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The New Zealand Marine Values Survey

DO HUMAN VALUES PREDICT
PERCEPTIONS, ATTITUDES & BEHAVIOURS
TOWARDS THE NEW ZEALAND MARINE ENVIRONMENT?

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Whakataukī

"He ika kai ake i raro, he rāpaki ake i raro"

[As a fish nibbles from below, so an ascent begins from the bottom]

—Mead & Grove, 2004, p. 73

Abstract

Human values predict perceptions, attitudes and behaviours towards the NZ marine environment. A confidential online survey (The New Zealand Marine Values Survey) was completed by 1,567 NZ citizens and residents in September and October of 2019. Respondents answered a variety of questions relating to demographic variables, PABs (perceptions, attitudes and behaviours) towards the NZ marine environment, and psychographic variables. Human values (values), as conceptualised and operationalised in the Theory of Basic Human Values by social psychologist and cross-cultural researcher Shalom H. Schwartz, have been demonstrated to be universal in nature and capable of predicting a range of PABs. Respondents' prioritisation of values were measured using the latest Portrait Values Questionnaire (PVQ-RR). Statistical analysis identified many significant ($p < .01$) relationships between values and variables of interest, including the New Ecological Paradigm (*NEP*) and a variety of PAB scales created in undertaking this research. Values explained between 24.6% and 57.2% of the variance seen in 14 scales, with each of the 19 value domains proving to be of some significance ($p < .01$) in the regression analyses performed. Universalism values were prominent in many of the analyses and often exhibited negative relationships with Conservation values. Findings provided mixed support for the Value Belief Norm (VBN) theory, which postulates a causal chain between values, worldviews, norms, and behaviour. Benevolence values, despite being prioritised strongly by the sample population as a whole, explained little of the variance seen in PABs towards the NZ marine environment and were an unexpected negative predictor of the *NEP*. This research provides an overview of how individuals, from a large sample of New Zealanders with an interest in the marine environment, prioritise human values and how these values are likely to inform PABs towards the NZ marine environment. This research should provide valuable insights to any individual or organisation hoping to engage with stakeholders in the NZ marine environment in a more meaningful and effective manner —especially those confronted with social barriers to change.

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List of Initialisms, Acronyms and Abbreviations

AC	Awareness of adverse consequences
AR	Ascription of responsibility to self
APA	American Psychological Association
BERL	Business & Economic Research Ltd.
BP	Before Present
B_0	Original/Unfished/Virgin Biomass
Coastguard	Royal New Zealand Coastguard
CCF	Common Cause Foundation
COFI	FAO's Committee on Fisheries
CO_2	Carbon Dioxide
CRI	Crown Research Institute
DOC	Department of Conservation
ECO	Environment and Conservation Organisations of Aotearoa New Zealand
EDS	Environmental Defence Society
EEZ	Exclusive Economic Zone
ENGO	Environmental Non-Governmental Organisation
Est.	Established
FAO	Food and Agriculture Organization of the United Nations
Fig.	Figure
Forest & Bird	Royal Forest and Bird Protection Society of New Zealand
FNZ	Fisheries New Zealand
GESAMP	IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
Govt.	Government
HMS	Highly Migratory Species
H_0	Null hypothesis
H_1	Hypothesis
ICES	International Council for the Exploration of the Sea
IEA	International Energy Agency
ITF	International Transport Forum

IMO	International Maritime Organisation
IPCC	Intergovernmental Panel on Climate Change
IRI	Independent Research Institute
ISA	International Seabed Authority
IWC	International Whaling Commission
LINZ	Land Information New Zealand
Ltd.	Limited (LLC; Limited Liability Company)
Met Service	Meteorological Service of New Zealand Limited
MBIE	Ministry of Business, Innovation and Employment
MCH	Ministry for Culture and Heritage
MfE	Ministry for the Environment
MFish[1]	Ministry of Fisheries
MPI	Ministry for Primary Industries
MRAT	Mean Rating of item scores from the PVQ scale
MSC	Marine Stewardship Council
MOT	Ministry of Transport
NGO	Non-Governmental Organisation
NEP	New Ecological Paradigm
NIWA	National Institute of Water and Atmospheric Research Limited
NZ	Aotearoa New Zealand
NZAVS	New Zealand Attitude and Values Study
NZMVS	The New Zealand Marine Values Survey
NZSFC	New Zealand Sports Fishing Council
OECD	Organisation for Economic Co-operation and Development
PABs	Perceptions, Attitudes and Behaviours
PCE	Parliamentary Commissioner for the Environment
PVQ	Portrait Values Questionnaire
Plant & Food	New Zealand Institute for Plant and Food Research
QMS	Quota Management System
SVS	Schwartz Values Scale
NGO	Non-Governmental Organisation
RFMO	Regional Fisheries Management Organizations

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[1] The Ministry of Fisheries was merged into MPI in April 2012.

SDG	(United Nations) Sustainable Development Goal
SOE	State Owned Enterprise
SOFIA	State of World Fisheries and Aquaculture (report)
SOV	Study of Values (Vernon & Allport, 1931)
SRE	Stakeholder Representative Entity
Stats NZ	Statistics New Zealand
TACC	Total Allowable Commercial Catch
TNC	The Nature Conservancy
UN	United Nations
UNCLOS (I, II, III)	United Nations Conference on the Law of the Sea (I, II, III)
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Programme
UNFSA	United Nations Fish Stocks Agreement[2]
VBN	Value-Belief-Norm
WHO	World Health Organisation of the United Nations
WOR	World Ocean Review
WWF	World Wildlife Fund

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[2] The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks.

Acknowledgements

Thanks Mum.

Chapter 1: Introduction

> Would you trust a person who has no values? The answer is obvious: you would not. Such a person would be a sociopath. Nor would you trust a person whose values you consider to be anathema to your own. But if you thought that person shared at least some of your values—even if perhaps not all of them—you might be willing to listen. And you might accept some of what you were hearing.
>
> —Naomi Oreskes, *Why Trust Science?, 2019*

The New Zealand (NZ) marine environment is of consequence to all New Zealanders (MfE, 2019) and exists within an interconnected global marine environment that is integral to the health and prosperity of Earth and its inhabitants (WOR, 2015). NZ's marine environment provides benefits and opportunities to all New Zealanders, yet these are neither valued, nor distributed, nor utilised equally (Yandle, 2007; Stats NZ, 2020a). Perceptions, attitudes and behaviours (hereafter referred to collectively as PABs) towards the marine environment are important as they affect our stewardship of the marine environment and the value that we derive from it (Gray & Hatchard, 2007). A greater appreciation for, and a better understanding of, New Zealanders PABs towards the marine environment may therefore enable improved outcomes for the marine environment and all who benefit from it. Regional marine stewardship initiatives have repeatedly failed to achieve their own stated goals (e.g. Hauraki Gulf Forum, 2020), although the limited success of some community-led initiatives (e.g. Te Tai ō Marokura, 2020; Fiordland Marine Guardians, 2020) offer some cause for optimism. Division between stakeholders (those with an active interest in the marine environment) hinder the prospect of unanimous agreement on improvements to the marine environment, a greater focus on the human dimensions that underlie the differences between individuals and organisations may improve communication and cooperation, helping to achieve more successes and fewer failures.

