown the validity of using the INS scale in environmental management. As there is a wide recognition that beliefs about 'nature' translates into behaviours to 'nature' (Meadows, 1999; Stern *et al.,* 1999; Ajzen, 1991) the findings from this research can provide some understanding as to why people behave differently toward 'nature' or are more likely to hold pro-nature beliefs compared to others.

The research has addressed the points raised by authors such as Restall & Conrad (2015) and Ives *et al.,* (2017) that state tat research on human beliefs relating to 'nature' is seldomly executed from an environmental management perspective with research rarely being situated as being relevant for sustainability efforts. This was done by positioning the research from an environmental management perspective and relating the findings back to policy, strategy, and planning.

Despite the geographical and political landscape of each country being different to Aotearoa New Zealand, the findings and their implications can be useful to prompt thinking about how environmental planning, policy and strategy around the world can encompass human beliefs relating to nature. Also, since Tāmaki Makaurau Auckland is considered one of the most ethnically diverse cities in the world (Auckland Unlimited, 2018) the findings may provide a partial appreciation towards understanding the potential diversity in human beliefs in relation to 'nature' across other similarly diverse cities. The research thus acts as a useful case study that can be replicated in other contexts and provides numerous recommendations as to how this could be executed more efficiently based on the learnings from the research process (discussed further in section 6.4).

6.2 IMPLICATIONS

Sustainability transformation requires shifts on a range of levels and thus it is important to integrate the values, and beliefs that people hold into practice, policy/strategy and planning to initiate change (Riechers *et al.,* 2021). Therefore, this section discusses the implications of the results for environmental management in Tāmaki Makaurau Auckland in relation to planning, policy/strategy, and practice in the area. It also provides some recommendations as to how the findings could be implemented by Auckland Council to help them achieve more positive environmental management and sustainability outcomes.

The way Auckland Council's planning, policy/strategy, and practice currently work was outlined in section 1.7.3 and Figure 1.4. As a reminder, the region has an overarching spatial plan – the Auckland Plan 2050 – which guides planning processes and regulations, the region's

development strategy, bylaws, regional policies, and smaller place-based and topic-based plans. At times, central Government releases national policy statements (NPS) to provide national direction relating to specific issues (e.g., housing) or environmental issues (e.g., coastal management). These NPS's must be adhered to by Councils and all the regional plans, strategies, policies, or bylaws must be consistent with the aims and objectives of NPSs.

6.2.1 PLANNING

The findings from this research have a number of implications for planning in the Tāmaki Makaurau Auckland region. Specifically, there are implications in four contexts. The research is very relevant to:

1. Proposed changes to the Auckland Unitary Plan (AUP) in response to a new national policy statement relating to urban development which requires increased residential intensification in urban areas to mitigate the housing crisis that Aotearoa New Zealand, in particular Tāmaki Makaurau Auckland, is currently experiencing (Ministry for Social Development, 2021; Demographia, 2021),

2. Proposed changes to the AUP in response to the requirement to increase the urban boundary to accommodate the Auckland Plan 2050 development strategy to adapt to the increasing population growth (StatisticsNZ, 2021),

3. The current planning context in the region regarding the lack of priorities and policies to increase open/green spaces in the region, and

4. The current planning context in the region regarding the current provisions in the AUP that lack emphasis on protecting and enhancing open/green spaces in urban zones.

This sub-section will first situate the above points in the context of this research, discuss the direct implications of the findings, and conclude by providing recommendations to address the identified implications.

Firstly, intensification within current urban zones will increase due to the requirements of the National Policy Statement – Urban Development (NPS-UD) (New Zealand Government, 2021). This directs local authorities (Councils) to allow for more houses to be built with greater height and density in areas close to cities, and provides for community services, jobs, and public transport to address the housing crisis in Aotearoa New Zealand (Ministry for Social Development, 2021). In response to the NPS-UD and to accommodate its requirements, Auckland Council have proposed amendments to the AUP, resulting in several plan changes to be undertaken in areas close to the city centre, and to community services and public transport hubs allowing for housing intensification of the region to occur. For example, this will include the re-zoning of single house zones or open space zones to more intensified zones such as terraced housing and apartment building zones. This provides the planning framework for increased condensed housing development that the NPS-UD requires.

Secondly, the development strategy (Auckland Council, 2018) identified 15,000 hectares of land outside of the urban boundary that can be converted to urban zones (e.g., residential[30], business[31]) to accommodate for predicted population growth in the region (1.1% a year from 2021 to 2048 (StatisticsNZ, 2021)), This conversion under the development strategy provides more residential development opportunities and necessary business infrastructure to support this. The result being that within the next 35 years 40.0% of urban development will be outside of the current urban boundary. The ramification of this will be increased urban sprawl across the region (Silva, 2019).

Thirdly, at present, under the AUP there are no policies within urban zones to increase public open/green spaces (e.g., reserves or parks) alongside development[32]. This is likely the result of there being little emphasis in the Auckland Plan 2050 which informs the AUP on increasing open/green space in the region. This is contrary to the previous Auckland Plan 2040 (Auckland Council, 2012) which heavily promoted the importance of increasing open/green spaces and required the development of an open space provision policy (Auckland Council, 2016). However, the current Auckland Plan 2050 instead seeks that innovative design approaches and opportunities for enhancing current open/green spaces are implemented to *"get more out of what we already have"* as *"acquiring new spaces is expensive"* (Auckland Council, 2018c). This approach is to be expected as Auckland Council are prioritising increased housing options to meet the scale and pace of the anticipated need for housing. Tāmaki Makaurau Auckland is now the fourth most unaffordable city in terms of residential costs in the world (Demographia, 2021) and the population is continuing to grow (Statistics, 2021) so finding ways to address shortages and create affordable housing is necessary.

Lastly, when considering the regulations within each AUP zone, there are clear differentiations to the rules as to how 'nature'/natural areas must be protected, managed, or enhanced within the varying zones. For example, only open space zones (e.g., conservation or recreation) have rules that require *"...the natural ecological and landscape values of the zone must be enhanced and protected from adverse effects of use and development"*. The result being that in other zones such as urban or business, it is easier for landowners or developers to get a resource consent[33] to alter or impact natural landscapes, for example clearing trees as there are limited rules to prohibit these activities. This is evidenced through the extremely low level of ecosystems ranging from forests, wetlands, and regenerating ecosystems across Tāmaki Makaurau Auckland's urban residential and business zones (Singers *et al.,* 2017).

Overall, future urban intensification, along with an expansion of the urban area to accommodate for growth, a lack of prioritisation to increase open/green spaces, and a lack of strict policies relating to the protection of current open/green spaces in urban zones, will result in a reduction and fragmentation of open/green spaces over the next few decades in the region. Considering the findings from this research there are numerous implications for this which will impact a large sector of the population as 90.0% currently reside in urban zones (Auckland Council, 2018a).

[30] Example zones within residential zones are single house zones, mixed house zones, terrace zones and apartment zones

[31] Example zones within business zones are business park zones, city centre zones and light industry zones

[32] Albeit there are policies that require that houses have an outdoor yard

[33] In Aotearoa New Zealand, a resource consent is an approval from a local authority to undertake an activity (e.g., building a house) that will alter the surrounding environment.

One of the main implications is that areas which are considered 'nature' by the Tāmaki Makaurau Auckland population will become fewer e.g., there will be fewer places in urban zones that could be categorised as something which humans nor human development and/or influences are a part, and flora and fauna will likely be impacted. People's ability to enact their 'connections to 'nature'' may also be impacted due to the reduction of these areas. For example, a large sector of the respondents in this research conceptualised their 'connections to 'nature'' as being experiential and/or physical which means that interacting with 'nature' (precisely flora or fauna) is how they enact their 'connections to 'nature''. Furthermore, respondents commonly discussed exposure to 'nature' as being a key pathway to sustaining, increasing, or promoting their connection to 'nature' and therefore the fragmentation of 'nature' areas may result in a large sector of the population struggling to prompt or enact their 'connections to 'nature''. This is particularly problematic, as 'modern societal factors', specifically references to 'urban life', were perceived by respondents' as being a key barrier to connecting to 'nature'. Therefore, this creates a situation whereby 'urban life' is increasing due to intensification and expansion of the urban area, and opportunities to 'connect' with 'nature' are decreasing due to lack of 'nature' areas to interact with. In addition to this, considering the widely documented link that exposure to 'nature' is crucial for health and wellbeing (Jimenez *et al.,* 2021) and the high reference to the health and wellbeing benefits of 'nature' as identified by respondents, there may also be negative implications on people's health and wellbeing from the reduction of open/green spaces in urban zones.

Despite the potential fragmentation and reduction of open/green spaces from current planning strategies, it is important to note that there are some place-based plans that have been recently released which will help to enhance existing open/green spaces. For example, the City Centre Masterplan (2020a) was developed to deliver strategic directives from the Auckland Plan 2050 relating to housing development. This plan provides guidance, and a framework, to enhance current public spaces in the city centre and convert them into networks of greenspaces, green corridors, trees, and urban farms. This place-based plan complements the topic-based plan; the Urban Ngahere (forest) Strategy (2018b) which was developed to deliver the strategic directive of the Auckland Plan 2050 relating to 'nature' protection and enhancement. This strategy provides guidance as to how tree cover across the urban area can be increased by 30.0% over the next ten years. Notwithstanding the implications of the increase in development in the region and reduction in open/green spaces, these plans/strategies constitute a significant positive step towards ensuring that 'nature' is accessible to the population when considering the findings from this research around the importance of physical exposure, interaction, or experience in 'nature' for 'connections to 'nature''. However, these are not legally binding or statutory documents, and therefore do not necessarily have to be adhered to in planning processes.

Furthermore, albeit not part of standard planning processes, to make up for the loss of revenue that Auckland Council faced from the COVID-19 pandemic and restrictions the region faced in 2020[34], land disposal and rationalisation processes were undertaken. This involved re-zoning 25 open space areas including both open space – recreation and conservation to either residential or business zones and selling them for housing development (Panuku Development, 2020). This further contributes to the loss in open/green space across the region.

[34] Auckland Council generates 60% of its revenue from Council owned leisure centres, libraries, Auckland Airport dividends, etc. Public statements made by Auckland Council in 2020 (e.g., this news article) were that the revenue would decrease by $550 million due to COVID-19 lock-down restrictions in the region that were from March – June 2020.

There are opportunities for future planning in the region undertaken by Auckland Council to play a meaningful role in addressing, and mitigating, the implications from the findings of this research specifically around maintaining 'nature' or open/green spaces and allowing for easy access for the growing population in urban areas. These are as follows:

- In parallel to undertaking the required plan changes to accommodate the NPS-UD, develop place-based plans such as the aforementioned City Centre Masterplan (2020a) for other areas that will guide the enhancement, and conversion of public spaces to greenspace networks, green corridors, trees, and urban farms,

- When undertaking the required plan changes to accommodate the NPS-UD, retain as much open space (e.g., recreation or conservation) as possible. In this context it is recommended to also consider recent research undertaken in Aotearoa New Zealand which explores the use of open spaces/interaction with 'nature' across different age groups by Freeman, Stein, Hand & Van Heezik, 2018; Freeman, Waters, Buttery & Van Heezik, 2019; Freeman *et al.*, 2019; Freeman, Buttery & Van Heezik, 2021 to help encompass age specific considerations of accessibility to these spaces,

- Consider resources provided by the World Health Organization such as the *Urban Green Spaces – A Brief for Action* (2017) handbook which provides guidance as to how open/green space in urban areas can be strategically maximised and enhanced,

- Consider recommendations by the World Health Organization (2012) that there needs to be a minimum of $9m^2$ of open/green space per person in urban areas (for health and wellbeing benefits),

- Consider the growing literature which evaluates the ratio of open/green space required in urban areas to ensure easy access by the population, such as research by Russo & Cirella (2018) and Susaki & Komiya (2014),

- Integrate new policies into AUP urban and business zones requiring infrastructure to encompass a certain amount of biophilic design principles[35] to enhance current and future infrastructure and use these as opportunities to increase natural environments in the urban zone, similarly, integrate principles from new planning paradigms such as 'biophilic urbanism', seen in countries such as Singapore (Newman, 2014),

- Update and re-introduce an open space provisions policy for the region,

- Re-consider the development strategy and identify whether there are opportunities to increase housing in current urban areas considering the new NPS-UD, as opposed to continuing with the expansion of the current urban boundary. Not only will this preserve

[35] The concept of 'biophilic design' is related to six design elements: environmental features, e.g., use of natural colours, use of water features, use of natural ventilation, insertion of plants on structures such as green roofs, allowances for free-roaming animals (e.g., chickens), use of natural and organic materials, and building alongside the landscape, versus dominating it, natural shapes and forms e.g., use of motifs and forms which resemble those found in 'nature', natural patterns and processes e.g., incorporation of properties found in 'nature' such as fractals and sensory variabilities, light and space e.g., increasing the flow between indoor and outdoor spaces, increased integration of natural light as opposed to artificial light, place-based relationships e.g., creating areas which facilitate, and support people to have connections to it, and evolved human-'nature' relationships e.g., incorporating the fundamental aspects of the inherent human relationship with 'nature' such as providing a sense of refuge and security, attraction and beauty (Kellert, Heerwagen, & Mador, 2008).

open space zones but will result in a more compact city that is built up (versus out) which has numerous of other associated benefits such as sustainable transportation, lower environmental footprint, social benefits, and so on (Birbri, Krogstie & Kärrholm, 2020).

- Increase policies in AUP residential and business zones relating to the protection of natural ecological and landscape values which are currently only within open space zones to ensure that as much 'nature' remains in these zones, and

- Despite place-based and topic-based strategies and plans not being statutory and thus not legally binding, acknowledge and consider those which aim to increase open/green spaces in the urban area such as the Urban Ngahere (forest) Strategy (Auckland Council, 2018b) and the City Centre Masterplan (Auckland Council, 2020a) as much as possible. For example, in practice, this would look like resource consents requiring more conditions[36] relating to the aims and objectives of strategies such as the Urban Ngahere (forest) Strategy – e.g., requirement to increase canopy cover of a property to contribute to the goal of 30.0% forest as part of the Urban Ngahere (forest) Strategy.

6.2.2 POLICY AND STRATEGY

The findings from this research have a number of implications for policy and strategy in the Tāmaki Makaurau Auckland region. Firstly, as discussed in the previous section and in section 1.7.3, all planning in the region is informed by the over-arching Auckland Plan 2050 strategy which as discussed, does not place much emphasis on the increasement of open/green spaces due to the ongoing pressure of needing to expand the stock of housing to accommodate the population growth of the region (Statistics, 2021) and to alleviate the current housing crisis (Ministry for Social Development, 2021).

Acknowledging these pressures, recommendations were made in the earlier section specifically focussed on how to enhance and protect 'nature' in existing urban areas and how to innovatively include more 'nature' in the urban area through planning processes. However, the implications from the findings of the study regarding the importance of retaining 'nature' areas (free of human disturbance and predominantly flora and fauna) to support individuals to enact and sustain their 'connections to 'nature'', highlight that more emphasis in the Auckland Plan 2050 needs to be placed on how to balance housing development with retaining these spaces.

If emphasis in the Auckland Plan 2050 was increased by providing strong objectives to preserve and enhance these spaces, the place and topic-based plans developed to deliver the strategic directives in the Auckland Plan 2050 would be required to achieve this. Therefore, this may entail the development of more strategies such as the City Centre Masterplan (Auckland Council, 2020a) and Urban Ngahere (forest) Strategy (Auckland Council, 2018b) and would result in stronger requirements for planning regulations to increase and maintain more open/green spaces across all urban zones. Furthermore, if stronger emphasis and guidance was included in the Auckland Plan 2050 around the importance of preserving and increasing open/green spaces, any future plan changes must be consistent with the Auckland Plan 2050's overall objectives, seeking to re-zone open spaces to urban may not be possible.

[36] When a resource consent is granted, a council may require the applicant adheres to certain conditions as part of the resource consent.

Secondly, the implications from the findings that reflected that a dominating view across the respondents is that humans and 'nature' are separate, suggest that 'nature' related strategies and policies should be considered in the broader context of the connection between humans and 'nature'. For example, at present, Auckland Council's policies and strategies are developed and executed[37] in silos, those being community and social development, parks, sport, and outdoor, environmental, economic development, housing, and asset management (Auckland Council, 2021b). However, these findings suggest there may be merit in increasing co-ordinating strategies and policies across these institutional topical borders to socialize the population to consider that 'nature' is not something that is isolated from humans and that it is intertwined with economic development, social development, etc. Co-ordinating and executing policies and strategies to reflect the linkages across differing domains further addresses the implication from the findings indicating the strong influence that connecting to 'nature' has on health and wellbeing. For example, co-ordination of policies and strategies will allow for objectives or aims relating to protection and enhancement of 'nature' to be intertwined with objectives and aims looking to enhance the populations health and wellbeing.

In addition, the findings which suggest that people of different age groups and ethnicity view themselves in relation to 'nature' differently may highlight that the current 'one size fits all' approach currently taken by Auckland Council is not the best strategy. Applying the same 'nature'-related policies and strategies across the whole population is potentially failing to encompass the different beliefs that may exist.

Furthermore, the findings indicating that 'nature' is conceptualised as being predominantly flora and fauna call attention to the importance of how 'nature' related policies and strategies are communicated to the population. This is seen as being important because even though respondents were not interrogated further as to why they conceptualised 'nature' the way in which they do, the dominating view that 'nature' was considered to be certain aspects (e.g., flora and fauna) and not others (e.g., geological features, lakes), suggests that it is important that specificity is used in 'nature' policy and strategy related communications by Auckland Council around which aspects of 'nature' policies or strategies are intending to target. Using greater specificity would prompt the population to consider 'nature' as being aspects outside of flora and fauna just as much as flora and fauna themselves. As discussed in section 1.5, Auckland Council has no consistent definition or use of the term 'nature' and uses the terms 'nature', 'environment' and 'natural heritage' interchangeably with little specificity as to what the terms entail. Additionally, the dominating view that 'nature' is something of which humans nor human influence/development is not a part and the perceived separation between 'nature' and 'self' suggests that greater emphasis should be placed on discussing or depicting 'nature' in communications a way that reflects the inherent interconnectedness, interdependence and interrelationship between humans and 'nature'. One way to do this could be through ongoing emphasis by agencies and/or environmental organisations of how humans and human systems are entirely intertwined and reliant on 'nature' for survival.

The findings from this study also call attention to the urgency of protecting and enhancing current 'nature' areas/green or open space and that retaining these areas are a top priority in future development and urban design strategies. As findings highlight, 'nature' is important for people's ability to enact their 'connections to 'nature'' and therefore retaining as much 'nature' (categorised as being free of human influence and predominantly flora and fauna) as possible is key to supporting a connected population. This is important for future environmental

[37] Anecdotal observations through my experience working with Auckland Council, whereby all departments work predominantly in isolation with limited cross-fertilization of ideas, implementation, and monitoring

sustainability and conservation efforts given that connections are strongly linked to pro-'nature' actions (as highlighted in empirical research as summarised by Whitburn *et al.,* (2019)). As discussed earlier in section 6.2.1, there are clear implications for planning as 'nature' areas may become more decreased and fragmented due to increased urbanisation and growth. Therefore, over-arching policies and strategies which aim to protect and enhance 'nature' must be given increased weighting in decision making processes pertaining to how areas are managed in the future. For example, in situations as discussed earlier where Auckland Council re-zoned open space areas to urban in order to sell them for development to overcome financial deficits experienced by the COVID-19 pandemic (Panuku Development, 2020).

Lastly, the findings highlight the importance of strengthening research in the topic of beliefs about 'nature' to inform strategy in policy in the Tāmaki Makaurau Auckland region. As discussed in section 1.5, Auckland Council have recently developed a baseline of the Tāmaki Makaurau Auckland population's level of connectedness to 'nature' using an international scale called the Connectedness to Nature Scale (CNS) by Mayer & Frantz (2004) (Ovenden & Roberts, 2021) which despite being a step in the right direction, makes an assumption that a 'connection to 'nature'' is able to be measured in the same way across the population. This approach does not consider the diverse ways in which the population conceptualises 'nature' or their personal 'connections to 'nature''. However, as examined in chapter three, the CNS may be sufficient in measuring 'connections to 'nature'' given that it focuses on affective, cognitive, and experiential dimensions of 'connections to 'nature'' – which were the dominating conceptualisations reported across the respondent group. Therefore, to complement research such as this by Auckland Council, it would be beneficial that more qualitative research is undertaken to understand 'nature' conceptualisations and connections, as this research has suggested that there may be significant diversity across the population, and this may implicate people's actions toward 'nature'. Additional research exploring these areas would therefore contribute to the formulation of more robust policy and strategy that resonates with the population.

Based on the implications discussed, it is recommended that Auckland Council could consider the findings from this research when developing future environmental policy and strategy and incorporate the knowledge as follows:

- Increasing the emphasis in the over-arching Auckland Plan 2050 on the importance of balancing development, retainment, and enhancement of open/green spaces. This will result in increased place-based and topic-based strategies that can help to deliver on these directives,

- Ensuring strategies such as the Urban Ngahere (forest) Strategy and the City Centre Masterplan are given sufficient weighting and consideration within decision making processes, e.g., particularly during ad-hoc processes which seek to sell Council assets for development which are currently zoned as open-space parks and reserves as was recently done to alleviate the financial pressures from COVID-19 on Auckland Council,

- Creating a workstream within Auckland Council's strategy office to clarify what terms such as 'nature' and 'connection to 'nature'' are intended to mean in all current regional strategies, plans and policies and compare that to the dominant findings uncovered in this research. Alternatively, utilize Auckland Council's broader Research & Evaluation Unit's social research curriculums to focus more on this area of research to map the varying conceptualisations of 'nature' and 'connections to 'nature'' across the Tāmaki Makaurau Auckland population, this could be done alongside research such as what Auckland Council

began in 2021 (Ovenden & Roberts, 2021) as a geneal means to understand how connected the population feels to 'nature',

- Consider how to re-frame policies that seek to protect 'nature' to integrate more interconnected views of humans and 'nature'. For example, justifications for protecting 'nature' in policies could include reference to the importance of protecting 'nature' for health and wellbeing,

- Considering developing multiple versions of strategies or policies for various age groups and ethnicities relating to 'nature' protection and enhancement, based on the potential differences in how various age groups and ethnicities view themselves in relation to 'nature',

- Re-framing the communication strategy of 'nature' related news/policies/events/programmes to be more specific e.g., in the context of conservation, preservation, or protection could include (hypothetically) terms like "*conserving plant species*", "*protecting our landscape*" or "*rivers are facing significant pressures*",

- Consider how to place increased emphasis on aspects of 'nature' that were not as commonly associated with 'nature' in this research but are facing degradation (e.g., geological features etc), and

- When undertaking future cost-benefit exercises aimed at determining the financial feasibility of programmes, projects, planning or when looking to sell open/green space Auckland Council assets, to include the benefits of protecting and enhancing 'nature' for human health and wellbeing.

6.2.3 PRACTICE

The findings from this research also have implications for environmental management practice, such as conservation and environmental programmes, campaigns, and projects in Tāmaki Makaurau Auckland.

Firstly, the findings which suggest that common ways people enact their 'connections to 'nature'' are cognitive, affective, or experiential, and that exposure or interacting with 'nature' enhances and sustains 'connections to 'nature'', implies that some projects and campaigns implemented by non-Government groups may be effective at enhancing and supporting 'connections to 'nature''. For example, organisations active in Tāmaki Makaurau Auckland such as Forest & Bird, WWF, Greenpeace, Sustainable Coastlines, Conservation Volunteers and EcoMatters, focus their projects/campaigns on either increasing knowledge about 'nature', increasing their emotional attachment to 'nature', or prompting people to engage in conversation activities. These projects/campaigns thus support the common ways that people connect to 'nature' (cognitively, affectively, or experientially) and assist with increasing time spent in 'nature' and as such provide effective pathways to connect to 'nature'. Similarly, these same findings give support to the Tiaki Tāmaki Makaurau (Conservation Auckland) programme launched by Auckland Council in 2021 (Auckland Council, 2021) which aims to engage the population in conservation activities by mapping projects across the region and further educates the population on 'nature' areas across the region which are under pressure from activities and development. However, despite the effectiveness of these projects, programmes, or campaigns in supporting 'connections to 'nature'', research by Ovenden &

Roberts (2021) suggested that only a small portion of the Tāmaki Makaurau Auckland population participate or engage with conservation groups such as Forest & Bird, WWF, Greenpeace, Sustainable Coastlines, Conservation Volunteers and EcoMatters, or engage in conservation activities. Therefore, increasing participation and engagement with these groups and their programmes, projects, or campaigns and/or generating more accessible, potentially Council sponsored or endorsed groups and initiatives would be useful in enhancing 'connections to 'nature''.

The implications from the findings further indicate that there are opportunities to encompass individuals' beliefs more broadly in practice and programmes. For example, the findings suggesting the dominant view that humans and 'nature' are separate, show that there is merit in programmes which aim to promote environmental sustainability to emphasise an interconnected view between humans and 'nature'. For example, incorporating educational components which seek to highlight how humans are entirely interdependent of 'nature''s services for survival. Secondly, as there were several other ''connections to 'nature''s' identified in this research, programmes can focus on how other ways in which 'connections to 'nature'' can be supported. For example, fostering cultural connections through specific cultural curriculums (discussed further below).

Similarly, the results from chapter three showed that experiential 'connections to 'nature'' were only the third most commonly conceptualised 'connection to 'nature'' which may mean that the ongoing emphasis to 're-connect' people to 'nature' by going outside (assumed to be the only way to 'connect to 'nature'') by government agencies (e.g., Department of Conservation, 2011; Ministry for the Environment, 2019; Auckland Council, 2020)) is missing important dimensions of 'connections to 'nature'' that a large segment of the population may have.

Lastly, based on the dominant health and wellbeing benefits associated with 'nature' or connecting with 'nature' as reported by respondents, 'nature'-related practice and programmes should be considered in the broader context as to how supporting and facilitating 'connections to 'nature'' can have wider benefit to the population's health and wellbeing. This may mean including connection to 'nature' programmes within the wide-ranging programmes that take place in Tāmaki Makaurau Auckland which seek to increase health and wellbeing (e.g., Green Prescription Active Families, a free programme aimed to enhance community wellbeing through nutrition and exercise run by Counties Manukau Health).

Therefore, to address the implications of the findings from this research, future environmental practice, projects, and programmes could consider the following:

- Expanding participation in programmes which focus on increasing knowledge about 'nature' (namely, challenges facing 'nature' around the globe and within Aotearoa New Zealand), or prompting people to engage in conversation activities as this can support cognitive and experiential 'connections to 'nature'',

- Expanding programmes that can support the other dimensions of 'connections to 'nature'' that people hold, for example facilitating affective connections by implementing programmes or projects whereby the community has opportunity to form emotional attachments with certain aspects of 'nature' (e.g., native wildlife at the zoo, 'nature' parks or reserves), or cultural 'connections to 'nature'' that those who identify as Māori may be

more inclined to have in comparison to those who identify as NZ Pākehā/European, such as by working alongside Māori to develop 'nature' connection projects and programmes,

- Increasing the focus within programmes towards educating the public on the interconnectedness between people and 'nature', this could be done alongside Matāuranga Māori practitioners as these views are aligned with Matāuranga Māori,

- Increasing collaboration between organisations or agencies who facilitate programmes which aim to engage people with 'nature' or support 'connections to 'nature'' and other organisations who aim to increase health and wellbeing based on the synergies between health and wellbeing benefits of 'nature', and

- Supporting businesses/employers to run initiatives during standard working hours which aim to get people out into 'nature' and engaging with a range of activities that are shown to increase connection to 'nature' (discussed in section 4.5) to mitigate the perceived barriers around lack of time to connect with 'nature' due to 'urban life' or 'stress from work'.