Perspectives on NZ's marine environment are often communicated by stakeholders with a confidence that cannot be justified by fair consideration of the facts (e.g. Greenpeace NZ, 2018; McKenzie, 2020). Despite being influenced by a wide range of economic, environmental and social factors, individuals and organisations regularly appeal to science in defence of their PABs towards the NZ marine environment (e.g. WWF, 2016; FNZ, 2019). Science is often used to frame PABs as objective, impartial and 'evidence based', while

subjective issues that lie at the core of marine stewardship are rarely acknowledged. Public disagreement between scientists (e.g. RNZ, 2020) also enables the selective promotion of science in defence of incompatible stakeholder PABs. Although science may inform or support PABs, science is unlikely to be the proximate cause of most PABs towards NZ's marine environment as data is often lacking or disparate (Jarvis & Young, 2019; Morton, 2019; McKoy, 2006). A lack of knowledge regarding many aspects of the NZ marine environment contrasts with the use of science by stakeholders to justify and promote partisan agendas.

Improved outcomes for and from the marine environment may not only require a better understanding of the marine environment but a better understanding of those who interact with it. A limited number of academic studies and institutional surveys offer some insight into relevant PABs of New Zealanders (Hughey, Kerr & Cullen, 2019; MfE 2018a, 2018b; Warren & Procter, 2005; Arnold, 2004;), yet an absence of relevant data provides little basis for claims to be made about their social and psychological underpinnings. Conversely, research exploring demographic and psychographic variables of interest provides some insight into New Zealanders social and psychological attributes but little of specific relevance to the marine environment (Stats NZ, 2020b; University of Auckland, 2020; MacDonald et al., 2020). A greater emphasis on understanding how and why the PABs of stakeholders in the NZ marine environment differ may facilitate improved communication and cooperation, resulting in improved outcomes for the marine environment and all who benefit from it.

This research seeks to provide social context to the NZ marine environment by questioning how the PABs of individuals relate to human values. Specifically, this research aims to answer the research question: Do human values predict perceptions, attitudes and behaviours towards the NZ marine environment? The hypothesis that there is a relationship between human values and perceptions, attitudes and behaviours towards the New Zealand marine environment (H_1) will be tested against the null hypothesis that no relationship exists (H_0). While assumptions regarding the motivations of New Zealanders with an active interest in the marine environment (i.e. stakeholders and stakeholder organisations) may well prove to be valid, there is currently little empirical evidence to support them.

Human values can be generally defined as "principles or standards of behaviour; one's judgement of what is important in life" (Values. 2020). An extensive body of research has

demonstrated the role of human values as a factor in the formation of PABs (CCF, 2016). Human values, especially as conceptualised and operationalised by social psychologist and cross-cultural researcher Shalom H. Schwartz, have been demonstrated to be universal in nature and capable of predicting a range of PABs, within and across cultures (Schwartz, 2012). This well established body of research, combined with an absence of research into PABs towards the NZ marine environment, led to the adoption of an exploratory research design. Exploring the relationships between human values and PABs towards the NZ marine environment, along with the relationships between PABs, could provide a better understanding of the similarities and differences within and between groups of individuals concerned with the NZ marine environment. An online survey, the New Zealand Marine Values Survey (NZMVS), was designed to self-select for individuals concerned with the NZ marine environment and collect data on a variety of demographic and psychographic (values and PABs) variables from a target population of NZ citizens and residents over the age of 16.

I consider this research important and necessary as shared aspirations for the prosperity of NZ's marine environment have rarely proven enough to ensure decisive action towards outcomes of mutual benefit to the NZ marine environment and those who benefit from it. This research explores the diversity of PABs towards the NZ marine environment and provides empirical evidence of the psychological differences that underpin this diversity. Findings should therefore be of interest to any individual or organisation involved with the NZ marine environment—especially those confronted by social barriers to change within it.

In this thesis, the *Background / Literature Review* chapter presents an overview of the global marine environment and the NZ marine environment, providing context to PABs of interest, before outlining the development of values theory and exploring the relationship between human values and PABs. The *Methods* chapter details the research design and the *Results* chapter then presents an overview of the dataset collected and statistical analyses performed. In the *Discussion* chapter, these results are then considered in relation to the research hypotheses and relevant literature. Research findings are summarised and consideration is given to the potential for further research in relation to this project.

Chapter 2: Background / Literature Review

2.1   The Global Marine Environment

Homo sapiens and the marine environment have a long history. Seafood has been a part of the human diet for at least 164,000 years (Marean et al., 2007) and the practice of pelagic fishing is at least 42,000 years old (O'Connor et al., 2011). Oceanic migration likely enabled human occupation of Australia (Norman et al., 2018) around 65,000 years BP (Clarkson et al., 2017) and eventually lead to the human settlement of every sizeable land mass on the planet by the 13th century AD, when people first arrived in New Zealand (Anderson, 2016). Our maritime history therefore long predates the earliest evidence of ocean-going craft (of approximately 5,000 years BC; Carter, 2006). Maritime migration, trade, warfare, and the exploitation of marine resources have all had wide-ranging effects on the course of human history.

While our relationship with the marine environment has changed substantially during the modern era, humans remain heavily reliant upon the ocean. Fish provides almost 20% of the average per capita animal protein intake for roughly 3.3 billion people (FAO, 2020), the maritime industry is responsible for transporting the vast majority of international freight (ITF, 2019), submarine telecommunication cables are responsible for over 99% of trans-oceanic data transfer (Satarino, 2019), more than a quarter of the world's oil and gas is sourced offshore (IEA, 2018) and the generation of offshore wind power is expected to increase substantially in coming decades (IEA, 2019). Although services provided by the ocean are invaluable, the annual economic contribution of the global marine economy has nevertheless been estimated "...very conservatively…" at around US$1.5 trillion for 2010 (OECD, 2016, p.13) and at US$2.5 trillion in 2015 (Hoegh-Guldberg & Bruno, 2015).

Seafood remains central to the human diet and fishing is of cultural, economic, recreational and social importance (Young et al., 2016). Globally, and especially in many developing nations, human nutrition and food security is dependent upon the marine environment (FAO, 2020). Nutrients from seafood prevent many nutritional deficiencies and are crucial in the development process for many pregnant women and young children (FAO & WHO, 2010). Seafood consumption has also been linked to a range of possible health benefits, including reduced risk of "...ischaemic stroke, non-fatal coronary heart disease events, congestive heart

failure, atrial fibrillation, cognitive decline, depression, anxiety and inflammatory diseases" (FAO & WHO, 2010, p. 3). These benefits are considered to outweigh various food safety and health risks associated with the consumption of seafood (FAO, 2018).