6.3 LIMITATIONS OF STUDY

As a PhD candidature is ideally set at 3-4 years full-time and financial resources are restrictive, there are time and money limitations imposed on the research which impacted upon the ability to delve deeper into the findings uncovered and address the further questions that emerged from this research. Furthermore, as the research was qualitative, there are a range of limitations that are traditionally associated with qualitative research methods which are important to acknowledge.

The limitations discussed in this section relate to sample size and representativeness, method of data collection, scope of data analysis, further interrogation of findings, wording of qualitative research questions, and the subjectivity of data analysis. The limitations identified assist in generating recommendations for future research with similar objectives (which will be further discussed in section 6.4) that would help to expand knowledge further and address some of the questions that remained unanswered in this research.

6.3.1 REPRESENTATIVENESS

The sample population was as representative as possible under the research constraints but was non-random. The sample group had the same gender split as Tāmaki Makaurau Auckland, however it did not have the same ethnicity or age group split. Furthermore, despite the sample size being statistically significant[38]; the sample group was not representative of the Tāmaki Makaurau Auckland population as complete representativeness requires selection of respondents through random sampling.

Random sampling would have entailed ensuring that each respondent had the same probability of being selected, which is a noted difficulty in survey research as it predominantly relies on voluntary participation by people (Luborsky & Rubinstein, 1995). However, it is important to

[38] Confidence interval 99.0%, margin of error, 4.0%

note that it was not the aim to achieve full representativeness as this was an exploratory study only, and that to achieve full representativeness would have required a significant amount of extra time and resourcing at the data capture stage. The use of non-representative sample groups in this line of research is common (e.g., Kempton, Boster & Hartley, 1995; Hazula-Delay, 2001; Van Den Born, 2008; Vining, Merrick & Kalnicky, 2008; Newton *et al.,* 2008; Buijs, Elands & Langers, 2009; Aaron & Witt, 2011; Tillmann, Button, Coen & Gilliland, 2019). Nonetheless, a broad range of respondents from ethnicities and age groups engaged with the research.

Had there not been any time restraints, advertisement of the online survey could have remained open until each age group and ethnicity was accurately represented. As discussed in section 1.8, during the online survey advertisement the advertisement targeting settings were changed to just targeting males, as there was a significantly high proportion of female input (e.g., at one stage 95.0% of respondents were females). Despite there being no option on Facebook advertising features to target specific ethnicities, there was an option to change targeting settings for age groups, however, there were concerns about the length of time it would take to reach representativeness for all age groups, particularly since older age groups (e.g., 65 +) may be less likely to spend time on social media. Hence, once the gender representativeness, data saturation and a significant sample number was achieved, the online survey advertisement was ended.

Thirdly, caution should be applied to extrapolating the results to other areas. The sample group was from an urban population from a developed Western city and country. Therefore, the findings can only provide insight from this perspective and there are limitations to generalizing the findings to rural or developing non-Western contexts.

Lastly, there may have been sample bias toward people with an interest in 'nature'. This was avoided as much as possible by advertising the online survey as neutral as possible (*"have your say on 'nature'-related topics)* and by offering a financial incentive to take part in the research in attempt to appeal to more people. However, it is acknowledged that it is difficult to avoid the fact that those with an interest in 'nature'-related topics would have been more likely to engage with the research.

6.3.2 METHOD OF DATA COLLECTION

The method of data collection relied heavily on social media (specifically Facebook advertising). Despite attempts being made to avoid this (e.g., as discussed in section 1.8, posters were erected in public places, pamphlets were dropped in mailboxes, undertaking further structured and semi-structured interviews etc.), overall, 97.0% of respondents engaged in the research via the online survey. Therefore, a noted limitation is that there is a level of sampling bias to those who are active on social media and have internet connections. Despite this, in attempt to compensate for the potential sampling bias interviews were undertaken as discussed in section 1.8. Consequently, it is important to interpret the findings within the context of the fact that these were obtained almost entirely from online respondents and the implications associated with this are that only a certain cohort of society engaged with the research.

6.3.3 SCOPE OF DATA ANALYSIS

Due to the subjectivity of coding, it is impossible to identify all potential codes within a set of open-ended responses. Accordingly, the most effective representation of themes within such a set of responses is to establish the percentage of respondents that referenced each theme. This is opposed to any attempt to calculate percentages of overall comments (which would require an objective and absolute measurement of all comments). This resulted in the limitation to be able to objectively measure all potential categories so that relative frequency could be calculated and presented.

Secondly, albeit not necessarily a limitation as it was not an intention to undertake sub-group analysis, it is important to acknowledge that this research explored human beliefs relating to 'nature' conceptualisations and connections across the sample group, versus analysing beliefs by demographic (e.g., by age group, gender, or ethnicity). Therefore, data was not analysed by demographic variable for research objectives one, two and three, and as such, the questions were designed with this intention. As mentioned in section 1.8.4.1.1, if this was the aim of the research, or this type of analysis was the purpose, the online survey and interviews would have been structured, and advertised differently (for example, questions would have been designed more quantitively to allow for easier correlation tests to be undertaken, there would have not been such a heavily reliance on data collection methods such as social media to attract respondents as this potentially limits input from older people, and, purposely visiting specific cultural locations and offering the survey in different languages to ensure all ethnicities are represented). The aim of research objective four was slightly different, whereby it was explored how people view themselves in relation to 'nature' (e.g., how interconnected they felt they were) and there was a goal of determining whether this changes across various age groups, ethnicities, or gender. Thus, the questions were quantitative (the INSS scale and NEP statements) allowing for this analysis to be done.

6.3.4 FURTHER INTERROGATION OF FINDINGS

The online survey, structured, and semi-structured interviews provided exceptional insight into beliefs relating to 'nature' conceptualisations and connections. However, further detail could be obtained without the restraints placed on a PhD that occurred within a timeframe that also contained a pandemic. For example, with more time and resources, and without the constraints and personal impacts caused by COVID-19 restrictions it might have been useful to engage in additional in-depth interviews to further prompt or interrogate responses which may have allowed for further insight into dominating conceptualisations uncovered in this research. For example, understanding how conceptualisations may have been formed, whether they are perceived to change over time, what respondents perceive influences their perceptions, etc. The next section (section 6.4) which provides recommendations for future research discusses in detail specifically how each theme could be further interrogated.

6.3.5 WORDING OF QUALITATIVE RESEARCH QUESTIONS

The wording of the question asked to respondents to achieve research objective one ("*please tell me in a few words what you think 'nature' is*") may have had different meanings across respondents,

for example, respondents may have been unsure if the question was seeking what they believe the definition of the word 'nature' is or whether it was seeking what 'nature' means to them personally. Similarly, in addressing research objective two the wording of the question asked to respondents ("*please tell me in a few words what a connection to 'nature' means to you"*) may have had different meanings across respondents, for example, respondents may have been unsure if the question was seeking what they believe the definition of the term 'connection to 'nature'' is or whether it was seeking what a 'connection to 'nature'' means to them personally.

6.3.6 SUBJECTIVITY

It is important to acknowledge the limitation around the subjectivity of content analysis as the process requires a subjective interpretation of textual data. Therefore, my own values, beliefs, and background as the researcher may have played a role in how responses were interpreted. However, this was avoided as much as possible through seeking peer-review of segments of the coding.

Furthermore, self-reported responses to a survey and/or interview can be subjective as responses given at any given time are reflective of how they are feeling at the time of engaging in the survey and/or interview. This applies to both the qualitative questions (e.g., research areas one, two and three) and the quantitative questions (e.g., research area four). Therefore, the results should be considered taking this into account. As acknowledged in chapters two and three, mitigating this limitation could be done by undertaking the survey at different times and testing whether conceptualisations change. Similarly, the responses are subjective as the questions and/or the framing of the questions may have been understood differently across respondents. For example, the wording of the qualitative questions discussed earlier in section 6.3.5, and the ways in which respondents may have understood the INS scale, which was discussed in section 5.5.

6.4 RECOMMENDATIONS FOR FUTURE RESEARCH

There are several opportunities to build on this research. However, firstly, it is important to note that despite the data collection for this research occurring before the global COVID-19 pandemic, there has been an emerging field of research which has explored how the pandemic, and the subsequent restrictions implemented across the globe to manage the impact on human health have both influenced interactions with 'nature' (as reviewed and summarised by Soga, Evans, Cox & Gaston (2021)). Therefore, future research with similar objectives to this research must consider findings within the broader context as to how interactions with 'nature' have significantly changed during the pandemic (for example, increased experiences in 'nature' as reported by Venter, Barton, Gundersen, Figari & Nowell, 2020; Derks, Giessen & Winkel, 2020; Grima *et al.,* 2020) and that this may implicate beliefs relating to 'nature' conceptualisations or connections.

It is strongly recommended that researchers from Tāmaki Makaurau Auckland and Aotearoa New Zealand continue advancing research on individuals' beliefs relating to 'nature' – specifically 'nature' conceptualisations and connections - to further fill gaps in knowledge and empirical research and to generate relevant and practical outcomes for environmental managers. It would also be useful to replicate the objectives of this research and conduct a similar type of study in different regions, with different sample demographics. This would help

to provide more robust data as to what the varying 'nature' conceptualisations and connections are across the Aotearoa New Zealand population. This could help to provide more information which could support environmental practice, policy/strategy and planning strategies which are better targeted towards overcoming the challenges facing 'nature' because of human activities and actions. Similarly, as discussed throughout this thesis there are numerous gaps in environmental management empirical research exploring beliefs relating to 'nature' conceptualisations and connections. This is due to empirical research predominantly coming from a psychological perspective, with little coming from environmental management related disciplines (Restall & Conrad, 2015; Ives, *et al.,* 2018). The result being that findings struggle to be translated to practice, policy and planning and that knowledge is often kept in disciplinary silos. Therefore, it is strongly recommended that researchers in the environmental management discipline globally place more emphasis on investigating human beliefs relating to 'nature' conceptualisations and connections so that the knowledge base in the discipline continues to grow and translate into tangible outcomes that environmental managers can implement. This should be a priority.

A range of specific recommendations were made for future research based on findings which emerged across the four research objectives/areas. They are presented below, and therefore it is recommended that future research locally, nationally, and internationally considers the following:

1. Conceptualizations of 'nature' and associations with 'nature'. Recommendations for future research:

    a. Replicate the research exploring conceptualisations of 'nature' and associations with 'nature' in multiple contexts to continue mapping the varying conceptualizations that populations hold,

    b. Employ targeted research specifically seeking to explore what has prompted the dominating conceptualisation uncovered in this research that 'nature' is something of which humans or human influence nor activities are a part, for example seeking respondents to articulate whether they feel that their views are shaped by certain factors such as media, historical discourses, the way 'nature' is communicated by Government agencies, etc.,

    c. Either through further analysis based on findings from this research, or if future research uncovers similar themes, further interrogate ambiguous themes such as that 'nature' is conceptualised as 'everything/the surroundings', 'everything/whole world/planet', or 'all living beings/anything growing/anything breathing' by prompting respondents to further elaborate what specifically is meant by these terms, or whether they are intending to mean the inclusion or exclusion of humans and/or human activities and influences,

    d. Employ similar research such as this which examines conceptualisations of 'the environment',

    e. Replicate this research to test whether common aspects associated with 'nature' in other contexts are similarly flora and fauna related,

f. Explore whether place of residence influences associations with 'nature', for example whether those living in coastal settings are more likely to mention aspects relating to the coast (ocean, beach, sand), and those living in forest settings are more likely to mention aspects relating to the forest (bush, trees, plants, birds),

g. If employing research similar to this, ensure that clarification is made with respondents as to whether the aspects mentioned when discussing conceptualizations of 'nature' are only the first aspects that come to mind, or, the only ones, and

h. If employing research similar to this, clarify with respondents which specific species they are thinking of when making mention of flora and fauna (e.g., exotic or native species).

2. Conceptualisations of 'connections to 'nature''. Recommendations for future research:

   a. Similar to point 1(a), replicate the research exploring conceptualisations of 'connections to 'nature'' in multiple contexts to continue mapping the varying conceptualizations that populations hold,

   b. Employ research that seeks to examine whether conceptualisations of 'connections to 'nature'' change over time,

   c. Employ research that seeks to examine whether people have uni-dimensional or multi-dimensional conceptualisations of 'connections to 'nature'',

   d. Employ research that seeks to examine whether certain 'connections to 'nature'' influence or support others (e.g., whether experiential connections support affective connections etc),

   e. If employing research similar to this and the theme that a 'connection to 'nature'' is a spiritual connection emerges, further clarify what is meant by connecting to 'nature' 'spiritually',

   f. Employ targeted research with the aim of exploring whether Māori or other indigenous cultures are more likely to conceptualise 'connections to 'nature'' as being a 'cultural connection' compared to other ethnicities, and

   g. If employing research similar to this and the theme that a 'connection to 'nature'' is a 'hippie term', further clarify what this is intended to mean.