The global marine environment is of great importance to humanity due to the immense value (cultural, economic, environmental, recreational, social, intrinsic, etc.) that it generates. Approximately 40% of the human population live within 100 km of the coast (Cohen et al., 1997) and approximately 10% of the human population live less than 10 m above sea level[3] (McGranahan et al., 2007). Proximity to the ocean facilitates greater access to opportunities, yet also increases exposure to risks associated with the marine environment. Coastal populations are more dependent upon the marine environment (e.g. for nutritional and economic benefits) than inland populations (Selig et al., 2019) and are at greater risk of adverse effects due to environmental change (Kron, 2013). Food sources and economic livelihoods are threatened by the disruption and breakdown of natural ecosystems (UNEP, 2006), while rising sea levels and increasingly frequent and intense extreme weather events threaten the long term viability of coastal settlements (McGranahan et al. 2007).

For the purpose of this thesis, the term *marine environment* refers to the "...oceans, seas, bays, estuaries, and other major water bodies, including their surface interface and interaction with the atmosphere and with the land seaward of the mean high water mark" (The Dictionary of Military Terms, 2009, p. 325). The importance of the global marine environment is typified by the size of the ocean, which covers over 70% of the Earth's surface area at an average depth of 3,688 m (Eakins & Sharman, 2010) and a maximum depth of 10,984 m (Gardner et al., 2014). The ocean contains over 96% of the planet's water (Shiklomanov, 1993), which has a mass of 1.384×10^{21} kg—surprisingly only 0.023% of Earth's total mass (Clark, 1984). The global marine environment is central to many of the physical, chemical, and biological processes that sustain life on Earth. The ocean facilitates and regulates Earth's climate system (Bigg et al., 2003) via the exchange and redistribution of energy, heat, water, gas, and particulate matter, and is the world's largest active carbon sink (Global Carbon Project, 2019), absorbing carbon dioxide directly via diffusion and indirectly through the photosynthesis of phytoplankton.

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[3] In areas with an uninterrupted connection to the coast via land less than 10m above sea level.

In 2015, 17 United Nations (UN) Sustainable Development Goals (SDGs) were set as a "...blueprint for shared prosperity in a sustainable world..." by 2030 (UN, 2019, p. 2). The marine environment is of relevance to many of these SDGs but of explicit relevance to SDG 14 (Life Below Water), which aims to "...conserve and sustainably use the oceans, seas and marine resources for sustainable development"(UN, 2019, p. 50). This goal poses an immense challenge as the global marine environment is currently in a state of decline as a consequence of anthropogenic causes (UN, 2017). Threats to the marine environment can be broadly categorised by five main stressors: climate change; pollution; habitat change/loss; invasive species; and overfishing (Nellemann et al., 2008).

Climate change will (and has already begun to) exert and exacerbate a range of pressures on marine ecosystems (Gattuso et al., 2015). Changes in ocean productivity, food-web dynamics, abundance of habitat forming species, species distributions, and incidence of disease have been linked to unnatural rates of change in the Earth's climate (Hoegh-Guldberg & Bruno, 2010). However, uncertainty exists regarding the spatial and temporal details of climate change effects and the cumulative effects of other anthropogenic stressors often increase this uncertainty (Halpern et al., 2015).

The marine environment is disproportionately impacted by climate change as a consequence of the physical dynamics of the ocean, which also regulate the Earth's climate (Hoegh-Guldberg & Bruno, 2010). Approximately 30% of all anthropogenic carbon dioxide (CO_2) emissions are absorbed by the ocean (Gruber et al., 2019). As the ocean absorbs CO_2 it changes in chemical composition, becoming more acidic. This process, known as ocean acidification (Royal Society, 2005), affects other marine processes (Doney et al., 2009). The disruption of the calcification process, in particular, poses an existential threat to many marine organisms (Fabry et al., 2008).

Anything introduced into the marine environment as a result of anthropogenic activity that causes negative effects is considered marine pollution (UN, 1997). Marine pollution therefore exists in a myriad of forms, many of which continue to be introduced to the marine environment at increasing rates (GESAMP, 2009). Point source and nonpoint source pollution introduce pollutants to the marine environment at widely varying concentrations and the rates at which pollutants dissipate also vary greatly (Beiras, 2018).

Addressing the extent of plastic pollution in the ocean will require both national and international action. Ambitious technological solutions (e.g., The Ocean Cleanup, n.d.) are attempting to remove an estimated 250,000 tonnes (Eriksen et al., 2014) of plastic from the ocean, while more straightforward methods (e.g. International Coastal Cleanup, 2017) are increasingly being adopted at a national level (Sustainable Coastlines, n.d.). As 70–80% (Lebreton et al., 2018; Li et al., 2018) of marine plastics are a consequence of land-based activities, effective waste management is necessary to address this issue, particularly in middle- and low-income coastal nations, where the mismanagement of plastic waste is commonplace (Jambeck et al., 2015).

Marine habitats are subject to loss or change as a consequence of both direct and indirect anthropogenic activity, on land and at sea (Brander et al., 2010). Many of the habitats at greatest risk are of disproportionate importance to the wider marine environment and the functioning of marine ecosystems (Barbier, 2017). The deterioration or destruction of coastal ecosystems will often have consequences that flow through the marine environment due to their role in the life-cycles of many marine organisms (Nichols et al., 2019).

Invasive species, defined generally as non-native species that cause ecological harm or harm to the economy or health of human populations (Executive Order No. 13112, 1999), continue to spread throughout the marine environment (Ricciardi et al., 2000). Although some invasive marine species occur as a consequence of intentional introduction by humans (e.g. the Pacific Oyster, *Crassostrea gigas*), most have resulted from unintentional introduction—generally via maritime activity (Jungblut et al., 2018). Properties of the marine environment and realities of human activity all but ensure that these species, once well established, will remain permanently (Parkes & Panetta, 2009).

Industrial fishing causes a range of undesirable outcomes for the marine environment: bycatch of threatened species; discarding of unwanted species; ghost fishing (by discarded fishing gear); habitat destruction or modification; ecological disruption; overfishing[4]; and effects common to maritime vessels (Crowder et al., 2008). The State of World Fisheries and Aquaculture (SOFIA) report details the precarious state of marine fish stocks. Overfished fish

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[4] Overfishing refers to the act of harvesting a fish stock to a point where the stock is unable to replenish itself to a level that will sustain the harvest rate (FAO Term Portal, 2020). Fish stocks are defined as populations of fish that are largely separated from other populations of the same species and are therefore self-sustaining (FAO Term Portal, 2020).

stocks have increased from 10% in 1975 to 34% today. Over the same period, the number of fish stocks considered to be "underfished" has decreased from 40% to 6% (FAO, 2020). 60% of fish stocks are currently considered to be maximally sustainably fished (formerly termed fully fished) (FAO, 2020).