3. Chapter four – Perceived influences on 'connections to 'nature''

   a. If employing research similar to this and the theme that a 'modern societal modalities' emerges, further clarify with respondents what it is specifically about modern society that is perceived as a barrier to their connection to 'nature',

b. Employ research such as this in non-Western, rural, and developing countries to determine whether the similar dominant finding emerges ('modern societal modalities' being perceived as the key barrier to 'connections to 'nature'') and,

c. Either through further analysis based on findings from this research, or if future research uncovers similar themes, further interrogate what specific aspects of 'nature' prompt and/or sustain their connection to 'nature' (e.g., only native trees versus exotic, hypothetically, or whether some aspects prompt and/or sustain their connection more than others (e.g., trees more than birds, hypothetically).

4. Interconnectedness with 'nature' and pro-'nature' beliefs. Recommendations for future research:

   a. Future research employing the INSS scale should clarify what the overlap in circle pairs B, C, D, E, and F signifies to respondents (e.g., physical, emotional, spiritual, etc),

   b. Future research employing the INSS should clarify whether the selection of circle pairs B, C, D, E, and F represents a distinction between self and 'nature' as was assumed in in the analysis and discussion in chapter five,

   c. If future research employs the INSS alongside methods to capture pro-'nature' beliefs and similarly finds correlations with higher INSS scores (interconnectedness) and pro-'nature' beliefs, interrogate respondents further as to whether they feel that interconnectedness with 'nature' informs high pro-'nature' beliefs, or the other way around,

   d. Explore whether INSS scores change over time,

   e. Employ targeted research with the aim of exploring whether Māori or other indigenous cultures are more likely to select "G" compared to other ethnicities,

   f. Replicate this research in other contexts to test whether the same correlation arises between interconnectedness with high pro-'nature' beliefs, and

   g. Overall, employ the INSS scale more regularly in environmental management empirical research as an easy to administer tool that can effectively provide insight as to how the sample group views themselves in relation to 'nature'.

Lastly, to address the methodological limitations discussed in section 6.3, it is recommended that future research locally, nationally, and internationally considers the following:

1. Use of representative sample groups (e.g., by age, gender, and ethnicity) to enable stronger generalisations to be made across the study population,

2. Employ random sampling techniques, again, to enable stronger generalisations to be made across the study population,

3. Undertake the research in rural, developing, and non-Western contexts,

4. Advertise the research in different ways to ensure as little sampling bias as possible toward individuals who have an interest in 'nature' e.g., consider not including any mention of the research topic in the advertisement/invitation,

5. Employ data collection methods that are not heavily reliant on social media and the completion of an online survey to minimise any sampling bias toward individuals who are active on social media and have internet connections,

6. If exploring the same four research objectives as this research, consider using quantitative questions so that further analysis can be performed to determine whether conceptualisations of 'nature' influence conceptualisations of 'connections to 'nature'', whether conceptualisations of 'connections to 'nature'' influence perceptions of what influences 'connections to 'nature'', etc.,

7. Consider methods that allow for objective measure of all potential categories that respondents could reference to calculate relative frequency,

8. If representative sample groups are achieved, further analyse whether conceptualisations differ across different age groups, ethnicities, and genders (and potentially other variables e.g., education levels etc),

9. If multiple data collection methods are used like this research (e.g., a survey followed by interviews), allow for further interrogative interviews to take place so that themes that emerge can be explored in more depth,

10. Use specificity when asking questions relating to notions such as conceptualisations of 'nature' or 'connections to 'nature'', for example, clarifying that it is the respondent's personal perspective being explored versus their understanding of what the term is defined to mean in general, and

11. To alleviate the subjectivity of coding within the process of content analysis as much as possible, work with a team of researchers that can peer review the coding.

6.5 CONCLUDING COMMENTS

'Nature' is facing significant pressures due to the decisions, activities, and actions of billions of people around the world, specifically in urban, Western countries such as Aotearoa New Zealand. As such, transformational changes amongst the population are required if 'nature' is to be adequately protected and degradation reduced. It has been argued that to do this, environmental managers need to determine what drives humans to behave the way they do by understanding individuals' beliefs – particularly 'nature' conceptualisations and connections. However, as identified in this thesis, there has been a lack of empirical research in environmental management that has sought to explore and understand these beliefs. This gap is an oversight, as it is widely suggested that beliefs may influence actions and therefore impact on environmental sustainability outcomes. Furthermore, research on the topic of human-'nature'connections and relationships predominantly comes from the psychological discipline, thus somewhat inhibiting the ability to apply the findings in environmental management practice.

Consequently, the aim of the research was to address this gap in literature and current research shortfalls and explore the four research objectives which investigated different aspects of beliefs relating to 'nature' – namely lay individual's reported 'nature' conceptualisations and perceived connections. To achieve this aim, an online survey and interviews were employed in Tāmaki Makaurau Auckland, Aotearoa New Zealand to generate data and in total 997 volunteer respondents engaged with the research. Therefore, this research acted as a novel first step in environmental management and the findings have provided substantial evidence towards the need to consider 'nature' conceptualisations and connections in environmental management theory, practice, planning and policy/strategy. The research makes a significant contribution to national and international empirical and theoretical literature – as it was the first major piece of research exploring the specific areas within the four research objectives and the application of this knowledge in Aotearoa New Zealand. It also contributed to the scarce literature available internationally by taking an inductive research approach and translating how human beliefs relating to 'nature' can be considered in environmental management. The new insight into the population of Tāmaki Makaurau Auckland has potential to help organisations involved in environmental and urban planning and management in the region to achieve more positive environmental outcomes.

Despite the valuable information provided by this study it is recognised that there is still much work to be done. Further research on the complex dynamics within the human-'nature' relationship and connection is important to be able to more fully inform environmental management so that interventions and initiatives are holistic and adequately consider the role that people's 'nature' conceptualisations and connections potentially play in how they treat 'nature'. Some of these avenues for future research have been recommended.

This research has shown that there are dominating views that 'nature' is separate from humans and with only some aspects being considered 'nature' more than others, that people connect with 'nature' in diverse ways, exposure to 'nature' is a key pathway to connect with 'nature' and factors associated with modern society are perceived barriers, and lastly that feelings of interconnectedness may translate to high pro-'nature' beliefs. Therefore, the research highlights the urgency for environmental managers in Tāmaki Makaurau Auckland and other similar regions to focus on how to support the spectra of connections people have 'nature', increase accessibility to 'nature', and prompt a shift to a more interconnected perspective between people and 'nature' so that there is a far greater opportunity to live in harmony with 'nature'. This consists of revising regional strategies, planning regulations and processes, policies, and programmes. This research adds further evidence to the fact that investment in understanding and working to improve human-'nature' relationships is necessary to generate the transformational change required to address global challenges facing 'nature' before it is too late.

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CHAPTER 7 - APPENDICES

7.1 APPENDIX 1 – MASSEY UNIVERSITY REGULATIONS FOR THESIS WITH PUBLICATION

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

PhD THESIS BY PUBLICATION

"PhD by Publication" vs "PhD by Monograph"

The "PhD by Publication" is an alternative to the traditional "PhD by Monograph" approach. In a *PhD by Monograph*, the PhD student writes a comprehensive piece of research in a book form, with typically separate chapters for literature review, conceptual development, analyses, and conclusions. The monograph approach is more in line with a view of demonstrating broad knowledge. Traditionally, only once the PhD thesis is completed, an attempt is made to carve out one or more research articles, which are then submitted to academic journals.

In a *PhD by Publication*, the PhD student authors or co-authors multiple articles, which are then joined together to constitute the PhD thesis. *Each* article will have the typical set up for the field, most frequently with sections for literature review, conceptual development, analyses, and discussion. The "PhD by Publication" model is an option for those doctoral candidates seeking to develop skills in writing articles for submission to peer reviewed journals during their PhD enrolment. A "PhD by Publication" teaches the PhD student the skills that are required for a modern academic: being able to write impactful and innovative research articles that are concise and clear, and being able to navigate the review process. The leading business schools in (continental) Europe, Asia, and North America have adopted a PhD by Publication system.

Key Differences

There are three key differences between a *PhD by Publication* and a *PhD by Monograph*:

1. ***The outcome***: A monograph will typically have more detail in each of the chapters (e.g., a more elaborate literature review, more detail on the analyses, lengthier discussion). In contrast, the PhD by Publication will be typically more concise, because academic journals demand parsimony in writing. Hence each chapter in this kind of thesis will look like a rather concise, but standalone research article.

2. ***The process***: In a PhD by Monograph, the supervision tends to be more at a distance; the idea is that each PhD student should show their own mastery of the subject through mostly independently-conducted research. In a PhD by Publication, the supervision is more of the nature of a master (supervisor) and apprentice (PhD student). The PhD student still takes the lead in the whole research process, but obtains rather direct supervision to ensure that the resulting working paper is worthy of being submitted to an academic journal. In the course of the PhD process, the supervision may get less tight to stimulate the development of the PhD student as an independent academic researcher.

3. ***The implications for the "pipeline" of PhD students*** (by the end of the PhD project): Whereas in a PhD by Publication, the chapters are essentially articles of a submittable standard for quality academic journals (and some of them may have been published already), in a PhD by Monograph the "article pipeline" for PhD by Monograph is typically empty. This may have important consequences for the PhD student on the job market if an academic career is the objective.

It is important to note that *PhD by Publication* is not an approach that will necessarily suit all candidates, all disciplines, or all supervisors, as it does place additional demands on the candidate and supervisors to prepare and submit material for publication. It is possibly harder to write a PhD by Publication, because every word counts and the research must
have the potential to be approved by peer reviewers in the field. Undertaking a PhD by Publication requires a) "stronger that average" ability and motivation of a PhD candidate and b) "stronger than average" support of the supervision panel from the point of acceptance of the PhD application through to the thesis completion. *Whether or not both parties are prepared to follow this approach can be reconsidered at the confirmation.*

It should also be noted that the requirements for the "PhD by Publication" can vary by Faculty.

Current Massey Guidelines

The publication of papers during candidacy, or at least the attempt, can be highly advantageous. Massey University supports "PhD with Publication," providing it conforms to the following:

Structure of the PhD by Publication thesis:

- The PhD with Publication requires the candidate to present a thesis comprising typically between two and six research papers some of which have been published, while others may be under review or ready for submission. The exact number of publications included in the thesis may vary per discipline, accounting for the significance or major contribution of the work, the rank of the targeted academic journals, expectations within the discipline, etc.

- The normal expectation is that each of those research projects is "publishable" (being prepared for a submission, under reviewer, or accepted for publication) in a recognized peer-reviewed academic journal. Ideally, the PhD candidate should target international and highly ranked outlets for publication. The quality of the targeted publication outlets should be demonstrable through, their impact factor and/or their inclusion in citation indexes and/or the credibility they hold within the field.

- The thesis must still work as an integrated whole, address a significant research question or questions and present a clearly identified original contribution to knowledge of the subject with which it deals. The usual practice is to have the overall introduction that introduces the topic, the problem (also covering the relevant literature in order to justify the topic and the research gaps)

and explains how different chapters address those issues. For some disciplines a separate literature review chapter may be required. At the end of the introductory chapter to the thesis the candidate is expected to outline the structure of the thesis indicating the chapters that have been written as papers for peer-reviewed publication and indicate the target outlets and the current status of each of the chapters with respect to those outlets (e.g., published, in revision following reviewers' comments, in review, to be submitted). The thesis should conclude with the overall conclusions across all the chapters.

- The candidate must ensure that all methods used in the thesis work are clearly described in the thesis, usually within the method sections of the corresponding papers in appendices (e.g., additional methods, derivations, questionnaires). Any data and discussion that was abbreviated due to the strictures of the publication process, including material published as supplementary can also be included in the appendices. It is also acceptable to have a separate chapter just on methodology, for as long as it is clarified whether or not this chapter represent a publication on its own.

- The research must have been conducted during the period of candidature (this stems from CUAP requirements, and it has implications for funding). Candidates cannot present material published prior to enrolment as part of the thesis.

Authorship on the publications:

- The authorship on the publications is determined based on the APA authorship guidelines, which also highlights that the supervisors are NOT automatically the authors on all publications. Only supervisors who have contributed sufficiently to an academic paper that is part of a PhD by publication are included as co-authors on the academic paper.

- The candidate may be the sole author of the publication(s), OR, where the candidate was a joint author, the research contributed by the candidate is normally expected to be in the capacity of first/ primary author. It is expected that multi-authored papers (of a submittable standard for quality academic journals) in a thesis would have a *substantial* and *significant* contribution by the candidate. The principal supervisor signs the Declaration for a thesis with publication form specifying the candidate's contribution. To protect the interest of candidates, it is important that authorship is discussed at an early stage of candidacy, ideally with the involvement of an independent party.

- Published material may be submitted for examination once only and by one doctoral candidate, so where team research is involved, it is important to clarify roles at an early stage.

- In special circumstances, different parts of the same publication may be submitted for examination by different candidates (e.g. where experiments and modelling have been done by different people).

- Manuscripts of a submittable standard, submitted manuscripts, manuscripts under review and/or accepted and published work, in part or in full, may all provide the basis for chapters in the thesis. Where work has been previously published, a journal may need to give copyright permission for the material to be included in a thesis which will be placed in the Library's electronic repository. Candidates should gain copyright clearance as early as possible.

- Where appropriate and possible, candidates are strongly advised to standardise the format and referencing of chapters. Copies of articles and/or creative works, as appropriate as published may be included in a pocket in the thesis, or in pdf form on the thesis CD.

- Candidates are advised to fully reference previous publication of their own sole-authored work, including graphs, tables and images that they themselves have generated. Any other intellectual content must be fully and appropriately referenced to the person(s) that supplied them. They are then able to sign a statement that the thesis is their own work.