Most of these threats are not being addressed in a manner that would see their effects subside over time (Butchart et al., 2010). Furthermore, the presence of multiple stressors has the potential to amplify their net effect on the marine environment (Halpern et al., 2015). In response to these concerns, a greater emphasis has been placed on the consideration of cumulative effects by the global research community (Korpinen & Andersen, 2016). However, despite the importance of and threats to the global marine environment, relatively little emphasis has been placed on the marine sciences by academia (Duarte, 2014) or society (Weichselgartner & Marandino, 2012). Paucity of information is commonplace within the marine sciences (Pendleton et al., 2020) and undermines the effective management of marine ecosystems. Even if this issue is addressed, achieving effective management of marine ecosystems is arguably the greatest challenge to ensuring their sustainability.

Governance of the global marine environment

Governance of the ocean has developed in the context of *Mare Liberum* or The Freedom of the Seas (Groitus, 2009). The legal doctrine, published in 1609, deemed the ocean a commons, postulating the principle of free trade and navigation between nations and arguing a right of innocent passage. The term commons refers to cultural and natural resources held in common ownership by and for all people (Hardin, 1968). Concerns of national security led to the concept of a territorial sea being established during the 18th century (Swarztrauber, 1970). The extent of these waters, typically 3 nautical miles[5,6] from the coast, was arrived at as a compromise between nations that had set limits via different means—either by a standard unit of maritime measurement or by the range of a cannon fired from land (Walker, 1945). Following the end of World War II, claims to territory that extended beyond the territorial sea were made by nations seeking to exert control over the commons[7] (Posner & Sykes, 2010).

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[5] 1 marine league, or 3.45 statute miles, or 5.5 km.
[6] 1 nautical mile = 1.15 statute miles = 1.85 km.
[7] The scramble for claims was initiated by President Truman in 1945. Proclamation No. 2667, Policy of the United States with Respect to the Natural Resources of the Subsoil and Seabed of the Continental Shelf (Sept. 28, 1945), 10 Fed. Reg. 12,303 (1945).

The opening of the first United Nations Conference on the Law of the Sea (UNCLOS I) in 1956 and the closing of the third United Nations Conference on the Law of the Sea (UNCLOS III) in 1982 bookended diplomatic efforts to reach international agreement on jurisdiction over the ocean (UN, 1998).

The United Nations Convention on the Law of the Sea (UNCLOS) stipulates the legal rights and responsibilities of nations in respect to the ocean (UNCLOS, 1982). While a number of international agreements, varying in scope and legal status, apply to the governance and management of the ocean, UNCLOS is the most comprehensive of these. Supported by two implementing agreements, 167 nations (and the European Union) have joined UNCLOS, which came into effect on 16 November, 1994 (UN, 2020). Additional agreements have been developed to supplement UNCLOS, such as the United Nations Fish Stocks Agreement (UNFSA), which aims to facilitate the effective management of straddling[8] and highly migratory fish stocks as well as outlining a range of maritime requirements (UN, 2010).

UNCLOS defines the territorial sea (12 nautical mile limit), contiguous zone (24 nautical mile limit), Exclusive Economic Zone (EEZ; 200 nautical mile limit), extended continental shelf (350 nautical mile limit) and high seas (UNCLOS, 1982). Article 56 of UNCLOS states that the EEZ of a coastal state provides "...sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living…" and jurisdiction with regard to "...the protection and preservation of the marine environment…" (UNCLOS, 1982, p.22). Currently, 150 EEZs cover roughly 39% of the ocean's surface area (Moraes, 2019).

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[8] Fish stocks that occur within the jurisdiction of multiple nations.
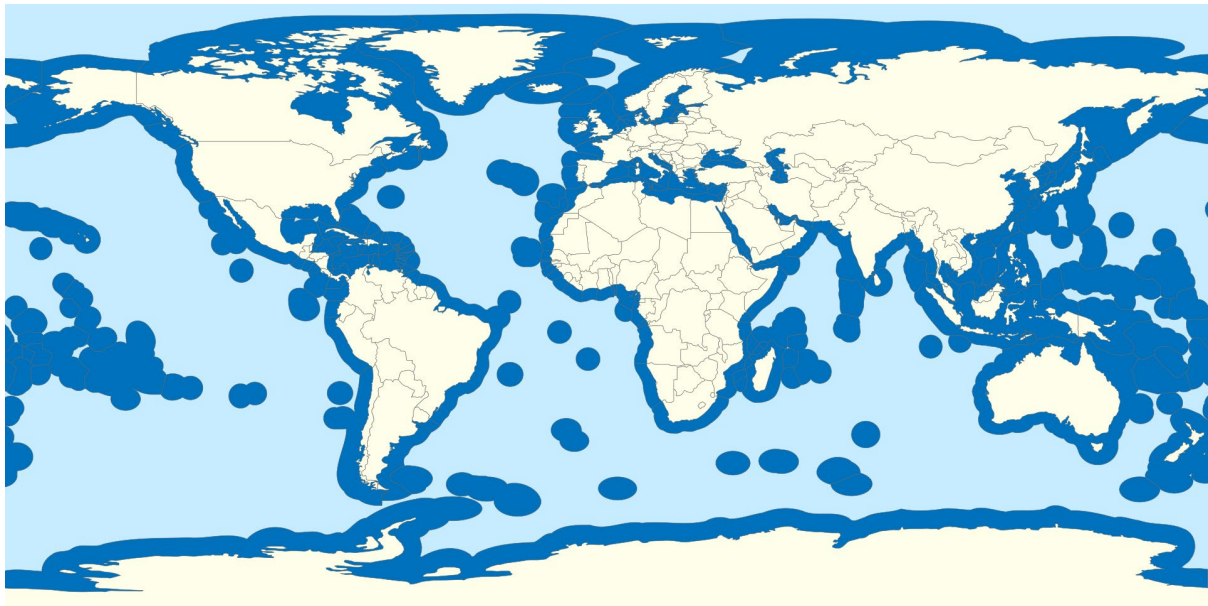
Figure 1. Global Map of National EEZ's (dark blue) and the High Seas (light blue)[9]

The high seas, otherwise known as international waters, cover roughly 61% of the ocean's surface area and remain outside of national jurisdiction or sovereignty (UNCLOS, 1982). The high seas remain part of the global commons, "...open to all States, whether coastal or land-locked…" (UNCLOS, 1982, p. 57). In 2015, a United Nations (UN) resolution to develop "...an international legally-binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction" (UN, 2015, p. 1) was passed, indicating support for further development of high seas governance. As the UN does not implement UNCLOS directly, a range of organisations have been established under UNCLOS and work with member states and commercial entities to regulate the global marine environment, such as the International Maritime Organisation (IMO), the International Seabed Authority (ISA), and the FAO's Committee on Fisheries (COFI).

International intergovernmental organisations operate independent of the UN and perform a variety of roles, such as the promotion of marine research by the International Council for the Exploration of the Sea (ICES), the conservation of whales and management of whaling by the International Whaling Commission (IWC), or the management of international fisheries by numerous Regional Fisheries Management Organizations (RFMOs). Non-Governmental Organisations (NGOs) and Environmental Non-Governmental Organisations (ENGOs)

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[9] "The World's exclusive economic zones, shown in dark blue" by B1mbo is licensed under CC BY-SA 3.0 CL.

represent a range of stakeholder interests internationally and multinational corporations from many different sectors have vested interests in the marine environment (e.g. World Ocean Council, 2020). The motivations of these organisations are diverse but many seek to influence governance of the marine environment, both internationally and domestically. As services and benefits derived from the marine environment come under threat, stakeholders in the marine environment will increasingly face pressure (both internally and externally) to address the negative impacts of human activity on the marine environment (Parviainen et al., 2018).