Examination

- The University sets the standard by which theses are examined, and acceptance of any part by a publisher does not necessarily mean that it meets examination standards. Examiners will be instructed to examine all parts of the thesis with equal rigour, and may request major or minor changes to any part of the thesis regardless of whether it has been published or not.

- It is advisable to select examiners who are familiar with the *PhD by Publication* format.

- The candidate is expected to have a working knowledge of all parts of the thesis, and to be able to answer questions about the thesis as a whole in the oral examination.

- The candidate is required to complete the form DRC 16 - 'Statement of Contribution to Doctoral Thesis Containing Publications' - for each article/paper included in the thesis.

NB: Research that has been published (or accepted for publication), does not ensure a successful Doctoral examination.




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7.2 APPENDIX 2 – STATEMENT OF CONTRIBUTION FORMS

STATEMENT OF CONTRIBUTION
DOCTORATE WITH PUBLICATIONS/MANUSCRIPT

We, the candidate and the candidate's Primary Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of candidate:	Lissy Fehnker-Heather
Name/title of Primary Supervisor:	Professor Diane Pearson
Name of Research Output and full reference:	
Fehnker, L.; Pearson, D.; Howland, P.J. (2021) Understanding Conceptions of 'nature' for Environmental Sustainability: A Case Study in Tāmaki Makaurau Auckland, Aotearoa New Zealand. *Earth*. *2*. 357-373. doi 10.3390/earth2030021	
In which Chapter is the Manuscript/Published Work:	Two (2)
Please indicate:	
The percentage of the Manuscript/Published Work that was contributed by the candidate:	80%
Describe the contribution that the candidate has made to the Manuscript/Published Work:	
Conceptualization; methodology; formal analysis; writing—original draft preparation; writing—review and editing	
For manuscripts intended for publication please indicate the target journal:	
Earth	
Candidate's Signature:	
Date:	18 January 2022
Primary Supervisor's Signature:	
Date:	19 January 2022

MASSEY UNIVERSITY
GRADUATE RESEARCH SCHOOL

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Fehnker, L.; Pearson, D.; Howland, P.J. (2022) Understanding Conceptualisations of 'connections to 'nature'' for Environmental Sustainability: A Case Study in Tāmaki Makaurau Auckland, Aotearoa New Zealand. *Australasian Journal of Environmental Management. 29*(1). doi: 10.1080/14486563.2022.2035834	
In which Chapter is the Manuscript/Published Work:	Three (3)
Please indicate:	
The percentage of the Manuscript/Published Work that was contributed by the candidate:	80%
Describe the contribution that the candidate has made to the Manuscript/Published Work:	
Conceptualization; methodology; formal analysis; writing—original draft preparation; writing—review and editing	
For manuscripts intended for publication please indicate the target journal:	
Australasian Journal of Environmental Management	
Candidate's Signature:	
Date:	18 January 2022
Primary Supervisor's Signature:	
Date:	19 January 2022

MASSEY UNIVERSITY
GRADUATE RESEARCH SCHOOL

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Fehnker, L.; Pearson, D.; Howland, P.J. (2021) Perceived Influences on Connections to Nature: A Case Study in Tāmaki Makaurau Auckland, Aotearoa New Zealand. *Australasian Journal of Environmental Management.* [accepted subject to second revision]	
In which Chapter is the Manuscript/Published Work:	Four (4)
Please indicate:	
The percentage of the Manuscript/Published Work that was contributed by the candidate:	80%
Describe the contribution that the candidate has made to the Manuscript/Published Work:	
Conceptualization; methodology; formal analysis; writing—original draft preparation; writing—review and editing	
For manuscripts intended for publication please indicate the target journal:	
Australasian Journal of Environmental Management	
Candidate's Signature:	
Date:	18 January 2022
Primary Supervisor's Signature:	
Date:	19 January 2022

MASSEY UNIVERSITY
GRADUATE RESEARCH SCHOOL

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Name of Research Output and full reference:	
Fehnker, L.; Pearson, D.; Howland, P.J. (2021). Inclusion of Nature in Self and Pro-Nature' Beliefs: Utilizing Psychological Scales in Environmental Management to Further Understand if Interconnectedness with Nature Supports Sustainable Outcomes – A Case Study in Tāmaki Makaurau Auckland, Aotearoa New Zealand. *Australian Geographer. 53*(1). doi:10.1080/0049182.2022.2051682	
In which Chapter is the Manuscript/Published Work:	Five (5)
Please indicate:	
The percentage of the Manuscript/Published Work that was contributed by the candidate:	80%
Describe the contribution that the candidate has made to the Manuscript/Published Work:	
Conceptualization; methodology; formal analysis; writing—original draft preparation; writing—review and editing	
For manuscripts intended for publication please indicate the target journal:	
Australian Geographer	
Candidate's Signature:	
Date:	18 January 2022
Primary Supervisor's Signature:	
Date:	19 January 2022

7.3 APPENDIX 3 – ONLINE SURVEY QUESTIONS

Demographic questions

Results presented in section 1.8.5

Please enter the suburb where you currently live.

TABLE 7.1 RESPONDENTS' PLACE OF RESIDENCE

Suburb	%	Count
Albany	1.0%	10
Algies Bay	0.1%	1
Arch Hill	0.1%	1y
Ardmore	0.1%	1
Arkles bay	0.1%	1
Auckland CBD	3.6%	35
Avondale	1.1%	11
Awhitu	0.1%	1
Balmoral	0.1%	1
Bayswater	0.5%	5
Bayview	0.3%	3
Beach Haven	0.6%	6
Beachlands	0.3%	3
Belmont	0.3%	3
Bethells Beach	0.1%	1
Birkdale	0.7%	7
Birkenhead	1.2%	12
Blockhouse bay	0.5%	5
Botany	0.6%	6
Browns Bay	1.2%	12
Bucklands beach	0.4%	4
Castor Bay	0.4%	4
Chatswood	0.1%	1
Clarks Beach	0.1%	1
Clevedon	0.2%	2
Clover Park	0.1%	1
Coatesville	0.4%	4
Cockle bay	0.1%	1
Dairy Flat	0.3%	3
Devonport	1.0%	10
Drury	0.2%	2
East Tamaki	0.2%	2
Eden Terrace	0.3%	3
Ellerslie	1.7%	16
Epsom	0.5%	5
Fairview Heights	0.1%	1
Farm Cove	0.2%	2
Favona	0.1%	1
Flat Bush	0.3%	3
Forrest Hill	0.6%	6

Franklin	0.2%	2
Freemans Bay	0.5%	5
Glen Eden	0.7%	7
Glen Innes	0.2%	2
Glendene	0.3%	3
Glendowie	0.2%	2
Glenfield	0.8%	8
Grafton	0.4%	4
Grafton,Newmarket	0.2%	2
Greenhithe	0.7%	7
Greenlane	0.7%	7
Grey Lynn	1.2%	12
Gulf Harbour	0.3%	3
Half Moon Bay	0.3%	3
Hauraki	0.4%	4
Helensville	0.3%	3
Henderson	0.8%	8
Herald Island	0.1%	1
Herne Bay	0.3%	3
Highland Park	0.1%	1
Hillcrest	0.6%	6
Hillsborough	0.6%	6
Hobsonville	1.0%	10
Howick	0.6%	6
Huapai	0.2%	2
Hunua	0.1%	1
Karaka	0.2%	2
Kaukapakapa	0.3%	3
Kawakawa Bay	0.2%	2
Kelston	0.1%	1
Kingsland	0.7%	7
Kohimarama	0.2%	2
Kumeu	0.7%	7
Laingholm	0.5%	5
Langholm	0.1%	1
Leigh	0.2%	2
Long Bay	0.1%	1
Lynfield	0.1%	1
Mahurangi	0.1%	1
Mairangi Bay	0.3%	3
Mangere	1.6%	15
Manly	0.1%	1
Manukau	0.2%	2
Manurewa	1.3%	13
Maraetai	0.1%	1
Massey	1.3%	13
Matakana	0.3%	3
Meadowbank	1.0%	10
Mellons Bay	0.2%	2
Milford	0.5%	5
Millwater	0.1%	1

Mission Bay	0.2%	2
Morningside	0.7%	7
Mount Albert	2.0%	19
Mount Eden	2.4%	23
Mount Roskill	1.3%	13
Mount Wellington	3.5%	34
Muriwai	0.3%	3
Murrays Bay	0.6%	6
Narrow Neck	0.2%	2
New Lynn	0.7%	7
Newmarket	0.2%	2
Ngati Whatua	0.1%	1
no response	0.5%	5
North Shore	0.4%	4
Northcote	0.5%	5
Northcross	0.1%	1
One Tree Hill	0.6%	6
Onehunga	2.4%	23
Oneroa	0.1%	1
Opaheke	0.1%	1
Orakei	0.3%	3
Oranga	0.1%	1
Oratia	0.5%	5
Orewa	0.7%	7
Ostend	0.2%	2
Otahuhu	0.6%	6
Otara	0.4%	4
Pakuranga	0.8%	8
Panmure	0.1%	1
Papakura	2.9%	28
Papatoetoe	0.6%	6
Parakai	0.1%	1
Parau	0.2%	2
Paremoremo	0.1%	1
Parnell	1.6%	15
Patumahoe	0.1%	1
Penrose	0.1%	1
Pinehill	0.1%	1
Point Chev	1.8%	17
Point England	0.1%	1
Point Wells	0.1%	1
Pokeno	0.1%	1
Ponsonby	1.6%	15
Pukekohe	1.2%	12
Rakino Island	0.1%	1
Randwick Park	0.1%	1
Ranui	0.6%	6
Red Beach	0.3%	3
Red Hill	0.2%	2
Redvale	0.2%	2
Remuera	2.5%	24

Riverhead	0.6%	6
Rodney	0.1%	1
Rosehill	0.2%	2
Rothesay Bay	0.1%	1
Royal Oak	0.1%	1
Saint Johns	1.5%	14
Saint Marys Bay	0.1%	1
Sandringham	1.2%	12
Shamrock Park	0.1%	1
Silverdale	0.5%	5
Snells Beach	0.1%	1
St Heliers	0.3%	3
St Lukes	0.1%	1
Stanley Point	0.1%	1
Stanmore Bay	0.1%	1
Stillwater	0.3%	3
Stonefields	0.6%	6
Sunnynook	0.3%	3
Sunnyvale	0.2%	2
Swanson	0.5%	5
Takanini	0.1%	1
Takapuna	0.2%	2
Taupaki	0.2%	2
Tawharanui	0.1%	1
Te Arai	0.1%	1
Te Atatu	1.9%	18
The Gardens	0.3%	3
Three Kings	0.2%	2
Titirangi	1.1%	11
Torbay	2.0%	19
Totara Heights	0.2%	2
Totaravale	0.1%	1
Tuakau	0.4%	4
Unsure	0.1%	1
Unsworth Heights	0.4%	4
Waiheke	0.9%	9
Waimauku	0.3%	3
Waitakere	0.8%	8
Waitoki	0.1%	1
Waiuku	0.3%	3
Waiwera	0.1%	1
Warkworth	0.4%	4
Waterview	0.1%	1
Wattle Downs	0.4%	4
Wellsford	0.4%	4
West Harbour	0.2%	2
Western Springs	0.2%	2
Westgate	0.1%	1
Westmere	0.7%	7
Whangaparoa	0.3%	3
Whangateau	0.2%	2

Whenuapai	0.2%	2
Wiri	0.1%	1
Total	**100.0%**	**963**

How long have you lived there?

TABLE 7.2 LENGTH AT RESIDENCE

Response	%	Count
10 years +	32.3%	311
Between 6 to 10 years	15.6%	332
Between 1 to 5 years	34.5%	150
Less than 1 year	17.3%	167
No response	0.3%	3
Total	**100.0%**	**963**

Of all the places you have lived, where do you consider your dominant place of residence?

TABLE 7.3 DOMINANT PLACE OF RESIDENCE

Response	%	Count
Same suburb as previous question	54.1%	521
Somewhere else	45.5%	438
No response	0.4%	4
Total	**100.0%**	**963**

How many days per week do you spend time outdoors? i.e., undertaking activities, exercising, working, etc.,

TABLE 7.4 DAYS PER WEEK SPENT OUTSIDE

Response	%	Count
None	0.4%	4
Less than 1	4.8%	46
1-2 days	16.1%	155
3-4 days	22.5%	217
5-6 days	20.2%	195
Everyday	35.9%	346
Total	**100.0%**	**963**

On these days, how many hours do you roughly spend outdoors?

TABLE 7.5 HOURS SPENT OUTSIDE

Response	%	Count
Less than 1 hour	6.4%	62
1-2 hours	35.8%	345
3-4 hours	32.0%	308
5-6 hours	10.5%	101
7-8 hours	4.5%	43

8 hours +	5.7%	55
Unsure	1.2%	12
Other	3.4%	33
No response	0.4%	4
Total	**100.0%**	**963**

Do any of the following apply to you? You can select more than one response

TABLE 7.6 INVOLVEMENT WITH THE OUTDOORS/ENVIRONMENTAL MANAGEMENT FIELD

Response	%	Count
My job is based outdoors	14.7%	142
Most of my recreational activities are based outdoors	57.4%	553
As a child, I was outdoors most days	66.8%	643
I work or study in the field of environmental management, conservation, sustainability, or something similar	8.3%	80
Someone close to me (e.g., spouse, family member, friend) works or studies in the field of environmental management, conservation, sustainability, or something similar	9.3%	90
Total	**156.6%**	**1508**

Please tell me in a few words what you think 'nature' is

Please note, there are no right or wrong answers, I am soley interested in your personal ideas and thoughts.
Results presented in Chapter 2 - Conceptions of 'nature'

Do you think there is anything positive or negative about 'nature'?