Although governance of the global marine environment developed substantially over the second half of the 20th century, use of the marine environment and extraction of marine resources expanded at unprecedented rates over the same period (IPCC, 2019). International agreements provided a legal framework under which coastal states could feasibly conserve and manage the marine environment within greatly increased marine territories, yet achieving effective and sustainable outcomes has proven difficult (OECD, 2019). While international cooperation and organisation will remain integral to addressing many of the most pressing issues faced by the marine environment, such as plastic pollution and climate change, cooperation and organisation between stakeholders within nations must be achieved in order to achieve effective and sustainable outcomes at a national level. It is in this global context that NZ's relationship with and management of the marine environment has developed.

2.2   The New Zealand Marine Environment

The first humans to settle in NZ arrived approximately 800 years ago from islands in the Pacific Ocean (Anderson, 2016). These pioneers were exceptionally skilled seafarers and navigators who faced long voyages over vast stretches of ocean to reach the shores of NZ (Anderson, 2016). Māori culture developed in connection with this new land and marine environment (Meredith, 2006). Māori harvested the ocean with skill and precision (Paulin, 2007), developing strong cultural and economic ties to the ocean (Wehi et al., 2013). Various customs and protocols, such as tapu, rāhui, mataitai and taiapure, helped to ensure the sustainable management of marine resources in response to localised depletion or environmental pressures (Bess, 2001; Memon et al., 2003; Wilson et al., 2007). The marine environment remains of great importance to Māori, considered a source of whakapapa[10]—central to Te Ao Māori, the Māori worldview (Jackson et al., 2017).

In 1642 the Dutch explorer Abel Tasman became the first European to sight NZ but it was not until 1769 that the British explorer Captain James Cook became the first European to set foot in NZ (King, 2003). The writings of Captain Cook and his crew acknowledged the scale of Māori fishing activity and the superiority of Māori fishing technology and expertise (Beaglehole, 1961; South Seas, 2004). In the decades following Cook's arrival, NZ was frequented by Europeans who made a living from the ocean, largely in the whaling and sealing industries (MCH, 2014). In 1840 the Treaty of Waitangi (Te Tiriti o Waitangi) was signed between Māori rangatira[11] and representatives of the British Crown. Article Two of the Treaty granted Māori "...the full exclusive and undisturbed possession[12] of their Lands and Estates Forests Fisheries and other properties…" (MCH, 2017). 1840 also marked the first wave of assisted settlement to NZ, with approximately 1,200 settlers arriving from Britain with the New Zealand Company (MCH, 2019). By 1858 the NZ European population surpassed the Māori population (Stats NZ, 2020c). Today, approximately 16.5% of NZ's population identify as Māori and 70.2% as European (15.1% Asian and 8.1% Pacific) (Stats NZ, 2019a).

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[10] "Connection, lineage, or genealogy between people and ecosystems and all flora and fauna" (Clapcott et al., 2018).

[11] The recognised leaders of kin groups and hapū, the basic political unit within Māori society (Ministry of Justice, 2001).

[12] Controversially, the english version of the Treaty granted "undisturbed possession", while the Māori version granted "tino rangatiratanga" or absolute chieftainship (MCH, 2012).
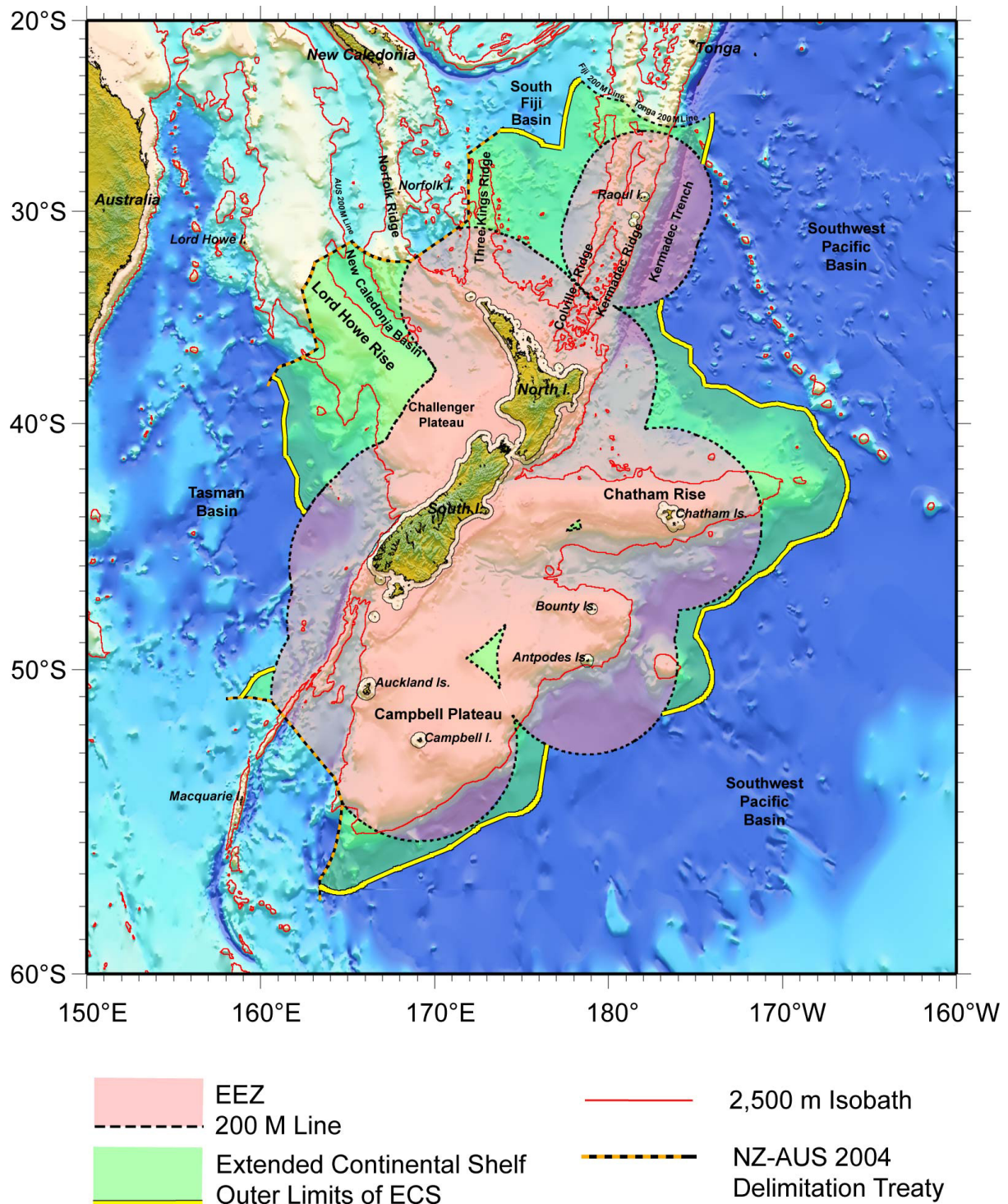
Figure 2. The New Zealand Marine Environment[13,14]

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[13] This map shows the boundaries for the Exclusive Economic Zone, extended continental shelf boundaries submitted to the Commission on the Limits of the Continental Shelf, and New Zealand and Australia Maritime Treaty. Boundary delimitation negotiations with Fiji and Tonga are still to be completed.