You can select more than one response

TABLE 7.7 PERCEIVED POSITIVE OR NEGATIVE ASPECTS OF 'NATURE'

Response	%	Count
Neither	17.2%	171
Positive	78.2%	780
Negative	22.6%	225
Unsure	5.1%	51
Total	**123.1%**	**1227**

TABLE 7.8 PERCEIVED POSITIVE ASPECTS OF 'NATURE'

[IF YES TO POSITIVE]		
Theme / Category	**% Positive (*n*=780)**	**Count**
Theme 1 - Health & Wellbeing Benefits		
Mental health benefits	39.6%	309
Health & wellbeing general	14.4%	112
Escape/freedom	4.5%	35
General connection	4.2%	33
Physical health benefits	3.3%	26
Connection with oneself	2.3%	18
Education about oneself	0.8%	6
Evokes an emotional attachment	0.8%	6

Connection with culture	0.4%	3
Life supporting	16.5%	129
Services (air, water, food, shelter)	13.3%	104
Recreational opportunities	2.4%	19
Development or economical	0.8%	6
Total	**103.3%**	**806**
Theme 2 - Life on Earth supporting		
Supports life in general	17.7%	138
Total	**17.7%**	**138**
Theme 3 - Aesthetic Benefits		
Aesthetic in general	15.5%	121
Certain aesthetic aspect	0.0%	0
Total	**15.5%**	**121**
Theme 4 - Educational Benefits		
Education about 'nature'	3.1%	24
General education	1.2%	9
Total	**4.2%**	**33**
Theme 5 - Spiritual Benefits		
Enhances spirituality and spiritual feelings	1.8%	14
Place to meet or connect with God	0.8%	6
Total	**2.6%**	**20**
Theme 6 – Everything		
Everything	1.3%	10
Total	**1.3%**	**10**
Other		
Actions on treating 'nature'	0.1%	1
Other	1.9%	15
Vulnerability of 'nature'	4.1%	32
Total	**6.2%**	**48**

TABLE 7.9 PERCEIVED NEGATIVE ASPECTS OF 'NATURE'

[IF YES TO NEGATIVE]		
Theme / Category	**% Negative (*n*=225)**	**Count**
Theme 1 - Health & Wellbeing Threat		
Natural hazards	28.4%	64
Dangerous/destructive	11.6%	26
Dangerous plants/animals	9.8%	22
Impacts on human health	6.7%	15
Total	**56.4%**	**127**
Theme 2 - Vulnerability from Humans		
Due to attitudes towards 'nature'	37.8%	85
Due to beliefs about 'nature'	3.6%	8
Total	**41.3%**	**93**
Theme 3 - Inconvenience to Humans		
Interference with development	2.7%	6
Interferes with daily tasks	1.3%	3
Generally annoying	0.9%	2
Generally inconvenient	1.8%	4
General inaccessibility	0.9%	2

Total	**7.6%**	**17**
Theme 4 - Based on human perception		
Entirely based on human perception	1.8%	4
Total	**1.8%**	**4**
Theme 5 - 'nature' is harmful to itself		
Vulnerabilities within 'nature'/'nature' harming 'nature'	2.7%	6
Total	**2.7%**	**6**

TABLE 7.10 COMMENTARY RELATING TO THE RESPONSE 'UNSURE' IF 'NATURE' HAS POSITIVE OR NEGATIVE ASPECTS

[IF YES TO UNSURE]		
Category	**% Unsure (*n*=51)**	**Count**
Based on human actions	13.7%	7
Both	9.8%	5
Just 'is'	7.8%	4
Other	7.8%	4
Doesn't know	5.9%	3
Based on human perceptions	3.9%	2

TABLE 7.11 COMMENTARY RELATING TO THE RESPONSE 'NEITHER' IF 'NATURE' HAS POSITIVE OR NEGATIVE ASPECTS

[IF YES TO NEITHER]		
Theme / Category	**% Neither (*n*=171)**	**Count**
Theme 1 - Other		
Just 'is'	26.3%	45
Based on human perception	15.8%	27
Based on human actions	12.9%	22
Other	2.9%	5
'nature' can't be controlled	0.6%	1
Total	**58.5%**	**100**
Theme 2 - Both Negative and Positive		
Both	17.0%	29
Neutral	12.9%	22
Balanced	5.8%	10
Total	**35.7%**	**61**

Please tell me in a few words what you think a connection to 'nature' is
Please note, there are no right or wrong answers, I am soley interested in your personal ideas and thoughts.
Results presented in Chapter 3 - Conceptualisations of 'connections to 'nature''

Do you have the connection to 'nature' that you described in the last question?
Results presented in Chapter 4 - Perceived Influences on 'connections to 'nature''

[if yes] Can you please explain in a few words why you feel you have the connection to 'nature' you described?
Results presented in Chapter 4 - Perceived Influences on 'connections to 'nature''

[if sometimes] Can you please explain in a few words why you sometimes have the connection to 'nature' you described?
Results presented in Chapter 4 - Perceived Influences on 'connections to 'nature''

[if no] Can you please explain in a few words why you think you do not have the connection to 'nature' you described?
Results presented in Chapter 4 - Perceived Influences on 'connections to 'nature''

[if yes/sometimes] How intense/strong do you feel this connection to 'nature' is?

TABLE 7.12 STRENGTH OF CONNECTION TO 'NATURE'

Response	% Yes/Sometimes (*n*=848)	Count
Extremely strong	39.2%	331
Moderately strong	45.2%	383
Neither strong nor weak	14.3%	121
Moderately weak	0.9%	8
Extremely weak	0.0%	0
Unsure	0.6%	5
Total	**100.0%**	**848**

[if yes/sometimes] How often do you display this connection to 'nature'?

TABLE 7.13 HOW OFTEN CONNECTION TO 'NATURE' IS DISPLAYED

Response	% Yes/Sometimes (*n*=848)	Count
Daily	50.2%	425
Weekly	31.8%	270
Monthly	7.5%	64
Yearly	1.3%	11
Unsure	9.2%	78
No response	0.0%	0
Total	**100.0%**	**848**

Do you believe that the Government could help to increase the strength/intensity of the connection to 'nature' you have?

TABLE 7.14 CAN THE GOVERNMENT INCREASE THE STRENGTH OR INTENSITY OF CONNECTION TO 'NATURE'

Response	%	Count
Yes	60.0%	578
No	16.2%	156
Unsure	23.5%	226
No response/no data*	0.3%	3
Total	**100.0%**	**963**

TABLE 7.15 PERCEIVED WAYS IN WHICH THE GOVERNMENT COULD INCREASE 'CONNECTIONS TO 'NATURE''

[IF YES]		
Theme	**% Yes (*n*= 578)**	**Count**
Theme 1 – Projects relating to protection and enhancement of 'nature'	48.1%	278
Theme 2 - Increased investment into 'nature'	32.7%	189

Theme 3 - Education	28.5%	165
Theme 4 – Decrease in urban sprawl an development	12.6%	73
Theme 5 - Collaborations or partnerships with other agencies	9.2%	53
Theme 6 - Accessibility to 'nature'	8.5%	49
Theme 8 – Increase in 'nature' related laws/legislations	3.1%	18
Theme 9 – Working with Māori	1.0%	6
Theme 10 – Government already does enough	0.9%	5

TABLE 7.16 COMMENTARY RELATING TO WHY THE GOVERNMENT CANNOT INCREASE 'CONNECTIONS TO 'NATURE''

[IF NO]		
Theme	**% No (*n*= 156)**	**Count**
Theme 1 - Personal value that government cannot influence	73.7%	115
Theme 2 - Generally nothing they could do / there is no way to increase connections	29.5%	46
Theme 3 - Could do more 'in general'	19.9%	31
Theme 4 – They are already doing something / doing enough / keep up what they are doing	17.3%	27
Theme 5 - Other	14.1%	22
Theme 6 – They have other higher priorities	9.0%	14
Theme 7 – Not enough adequate resourcing	9.0%	14
Theme 8 - Inability for government to track or measure connectedness	1.3%	2
Theme 9 - Results in too many rules/regulations/policies	1.3%	2

Do you believe there are any other organisations that could increase the strength of the connection to 'nature' you described for you personally?

TABLE 7.17 OTHER ORGANISATIONS OR BUSINESSES THAT CAN INCREASE 'CONNECTIONS TO 'NATURE''

Response	**%**	**Count**
Education Providers	39.6%	395
Businesses	38.1%	380
Community Groups	35.2%	351
Non-profit Organisations	28.7%	286
Other	13.3%	133
Total	**155.0%**	**1545**

TABLE 7.18 PERCEIVED WAYS IN WHICH BUSINESSES CAN INCREASE 'CONNECTIONS TO 'NATURE''

[IF YES TO BUSINESS]		
Theme	**% Yes (*n*=380)**	**Count**
Theme 1 - General sustainability actions and commitments	42.1%	160
Theme 2 - Monetary - i.e., funding env. initiatives or paying higher taxes	20.8%	79
Theme 3 - More 'green' in offices and surrounds / biophilic design	9.7%	37
Theme 4 - Allow staff to interact with 'nature' more or to engage in pro-environmental actions	8.4%	32
Theme 5 - Education	7.6%	29
Theme 6 - Investment in sustainable products/services	7.6%	29
Theme 7 - Other	6.3%	24
Theme 8 - Work/life balance and promotion of employee health and wellbeing	3.2%	12
Theme 9 - Lobbying government	0.3%	1

TABLE 7.19 PERCEIVED WAYS IN WHICH NON-PROFIT ORGANISATIONS CAN INCREASE 'CONNECTIONS TO 'NATURE''

[IF YES TO NON-PROFIT ORGANISATIONS]		
Theme	**% Yes (*n*=286)**	**Count**
Theme 1 - Education	36.0%	103
Theme 2 - Conservation projects	17.5%	50
Theme 3 - Other	15.0%	43
Theme 4 - Volunteering opportunities	8.7%	25
Theme 5 - General sustainable practices	8.0%	23
Theme 6 - Lobbying/advocacy	8.0%	23
Theme 7 - Support accessibility to 'nature'	4.5%	13
Theme 8 - Requires more resourcing	3.1%	9

TABLE 7.20 PERCEIVED WAYS IN WHICH COMMUNITY GROUPS CAN INCREASE 'CONNECTIONS TO 'NATURE''

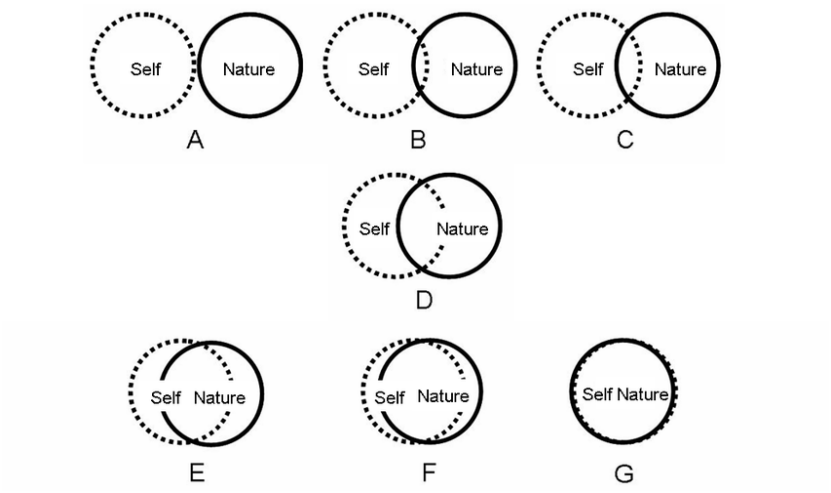
[IF YES TO COMMUNITY GROUPS]		
Theme	**% Yes (*n*=351)**	**Count**
Theme 1 - Conservation projects	31.6%	111
Theme 2 - Education/events	24.2%	85
Theme 3 - Volunteering opportunities/people involvement	20.2%	71
Theme 4 - Outdoor activities	15.7%	55
Theme 5 - Other	11.7%	41
Theme 6 - General sustainable outlooks 'looking after 'nature''	7.7%	27
Theme 7 - Lobbying/advocacy	4.6%	16
Theme 8 - Require more resourcing	0.6%	2
Theme 9 - Inclusiveness of Māori	0.3%	1

TABLE 7.21 PERCEIVED WAYS IN WHICH EDUCATION PROVIDERS CAN INCREASE 'CONNECTIONS TO 'NATURE''

[IF YES TO EDUCATION PROVIDERS]		
Theme	**% Yes (*n*=395)**	**Count of References**
Theme 1 - More general environmental topics in mainstream curriculums	55.9%	221
Theme 2 - Specific mention of children	24.8%	98
Theme 3 - More practical learning opportunities i.e., school trips	18.5%	73
Theme 4 - More opportunities for students to be outside	7.8%	31
Theme 5 - Education provides to run conservation projects or be more sustainable in their practices	4.6%	18
Theme 6 - Other	4.6%	18
Theme 7 - General school curriculum changes	2.3%	9
Theme 8 - Lobbying or research	1.3%	5
Theme 9 - Recommendation of overseas curriculums	0.3%	1

Please select which diagram below best displays how you view yourself in relation to 'nature'

Self = you personally



Results presented in Chapter 5 - Interconnectedness with 'nature' and Pro-'nature' Beliefs

Please read the following statements, and indicate whether how strongly you either agree, or disagree with each of them.
Please note that there are no right or wrong answers. I am solely interested in your opinion.

Results presented in Chapter 5 - Interconnectedness with 'nature' and Pro-'nature' Beliefs

Please indicate which of the following practices you take part in You will have an option to discuss any of your responses at the end of this section if you wish.
I would like you to answer these questions thinking about whether you do them from an environmental perspective, instead of for financial or health reasons.