[14] Source: Land Information New Zealand (LINZ) and licensed by LINZ for re-use under the Creative Commons Attribution 4.0 International Licence.

While NZ has a land area of less than 0.3 million square kilometres, it has a coastline of at least 15 thousand kilometres (CIA, n.d.) and a marine area of more than 4.0 million square kilometres, if defined by its EEZ, or more than 5.7 million square kilometres, if extended to its claim over the continental shelf (LINZ, n.d.). NZ's marine environment, spanning subpolar waters in the south to subtropical waters in the north, covers an array of unique ecosystems. NZ's geography has also resulted in a variety of coastal ecosystems, from fjords to estuaries, that provide habitat for a diversity of species.

Much of NZ's biodiversity exists in the marine environment. Over 17,000 known marine species represent only a fraction of NZ's total marine biodiversity (Gordon et al., 2010). NZ's native marine species provide many benefits (cultural, economic, environmental, recreational, social and intrinsic) to the people of NZ. A range of marine habitats make up the NZ marine environment and many of these provide essential ecosystem services (MacDiarmid et al., 2013). These services include: primary production; carbon sequestration; nutrient trapping and cycling; sediment facilitation; habitat provision (including nursery habitat), and protection against coastal erosion (MacDiarmid et al., 2013).

In the year to March 2017, NZ's marine economy contributed $7.0 billion to NZ's economy (direct contributions of $3.8 billion and indirect contributions of $3.2 billion) and employed 33,000 people who earned a total of $1.7 billion (Stats NZ, 2019b). Shipping (37.3%), fisheries and aquaculture (28.9%) and offshore minerals (26.7%) made the three largest direct contributions (Stats NZ, 2019b). Over 99% of NZ's imports and exports, by volume, are transported by sea (MoT, 2019). NZ's marine environment contains sizeable deposits of fossil fuels and mineral resources (GNS Science, n.d.). Although the marine environment already generates substantial economic returns for NZ, the potential for development of NZ's "blue economy" is vast (EnviroStrat, 2019).

The state of NZ's marine environment can be difficult to assess as data are often deficient (MfE & Stats NZ, 2016; Ewing, 2016; MfE & Stats NZ, 2019a). NZ's marine environment is subject to the same stressors faced by the global marine environment yet they differ in relative severity (MacDiarmid et al., 2012). To some extent, factors such as geographic and temporal isolation have insulated NZ from many of the threats faced by other nations; however, NZ also faces some unique challenges, which are often exacerbated by resource limitations and the extent of NZ's territory (PCE, 1999).

The effects of climate change are already impacting the NZ marine environment (MfE & Stats NZ, 2019a). Measures of ocean surface temperature, sea-level rise, ocean acidity, primary productivity and extreme wave events all indicate trends expected as a consequence of climate change (MfE & Stats NZ, 2019a). Oceanographic changes resulting from climate change will interfere with the natural ecosystems and species of NZ's marine environment (Willis et al., 2007). Abnormal ocean temperatures are suspected of affecting the distribution of fish stocks (Pinkerton, 2017; Barange et al., 2018) and driving coastal ecosystem change (Harley et al., 2006; Doney et al., 2012).

The effects of pollution from a range of sources impact NZ's marine ecosystems (MacDiarmid et al., 2012). Irrespective of NZ's actions, the NZ marine environment will be affected by other nations in respect to issues such as climate change and plastic pollution, problems that will require international solutions. Conversely, the effects of nutrient and sediment runoff on the NZ marine environment are all but entirely a consequence of terrestrial activity in NZ (Morrison et al., 2009; Stevens et al., 2019). Separated from Australia (NZ's closest neighbour) by roughly 1,500 km, NZ is exposed to minimal nutrient and sediment pollution from other nations and is therefore in a position to address the diverse (and generally diffuse) causes of nutrient and sediment runoff. However, doing so would require systemic change within NZ society and the NZ economy (PCE, 2012; 2013; McKergow et al., 2007).

Ecologically important biogenic habitats (e.g. bryozoan fields, mangrove forests, mussel beds, seagrass meadows, etc.) are under threat from human activities, both on land and at sea (Morrison et al., 2014). Many of NZ's native marine species are threatened with or at risk of extinction, notably 90% of seabirds, 80% of shorebirds and 22% of marine mammals (MfE & Stats NZ, 2019a). NZ is home to more species of seabird than any other nation and these species are under unique pressure, both on land and at sea. Predation by mammalian predators (many of these birds nest in NZ and evolved in the absence of terrestrial mammalian predators up until human arrival, less than 1,000 years ago) and incidental fisheries bycatch are a constant threat to NZ seabird populations (MPI, 2013; FNZ & DOC, 2019; Bell & Bell, 2019).

Some populations of NZ's indigenous marine mammals have recovered in recent years, while others have continued to decline (Mfe & Stats NZ, 2019b). The population of NZ's indigenous Maui's dolphin has been estimated at approximately 63 individuals (Baker et al., 2016). Despite incidence of fisheries bycatch mortality (DOC, 2020), recent deaths have largely been attributed to the parasitic disease toxoplasmosis, which is likely to originate on land in the faeces of infected cats (Roberts et al., 2019). Unusual threats such as this provide new and unique challenges to stakeholders grappling with issues of marine conservation and the protection of critically endangered species in particular.

Over 330 non-native species have been found in NZ waters since 2005 (MPI, 2019), with over 200 having become established in the NZ marine environment (MfE & Stats NZ, 2019a). Invasive marine species have become well established in NZ waters and will continue to do so as a consequence of continued maritime activity and changes in the marine environment—particularly those resulting from climate change (Sardain et al., 2019). Invasive species threaten both the ecological stability of marine ecosystems and the economic viability of marine industries (Bax et al., 2003; Hewitt et al., 2004).

NZ's commercial fishing industry harvests approximately 450,000 tonnes of fish per year (Williams et al., 2017). Of 685[15] fish stocks managed under the NZ Quota Management System (QMS), 297 (43%) are considered nominal stocks[16] and 219 (32%) have not been assessed (FNZ, 2020a). Of the 169 (25%) fish stocks that have been assessed, 142 (84%) are considered to be within target limits[17] and 27 (16%) are considered to be below target limits (FNZ, 2020b). Target limits are generally set in relation to the original, unfished or virgin biomass (B_0) in order to achieve biological sustainability, yet these targets are neither universally desirable nor mutually agreed to by stakeholders. Eight NZ species (hoki, hake, ling, southern blue whiting, albacore tuna, orange roughy, skipjack tuna and Ross Sea toothfish) are currently certified under the Marine Stewardship Council (MSC), an independent international non-profit organisation promoting the sustainable management of

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[15] 642 fish stocks represent 98 species (or species complexes), with some further subdivided for stock assessment purposes and a further five non-QMS Antarctic and Highly Migratory Species (HMS) managed via international RFMOs included (FNZ, 2020a).

[16] Nominal fish stocks are: stocks in areas outside the main range of a species (set up for administrative purposes only); stocks with insignificant catch or catch allowance (generally close to zero tonnes); and stocks that have little to no potential to develop as either recreational or commercial fisheries (MPI, 2020).

[17] A target limit is the desired average level of biomass, fishing mortality rate, catch, or proxy, for a fish stock (MFish, 2011).

fisheries (MSC, 2020). These stocks constitute more than half of the Total Allowable Commercial Catch (TACC) and more than two-thirds of the deepwater catch (MSC, 2018).

NZ's fisheries have been, and will continue to be, of great consequence to the governance of the NZ marine environment. While the multitude of threats faced by the marine environment place NZ's fisheries at risk, the framework under which NZ's fisheries are managed is considered by many stakeholders as an impediment to improving the governance of NZ's marine environment and effectively mitigating many of these threats.

Governance of the New Zealand marine environment

Prior to the 20th century, regulation of NZ's marine environment was minimal. The first legislation relating specifically to NZ's marine environment was the Harbours Act (1842), which specified measures relating to maritime pilots and pilotage, quarantine, harbour regulations, and penalties. "An Act to provide for the protection of Oyster Fisheries", the Oyster Fisheries Act (1866), was the first piece of fisheries legislation to be passed in NZ, followed by the Fish Protection Act (1877). Over 160 separate pieces of legislation relating to the protection of aquatic fauna (excluding birds) have been passed in NZ (Miskelly, 2016). Today, the NZ marine environment is broadly managed under various legislation (*Table 1*). The Treaty of Waitangi has been of importance to the history and development of this legislation (PCE, 2002).

Table 1. NZ legislation of current relevance to the management of NZ's marine environment.

Legislation	Purpose
The Treaty of Waitangi 1840	The broad principles, agreed to by representatives of Māori and the British Crown, enabling the foundation of New Zealand as a nation state and the formation of a New Zealand government.
Wildlife Act 1953	The law relating to the protection and control of wild animals and birds, the regulation of game shooting seasons, and the constitution and powers of acclimatisation societies.
Marine Reserves Act 1971	The setting up and management of areas of the sea and foreshore as marine reserves for the purpose of preserving them in their natural state as the habitat of marine life for scientific study.
Marine Mammals Protection Act 1978	The protection, conservation, and management of marine mammals within New Zealand and within New Zealand fisheries waters.
Resource Management Act 1991	The law relating to the use of land, air, and water, to promote the sustainable management of natural and physical resources.
Biosecurity Act 1993	The law relating to the exclusion, eradication, and effective management of pests and unwanted organisms.
Maritime Transport Act 1994	Establishes the statutory role of Maritime New Zealand; international maritime obligations; maritime transport law; marine environmental protection; and regulation of maritime and marine activities.
Fisheries Act 1996	The law relating to fisheries resources; international obligations relating to fishing; and provisions for related matters.
Submarine Cables and Pipelines Protection Act 1996	Establishes the provision of protection to submarine cables and pipelines; and international obligations.
Māori Fisheries Act 2004	Implements the Deed of Settlement; provides for the interests of iwi in fisheries, fishing and fisheries-related activities; and establishes a framework for the allocation and management of settlement assets.
Marine and Coastal Area (Takutai Moana) Act 2011	Establishes the special status of the common marine and coastal area as incapable of ownership; repealed the Foreshore and Seabed Act 2004, which vested the foreshore and seabed in the Crown.
Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012	The sustainable management of natural resources in the EEZ and the continental shelf; protection of the marine environment from pollution; and the regulation of certain activities that were previously unregulated.

The development of NZ's fisheries has been central to the governance of NZ's marine environment. Fishing in NZ had been confined to inshore operations until the arrival of Japanese vessels in 1959, which legally fished up to NZ's three nautical mile territorial sea. By 1970 the Japanese fleet had withdrawn outside a 12 nautical mile "fishing zone" established by the Territorial Sea and Fishing Zone Act 1965[18]. Vessels from other nations, South Korea and the Soviet Union in particular, had also begun to fish the waters of NZ's continental shelf and by 1973 the *reported* catch of foreign vessels was approximately three times that of the entire NZ fishing fleet. Prior to UNCLOS and NZ's Territorial Sea, Contiguous Zone, and Exclusive Economic Zone Act 1977, which established NZ's 200 nautical mile EEZ, all foreign fishing activity was entirely unregulated. NZ understood the economic opportunities that came with the adoption of UNCLOS but did not have the capital, expertise, infrastructure or fishing vessels to take advantage of them. This was problematic as UNCLOS only granted nations a right of first access to resources within their EEZs. In theory, if NZ did not harvest their deep sea fisheries then other nations would be legally entitled to do so (Johnson & Haworth, 2004).

The solution to this problem was to create joint venture (JV) fishing partnerships between NZ and foreign fishing companies. These partnerships were typically entered into with companies from Asia or Eastern Europe whose vessels faced exclusion from the new national jurisdictions. These arrangements enabled the development of NZ's offshore fishing fleet, providing the time and opportunities for NZ fishing companies to acquire capital, purchase vessels, and train crew. However, the continued use of foreign flagged and crewed vessels (known as foreign charter vessels or FCVs) by NZ fishing companies, decades after the initial objectives of the partnerships had been achieved, proved controversial. By the 1980's, rapid expansion of NZ's fishing fleet had also resulted in the widespread overexploitation of NZ's fisheries. (Johnson & Haworth, 2004)

Reeling in the wake of the 1978 oil crisis, the NZ economy was already in turmoil after the 1973 energy crisis and having lost Britain as the country's largest trading partner after they joined the EEC in the same year (MCH, 2018a). The response from NZ's Third National Government (1975–1984), under the leadership of Robert Muldoon, was to implement an interventionist economic strategy involving large scale industrial projects—a strategy dubbed

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[18] A 5 year withdrawal period was negotiated with the Japanese government.

Think Big (MCH, 2018b). Unfortunately, by the time many of the Think Big projects were enacted, oil prices had begun to decline as the 1980s oil glut began (Easton, 2004). NZ's public debt soared from $4.2 billion to $21.9 billion over the course of the Government's tenure (Kelsey, 1999) and inflation averaged 11.4% during the 1980's; Stats NZ, n.d.). The economic crisis saw the Fourth Labour Government elected in 1984, under the leadership of David Lange. Many of the Think Big projects and other state assets were sold to private interests as part of a pivot away from interventionist policies towards those of free market economics. Radical market reforms, termed "Rogernomics" after the Minister of Finance Roger Douglas, were extensive and shaped the NZ economy as it exists today (Easton, 1994). NZ's fisheries did not escape the neoliberalisation of the nation.