TABLE 7.22 RESPONDENT ENGAGEMENT WITH PRO-'NATURE' ACTIONS

Response	%	Count
I separate my rubbish into recyclable, and non-recyclable	93.9%	936
If I see rubbish on the ground, I pick it up and dispose of it appropriately	74.6%	744
I reuse anything I can at least one more time before discarding it into the bin	73.8%	736
I will pay more for free-range eggs to avoid the negative impacts that factory farming has on both animals and the environment	62.6%	624
I consciously try to use less energy at home and at work to reduce my carbon emissions. If yes - do you feel you are successful in doing this in practice?	55.3%	551
I consciously try to use less water at home and work to reduce my water consumption. If yes - do you feel you are successful in doing this in practice?	54.0%	538
I try not to buy products from companies with unsustainable environmental records	54.0%	538
I will knowingly pay more for products if I know it comes from a company with environmentally sustainable records	53.8%	536
I compost food waste	50.7%	505
I will pay more for free-range meat to avoid the impacts that negative factory farming has on both animals and the environment	43.3%	432
I talk to people about environmental issues and discuss what we can do to help	43.1%	430
I buy my groceries in bulk to avoid plastic and excess packaging	43.0%	429
I consciously try to avoid using my car and either use public transport, bike or walk to reduce my carbon emissions. If yes - do you feel you are successful in doing this in practice?	39.8%	397

I will knowingly pay extra for organic fruit and vegetables to avoid the pesticide and chemical use because it is unhealthy for soils and waterways	36.4%	363
I grow my own food in a sustainable way to reduce my impact on the environment	29.1%	290
I voluntarily contribute money to environmental organisations	20.2%	201
I eat a vegetarian or vegan diet, because I think it is more sustainable	17.5%	174
I volunteer with environmental organisations	15.8%	158
I participate in protests about environmental issues	12.4%	124
I lobby to local politicians and councillors to actively and positively address environmental issues in my region	10.0%	100
I facilitate protests, meetings or gatherings to discuss environmental issues	2.5%	25

Please indicate which environmental projects and policies you are aware of in the Auckland region

TABLE 7.23 RESPONDENT AWARENESS OF LOCAL PROJECTS AND POLICIES

Answer	%	Count
Auckland Council's Waste Minimisation Plan	38.8%	387
Auckland Council's Growing Greener Plan	12.1%	121
Auckland Council's Regional Pest Management Strategy	38.6%	385
Auckland Council's Low Carbon Action Plan	14.8%	148
Auckland Council's Indigenous Biodiversity Strategy	9.0%	90
Auckland Council's Auckland Plan 2050 - Environment & Cultural Heritage	16.9%	168
Department of Conservation's Auckland Conservation Management Strategy	12.9%	129
Projects by Sustainable Coastlines	27.5%	274
Projects by EcoMatters Trust	13.5%	135
Projects by Greenpeace (Auckland based projects)	29.8%	297
Projects by Forest & Bird (Auckland based projects)	38.1%	380
Projects by Keep New Zealand Beautiful (Auckland based projects)	22.8%	227
Projects by Experiencing Marine Reserves	10.2%	102
Projects by Kaipatiki Project	13.4%	134
Projects by Ark in the Park	13.3%	133
Projects by Shakespear Open Sanctuary	13.8%	138
Projects by Chinese Conservation Education Trust	1.4%	14
Projects by NZ Bird Rescue (Auckland based projects)	24.9%	248
Projects by NZ Dotterel and Shorebird Advocacy and Projection	16.6%	166
Projects by Sir Peter Blake Marine Education and Recreation	17.3%	172
Projects by Glenfern Sanctuary	2.2%	22
Projects by Little Barrier Island Supporters Trust	8.3%	83
Projects by Motuihe Trust	11.0%	110
Projects by Motu Kaikoura Trust	2.8%	28
Projects by Motuora Island Restoration Society	8.2%	82
Projects by Motutapu Restoration Trust	17.9%	178
Projects by Rangitoto Island Historic Conservation Trust	18.0%	179
Projects by Supporters of Tirititi Matangi Island	22.8%	227
Projects by CUE Haven Native Forest Restoration	2.4%	24
Projects by Mataia Restoration	2.1%	21
Projects by New Zealand Fairy Tern	6.7%	67
Projects by Omaha Shorebird Protection Trust	4.9%	49
Projects by Tamahunga Predator trapping group	2.3%	23
Projects by Tawharanui Open Sanctuary Society	13.1%	131
Projects by Forts of Aucklnad	2.8%	28

Projects by Friends of Okura Bush	9.5%	95
Projects by Raroa Urban 'nature' Reserve	0.4%	4
Projects by Tuff Crater Restoration Project	3.5%	35
Projects by Motu Manawa Restoration Group	1.4%	14
Projects by Mangere Mountain Education Trust	7.4%	74
Projects by Whau River Catchment Trust	7.3%	73
Projects by Friends of Mangemangeroa Society	2.0%	20
Projects by Pukorokoro Miranda Shorebird Centre	4.0%	40
Projects by Purewa Restoration Group	1.4%	14
Projects by WekaWatch Kawakawa Bay	2.9%	29

Thank you for your time completing this survey. If you have any further comments you wish to make about your responses, or about this research in general, please enter them below. Otherwise, leave the text box blank.

If you wish to download a copy of the Participant Information Sheet for your records, please click here to initiate the download.

Do you want to enter the competition to win one of four $50.00 supermarket vouchers?

- Yes
- No

Please enter your e-mail address below to enter the competition.

This research is considered a "low-risk" research project. Nevertheless, your responses will be anonymous and confidential. E-mail addresses collected for the purpose of the prize draw will kept always separate from survey responses.

7.4 APPENDIX 4 – UN-USED RESULTS

As discussed in section 1.8.6 not all questions that were in the online survey were presented as findings in chapters two to five. However, the results from all the un-used online survey questions were presented in Appendix 3.

The following table provides discussion on any result which was not included in chapters two to five that either supports/complements the main findings or undermines them (admittedly no un-used results undermined the findings). In some instances, further correlation tests were conducted to ensure the full and robust consideration of the un-used results.

Acknowledgement is made that most results below are supportive and complement the findings across chapters two to five and thus would have benefitted from being included in the respective chapters. However, as discussed in section 1.8.6 due to word count limits of journal articles, and the fact that the questions specifically aimed at addressing the four research questions sufficiently achieved doing that, they were not included.

All questions which were open-ended, used the same method to analyse the data as conducted in chapters two to four (content analysis).

TABLE 7.24 ANALYSIS OF UN-USED RESULTS

Question and summary of results	**Key result**	**Relationship to central findings of this thesis (research objective 1, 2, 3, 4)**
Table 7.1 Respondents' place of residence	Respondents who engaged in the online survey came from nearly every suburb in Tāmaki Makaurau Auckland.	Despite the sample group being non-random and therefore not representative of the Tāmaki Makaurau Auckland region, this adds further credence to the fact that a wide range of respondents engaged in the research.
Table 7.2 Length at residence	The most selected response was '1-5 years' (n = 34.5%), followed by '10 years+' (n = 32.3%).	This result does not have any relevance to the central findings.
Table 7.3 Dominant place of residence	The most selected response was 'same suburb' (n = 54.1%) followed by 'somewhere else' (n = 45.5%).	This result does not have any relevance to the central findings.
Table 7.4 Days per week spent outside	The most selected response was 'every day' (n = 35.9%), followed by '3 -4 days' (n = 22.5%).	This result complements the findings in chapter four. Firstly, an analysis to explore whether days per week spent outside and responses to the question asking respondents if they had a connection to 'nature' had any positive correlations, found that respondents who responded 'yes' were nearly double as likely to spend every-day outside (n = 42.0%) compared to

		those who responded 'unsure' (n = 29.0%); 'sometimes' (n = 21.9%) or 'no' (n = 25.0%). Similarly, respondents who selected 'no' were four times more likely to spend no days outdoors (n = 4.1%) compared to those who selected 'sometimes' (n = 0.9%), 'unsure' (n = 0.0%) or 'yes' (n = 0.1%). This supports the conclusion from chapter four that exposure to 'nature' is an important pathway to 'connections to 'nature''.
Table 7.5 Hours spent outside	The most selected response was '1-2 hours' (n = 35.8%), followed by '3-4 hours' (n = 32.0%).	This result also complements the findings in chapter four. By undertaking an analysis to explore whether time spent outside correlated with responses to the question asking respondents if they had a connection to 'nature', those who selected 'no' when asked if they had a connection to 'nature' were three times more likely to spend less than 1 hour outside (n = 33.3%) compared to the others ('sometimes' n = 10.9%; 'unsure' n = 3.4%; 'yes' n = 4.0%). Again, this supports the conclusion in chapter four that exposure to 'nature' is an important pathway to 'connections to 'nature''.
Table 7.6 Involvement with the outdoors/environmental management field	The most selected response was 'as a child I was outdoors most days' (n = 66.8%) followed by 'most of my recreational activities are based outdoors' (n = 57.4%).	The results from this question also support findings from chapter four. By undertaking an analysis to test for correlations between this question and the response asking respondents if they have a connection to 'nature', it showed that those who selected responses which related to spending more time outdoors (e.g., through recreational activities, or that their job is based outdoors) were mostly likely (by 15.0%) to respond 'yes' they have a connection to 'nature'. Again, this supports the conclusion from chapter four that exposure to 'nature' is an important pathway to 'connections to 'nature''.
Table 7.7 Perceived positive or negative aspects of 'nature'	Most commonly, respondents indicated that there are positive aspects of 'nature' (n = 78.2%), followed by negative (n = 22.6%).	The perception of as to whether there are positive or negative aspects of 'nature' do not support nor undermine any of the central findings, however, some of the commentary respondents made expanding on these responses do, as discussed below.

		This result supports findings from chapters two, three and four. Firstly, the dominating response that positive aspects of 'nature' are the health and wellbeing benefit it provides, supports the second most common theme in chapter two that 'nature' is conceptualised as a feeling (namely positive, e.g., calmness, peace).
Table 7.8 Perceived positive aspects of 'nature'	Most commonly, of the 78.2% of respondents who reported that there are positive aspects of 'nature', mostly discussed that these positive aspects were the health and wellbeing benefit it provides for humans (specifically mental health benefits) (n = 103.3%) followed by that 'nature' supports life on Earth (n = 17.7%).	Similarly, the dominating response supports the theme in chapter three that a 'connection to 'nature'' is conceptualised as a health and wellbeing connection. This dominating response also supports the fourth and fifth most common themes in chapter four, that what prompts and/or sustains 'connections to 'nature'' are the emotional reasons (specifically that it evokes a positive emotion), or that the health and wellbeing benefits (specifically mental health) that 'nature' provides prompts and/or sustains 'connections to 'nature''. The second most common response, that a positive aspect of 'nature' is the ability to support life on Earth, aligns with the tenth theme in chapter four of the acknowledgement of how 'nature' supports life on Earth and prompt and/or sustain 'connections to 'nature''.
Table 7.9 Perceived negative aspects of 'nature'	Most commonly, of the 22.6% of respondents who reported that there are negative aspects of 'nature', most commonly, respondents indicated that negative aspects of 'nature' were the threats it poses to health and wellbeing (n = 56.4%) followed by that it is vulnerable (n = 41.3%).	The perception of what aspects of 'nature' are negative do not support nor undermine any of the central findings. However, it is interesting to note that the most common comments relating to the perception that negative aspects of 'nature' are that it poses a health and wellbeing threat were predominantly surrounding natural hazards. With the increase in greenhouse gas emissions, climate change impacts such as natural hazards will continue to increase in intensity and form (World Meteorological Organization, 2021), therefore this result could provide an interesting implication

		that to motivate individuals to reduce their greenhouse gas emissions, could be achieved through highlighting to individuals that decreasing greenhouse gas emissions subsequently decreases the threat of natural hazards impacting their health and wellbeing as a motivational factor.
Table 7.10 Commentary relating to the response 'unsure' if 'nature' has positive or negative aspects	Most commonly, respondents indicated that they were unsure as it is based on human actions toward 'nature' (n = 13.7%) followed by that there are both positive and negative aspects of 'nature' (n = 9.8%).	This perception does not support nor undermine any of the central findings.
Table 7.11 Commentary relating to the response 'neither' if 'nature' has positive or negative aspects	Most commonly respondents indicated that 'nature' just 'is' (n = 26.3%) followed by that there are both negative and positive aspects of 'nature' (n = 17.0%).	Similarly, this perception does not support nor undermine any of the central findings.
Table 7.12 Strength of connection to 'nature'	Most commonly, respondents indicated that their connection was 'moderately strong' (n = 45.2%) followed by that it is 'extremely strong' (n = 39.2%).	The results from this support the findings from chapter four. By undertaking an analysis of the responses to this question and the responses to the question asking respondents how many days they spend outdoors per week to test if there are any correlations, it was found that those who selected the response that their connection to 'nature' is 'extremely strong' were most likely to respond that they spend 'everyday' outdoors (n = 47.2%) compared to others (less than 33.9%). This supports the finding that exposure to 'nature' is an important pathway to 'connections to 'nature''. Furthermore, it may suggest that exposure to 'nature' potentially prompts stronger 'connections to 'nature'' if spending time outdoors every day. However, it is important to note that no correlations were found when performing the same analysis with the response to this question

		seeking strength of 'connections to 'nature'' and hours spent outdoors.
Table 7.13 How often connection to 'nature' is displayed	Most commonly, respondents indicated that they display their connection to 'nature' 'daily' (*n* = 50.2%), followed by 'weekly' (*n* = 31.8%).	Again, the results from this support the findings from chapter four. By undertaking an analysis of the responses to this question and the responses asking respondents how many days they spend outdoors per week to test if there are any correlations, it was found that those who selected the response that they display their connection to 'nature' 'daily' were double more likely to also select the response that they spend everyday outdoors (*n* = 52.1%) as opposed to others (less than 24.0%). Again, this may suggest that exposure to 'nature' prompts 'connections to 'nature''. Similarly, those who selected the response that they only display their connection to 'nature' 'yearly' spent the least of time outdoors per week (1-2 days) (45.4%) compared to others (less than 28.1%).
Table 7.14 Can the Government increase the strength or intensity of connection to 'nature'	Most commonly, respondents indicated 'yes' (*n* = 60.0%) followed by 'unsure' (*n* = 23.5.%).	This result does support the recommendations made throughout chapters three and four relating to the role of Governments in prompting and/or sustaining 'connections to 'nature''. Furthermore, the commentary that respondents added after selecting 'yes' further provide insight into the role of how Government can increase 'connections to 'nature'' (as was discussed earlier in section 6.2).
Table 7.22 Respondent engagement with pro-'nature'ature' actions	Overall, of all the pro-'nature' actions listed, over half of them (64.6%) were reportedly engaged with by at least half of the respondents. Furthermore, nearly all the pro-'nature' actions (91.1%) were reportedly engaged with by at least a quarter of the respondents. Generally, pro-'nature' actions that were engaged with by less than half of the respondents, tended to be those that required extra costs to the respondent (e.g., paying more for free range meat, donating money to environmental	The general result that the respondents engage frequently in pro-'nature' actions is somewhat expected for four reasons. Firstly, it further suggests that the respondents may have been more ''nature' orientated/sustainable' than the usual lay person, which is reflected in their voluntary agreement to engage in this research. Although it was attempted to avoid this, it is difficult to avoid entirely. Secondly, the reported high engagement in pro-'nature' actions may be a result of response bias, specifically 'pleasing the researcher', as discussed in section 1.8.

	organisations), or, required time or effort (e.g., volunteering with environmental organisations, participating in protests, etc). In most instances, pro-'nature' actions that had some form of benefit for the respondent were more likely to be engaged with (e.g., separating rubbish, reusing items, using less energy or water etc).	Thirdly, given the strong suggested correlation between 'connections to 'nature'' and pro-'nature' actions (Whitburn, Linklater, & Abrahamse, 2019), the high engagement in pro-'nature' actions is expected given that 69.9% of respondents indicated 'yes' when asked if they have a connection to 'nature' (discussed in chapter 4), and that 79.6% indicated some form of connectedness when responding to the Inclusion of Nature in Self scale (discussed in chapter 5). Lastly, most respondents engaged in pro-'nature' actions which were convenient to them. For example, the most frequently engaged in pro-'nature' action reported by respondents was that they separate their rubbish into recycling and non-recyclable (n = 93.9%). In the study location, kerbside rubbish facilities provide a small general waste bin, and a larger (almost double in size) recycling bin. It is therefore in the best interest to recycle to avoid overflow and needing to purchase additional general waste rubbish bags. This is like the reported high engagement with the pro-'nature' action of re-using anything at least one more time before discarding it into the bin (n = 73.8%), using less energy (n = 55.3%) and using less water (n = 54.0%). This is opposed to pro-'nature' actions which require extra money or time, e.g., only 2.5% of respondents indicate that they facilitate protests, meetings, or gatherings to discussed environmental issues, only 10.0% of respondents indicate that they local politicians to address environmental issues, or that only 15.8% of respondents indicate that they volunteer with environmental organisations.
Table 7.23 Respondent awareness of	The most common projects and policies that respondents reported that there were aware of were Auckland Council's Waste	This result does not undermine any findings from this research, however, it highlights that if the recommendations made in section 6.2 derived from the research implications are actioned, that

local projects and policies	Minimisation Plan (*n* = 38.8%), Auckland Council's Pest Management Strategy (*n* = 38.6%) and projects by Forest & Bird (*n* = 38.1%).	potentially a large percentage of the population would become aware of them given current awareness of over a quarter of the respondents of programmes and strategies employed by local Government and non-profit organisations (namely Forest & Bird).

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7.5 APPENDIX 5 –INTERVIEW QUESTIONS (STRUCTURED AND IN-DEPTH)

Note: The questions below formed the basis of the in-depth interviews, but further questions were asked as the conversation with the respondent progressed e.g., "can you give me more examples".

1. Can you please tell me what you think 'nature' is? There is no right or wrong answer here. I am solely interested in your ideas and feelings.

2. Can you now tell me what you think a 'connection to 'nature'' is? Again, there is no right or wrong answer here. I am solely interested in your ideas and feelings.

3. Do you have this connection?

    - *if yes* - Can you please explain in a few words why you feel you have the connection to 'nature' you described?

    - *if no* - Can you please explain in a few words why you think you do not have the connection to 'nature' you described?

    - *if sometimes* - Can you please explain in a few words why you sometimes have the connection to 'nature' described?

7.6 APPENDIX 6 – PARTICIPANT CONSENT FORMS

Ethics notification number: 4000020091

Participant Information Sheet

Invitation

My name is Lissy Fehnker and I am currently a PhD candidate at Massey University and live in Auckland. I left my full-time job so that I could undertake this PhD full-time. I really enjoy my studies and am very passionate about the topic.

I would really appreciate your help with this research.

What is the purpose of this research?

The purpose of this research is to investigate how people perceive, value and connect with 'nature'. I will also look at what influences people's perceptions of, and connections with, 'nature'.

How were you chosen for this research?

I need a range of participants for this research from across the Auckland region. I have advertised this research project on social media channels based in Auckland, and by hanging up posters, handing out pamphlets, doing mail drops and approaching people in the Auckland region. Therefore, you were chosen and/or targeted to undertake this research as you live in the Auckland region.

Please note: To take part in this research, you must be over 16 and live in the Auckland region.

If you participate, what will you need to do?

You will complete a survey which requires you to give short answers and indicate your opinions and behaviours on a scale. The survey is approximately 15minutes long.

If you participate, what are the benefits?

On completion of this research project the findings will be used in my PhD thesis. From this, I will be making recommendations to a number of interested stakeholders (i.e., government, businesses, organisations). This means that your answers in this survey will be directly used in these recommendations (anonymously) and will help these stakeholders understand how people value and connect with 'nature'. This may help with future decision making, management of the natural environment, policies, education programmes, etc.

If you participate, what are the risks of being involved?

This research is considered a "low-risk" research project. Nevertheless, your responses will be anonymous. To take part in the competition, you will be asked for your e-mail address on a separate screen on completion of the survey. Your e-mail address will be kept always separate from your responses.

If you participate, what are your rights?

You are under no obligation to accept this invitation. If you decide to participate, you have the right to withdraw from the research within 21 days of taking part in the survey. You can do this by contacting me either via phone or e-mail (details at the bottom of this page). You can ask any questions about the study at any time or decline to answer any particular question (or reflect on any particular issue). You can do this by leaving the field/checkbox blank and clicking 'next' at the bottom of the screen. When the PhD is concluded, you can request an Executive Summary and can request to be given access to the full thesis.

If you participate, how will your data be managed and stored?

Raw data will be stored securely in password protected electronic files in an online cloud system.

Who else is involved in this research?

I am the only person involved in this research. However, I have supervisors from Massey University who oversee the project – through providing guidance, peer reviewing work, and offering expertise on the subject. These supervisors are Professor Diane Pearson and Dr Peter Howland from Massey University.

Both Prof Pearson and Dr Howland will have access to the raw data.

If you participate, what do you do if you have concerns about the research?

If you have any concerns, please contact myself in the first instance or my primary supervisor, Professor Diane Pearson.

Lissy Fehnker, PhD Candidate

Phone: +64 21 02753002, Email: lissy.fehnker@hotmail.co.nz

Professor Diane Pearson, Supervisor of research

Phone: +64 (06) 356 9099 ext. 84837, E-mail: d.pearson@massey.ac.nz

If you feel your concerns have not been addressed, you can contact the Massey University Human Ethics Committee. The details are below.

This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact Professor Craig Johnson, Director (Research Ethics), email humanethics@massey.ac.nz

7.7 APPENDIX 7 – PAGE ONE OF PUBLISHED ARTICLES

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Article

Understanding Conceptions of 'Nature' for Environmental Sustainability: A Case Study in Tāmaki Makaurau Auckland, Aotearoa New Zealand

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Abstract: Empirical research that inductively investigates lay conceptions of 'nature' is scarce, despite global environmental narratives around sustainability calling for humans to have harmonious relationships with 'nature'. This paper presents inductive research that attends to the empirical knowledge gap by exploring how respondents self-reportedly conceive 'nature' using Auckland, New Zealand as a case study. Results suggested that conceptions of 'nature' within the respondent group are diverse and range across 17 themes. Most commonly, respondents conceived 'nature' as being something that neither humans nor human influence or activities are a part of. This finding is consistent with what has been found by previous deductive research approaches to understanding conceptions of 'nature'. However, this research provides a deeper understanding by identifying that respondents form associations with over 60 'aspects' of 'nature'. By highlighting the complexity of 'nature' from a human perspective and being able to identify significant components of 'nature' that people associate with, this study not only provides valuable insight for environmental management in the New Zealand study site, but also has potential to support improved management of human–nature interactions that can have a more targeted impact towards achieving sustainability goals at the global scale.

Keywords: nature; conceptions of nature; human nature relationships; framing nature; environmental sociology; environmental philosophy

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1. Introduction

Secretary-General for the United Nations António Guterres recently made a plea that "our war against nature must stop [. . .] it's time to make peace with nature" [1]. This powerful statement raises two important and urgent questions. Firstly, what is 'nature' and/or what does 'nature' mean to people? Secondly, do the organizations and agencies charged with protecting 'nature' acknowledge that 'nature' may mean different things to different groups of society? Despite the growing consensus since the 1970s within the scientific community that we must protect 'nature', the term still lacks clear definition [2].

Over the last decade, multi-disciplinary scholarly literature has debated the origins and meanings of the term 'nature' from a philosophical and theoretical stance. For example, conservationists Ducarme and Couvet [3] and political scientist Arias-Maldonado [4] provide useful discussions around the historical conceptions of 'nature' and how it has semantically mutated throughout history. However, there is scant literature exploring what the general lay public think 'nature' is across various contexts. At the time of writing, there has been little empirical research that has focused on exploring conceptions of 'nature'

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Exploring conceptualisations of 'connections to nature' from an environmental management perspective: a case study in Tāmaki Makaurau Auckland, Aotearoa New Zealand

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ABSTRACT

Disconnect between humans and nature has been considered a driver of contemporary environmental crises. This has resulted in environmental managers calling for society to 're-connect' with nature for future sustainability. However, conceptualisations of 'connections to nature' are fragmented in theoretical terms and practical application, as empirical research in environmental management literature exploring lay people's conceptualisations of their personal 'connections to nature' is scarce. This raises a key issue: if environmental managers do not know what they are aiming for, how can it be effective? This study responds to the empirical gap by exploring what a 'connection to nature' means to lay individuals. Just under 1,000 respondents from Tāmaki Makaurau Auckland, Aotearoa New Zealand engaged in the study. Results suggest that lay conceptualisations of 'connections to nature' range across nine dimensions – cognitive, affective, experiential, philosophical, spiritual, material, well-being, cultural or that it is a 'hippie term'. Diversity of conceptualisations among the respondent group suggests that empirical exploration of the way that people conceptualise their 'connections to nature' is beneficial. These understandings could prove vital for more efficient sustainability actions to achieve more effective outcomes. The findings advance discourse on human-nature connections in environmental management literature.

KEYWORDS

Human-nature connections; connections to nature; connectedness to nature; nature; human-nature relationship; environmental sociology

Introduction

Understanding the relationship between humans and the natural world has been of interest to scholars and philosophers over the past century. Leopold (1949) encouraged the consideration of the human-nature relationship through his theory of land ethics, stressing that if people see themselves as part of nature, they are more likely to practice a degree of stewardship towards it, arguing that 'when we see land as a community to which we belong, we may begin to use it with love and respect' (Leopold 1949, xviii). These ideas were expanded upon during the twentieth century with the growth of the environmental movement. For example, Edward O. Wilson's biophilia hypothesis

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Inclusion of nature in self and pro-nature beliefs: utilizing psychological scales in environmental management to Further understand if interconnectedness with nature supports sustainable outcomes – A case study in Tāmaki Makaurau Auckland, Aotearoa New Zealand

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ABSTRACT

It has been asserted that to overcome nature degradation, environmental managers need to understand the ways in which people view themselves in relation to nature as this influences their beliefs and actions toward nature. To examine this assertion, this study explored how 960 subjects in Tāmaki Makaurau Auckland, Aotearoa New Zealand reported themselves in relation to nature, and whether the way in which they viewed themselves in relation to nature influenced their pro-nature beliefs. Results suggested that most respondents perceive some degree of connectedness with nature despite viewing a distinction between themselves and nature. Results further indicate that respondents who perceived complete interconnectedness with nature were more likely to hold pro-nature beliefs. Conversely, respondents who perceived complete separation between self and nature were less likely to hold pro-nature beliefs. The findings suggest that positive environmental management outcomes may be more achievable if environmental managers focus on increasing individuals' feelings of interconnectedness with nature to prompt and/or enhance pro-nature beliefs. The study calls attention to the merit of deployment of psychological scales in environmental management contexts, which are currently lacking, to understand the divergent ways in which people relate to nature to contribute to more effective environmental management programmes and policy.

KEYWORDS

Interdisciplinary research; connections to nature; interconnectedness with nature; pro-nature beliefs; human – nature relationships; Auckland; conservation psychology

Introduction

Human actions and activities, particularly in urban Western countries, are degrading nature at an unprecedented rate. This has grave consequences for the Earth's long-term sustainability in terms of the on-going, necessary provisioning of natural capital and ecosystem services.

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