The Fisheries Act 1983 established the first quota rights for fishers and the Fisheries Amendment Act 1986 established the NZ Quota Management System (QMS), making NZ one of the first nations to implement a comprehensive fisheries management system based around private fishing rights (Johnson & Haworth, 2004). Subsequently, the Māori Fisheries Act 1989, the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 and the Fisheries Act 1996, established Māori as major stakeholders in NZ's fisheries (Hale & Rude, 2017). The establishment of the strong rights held by both iwi and commercial fishing interests have positioned NZ's fisheries legislation at the core of governance relating to NZ's marine environment.

Māori interests currently own between 30% and 50% of NZ's fishing quota (Hale & Rude, 2017), including a 50% stake in the fishing company Sealord—the other 50% currently owned by global seafood giant Nippon Suisan Kaisha (Nissui) (Sealord, 2020). Māori have also retained the right to harvest seafood for non-commercial purposes, acknowledging the significance of seafood in Māori history, tradition, culture and diet (Māori Fisheries Act, 2004). Along with recreational catch, this customary catch is not built into NZ's QMS. Instead, an allowance is made for these forms of fishing by the Minister of Fisheries when calculating the TACC (Hale & Rude, 2017). While the customary take is negligible, recreational catch is significant in some important fisheries—such as the Snapper 1 (SNA1) fishery on the northeast coast of NZ's North Island, where the recreational sector was responsible for an estimated 40% of the total catch during the 2017-18 fishing year[19](Hartill

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[19] The New Zealand fishing year runs from 1 October–30th September.

et al., 2019; FNZ, 2020c). This arrangement has the potential to prove problematic for the functioning of the NZ QMS, especially in circumstances of increased recreational harvest (Bess, 2017).

In this research, the term *stakeholder* has been used in reference to any individual or organisation with an active interest in the marine environment. In this regard, a wide variety of stakeholder organisations share an interest in the NZ marine environment, yet the specific concerns of these stakeholders vary substantially and often conflict (Bess & Rallapudi, 2007). Selected stakeholders of note have been summarised in *Table 2*. The diversity of individuals and organisations who take an interest in the NZ marine environment are likely indicative of a diversity of PABs towards the NZ marine environment, yet both the extent and cause of this diversity is poorly understood.

Table 2. Selected stakeholders in the NZ marine environment (continued on p. 23)

Stakeholder	Type	Category	Established	People	Revenue (2019)	Relevance
NIWA	CRI	Science & Research	1992	700 staff	$161.3m	Environmental, climate, marine, fisheries, aquaculture
Met Service	SOE	Science & Research	1992	280 staff	$61.1m	Meteorology, hydrology, oceanography (MetOcean)
Plant & Food	CRI	Science & Research	2008	900 staff	$168.9m	Food science, seafood, aquaculture, fishing technology
Cawthron Institute	IRI	Science & Research	1919	275 staff	$43.8m	Marine science, aquaculture, biosecurity
Callaghan Innovation	Crown Agent	Science & Research	2013	410 staff	$353.5m	R&D, innovation, technology
MSC (international)	NPO	Science & Research	1996	140 staff[20]	£26.3m	Sustainable fisheries certification
MBIE	Govt. Department	Public service	2012	4,700 staff	$838.2m	Productivity and economic growth
DoC	Govt. Department	Public service	1987	2,280[21] staff	$429.6m	Conservation of natural and cultural heritage
MfE	Govt. Department	Public service	1986	370 staff	$77.5m	Environmental regulation
MPI	Govt. Department	Public service	2012	3,030 staff	$723.0m	Primary industries
FNZ	MPI Business Unit	Public service	2018	N/A	$102.0m[22]	Fisheries management (MPI Business Unit)
Maritime NZ	Crown Agent	Maritime	1993	220 staff	$52.8m	Maritime Safety Authority, maritime affairs
Coastguard	NPO	Maritime	1979	1,990 volunteers	$12.6m	Maritime search & rescue
NZSFC	NPO	Recreational fishing	1957	55 clubs	$0.2m	55 member fishing clubs with 35,000 members
LegaSea	NPO	Recreational fishing	2012	11–50 staff*	$0.8m	NZFSC affiliate, advocacy, public outreach
Te Ohu Kaimoana	Iwi Collective	Commercial fishing	2004	14 staff	$8.7m	Representative for 58 Iwi organisations
Sanford	Commercial	Commercial fishing	1881	1,600 staff	$545.1m	Publicly listed
Sealord	Commercial	Commercial fishing	1961	1,100 staff	$360.0m	Privately held, 50% Māori owned, 50% Japanese owned
Talley's	Commercial	Commercial fishing	1936	1,000 staff	N/A	Private company, family owned, primary production

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[20] https://en.wikipedia.org/wiki/Marine_Stewardship_Council
[21] https://ssc.govt.nz/our-work/workforce-data/2019-fact-sheet-summary/
[22] MPI revenue allocated to fisheries related activities (only to FNZ in part)

* Source: https://linkedin.com

Table 2. Selected stakeholders in the NZ marine environment (continued from p. 22)

Stakeholder	Type	Category	Established	People	Revenue (2019)	Relevance
Moana	Commercial	Commercial fishing	2004	370 staff	$143.0m	Private company, Māori owned
Leigh Fisheries / Lee Fish	Commercial	Commercial fishing	1958	90 staff	N/A	Private company, Foodstuffs owned
Sea Shepherd NZ	ENGO	Environmental	N/A	N/A	N/A	Charitable trust, activism, advocacy
Greenpeace NZ	ENGO	Environmental	1974	51–200 staff*	$9.5m	Non–profit, activism, advocacy
Forest & Bird	ENGO	Environmental	1923	51–200 staff*	$9.4m (2018)	Charitable trust, advocacy
WWF NZ	ENGO	Environmental	1975	11–50 staff*	$5.6m	Charitable trust, advocacy
TNC NZ	ENGO	Environmental	N/A	N/A	N/A	Charitable trust, advocacy
ECO	ENGO	Environmental	1972	N/A	N/A	Charitable trust, advocacy
Seafood NZ	Industry Representative	Commercial fishing	1996	2–10 staff*	N/A	Private company, industry representative body
Seafood Innovations Ltd.	Industry Innovation	Commercial fishing	2004	2–10 staff*	N/A	Private company, Seafood NZ subsidiary
Aquaculture NZ	SRE	Commercial fishing	2007	2–10 staff*	N/A	Private company, industry representative body
Deepwater Group	SRE	Commercial fishing	2005	2–10 staff	N/A	Private company, industry representative body
Fisheries Inshore NZ	SRE	Commercial fishing	2013	2–10 staff*	N/A	Private company, industry representative body
NZ Rock Lobster Industry Council	SRE	Commercial fishing	1998	2–10 staff	N/A	Private company, industry representative body
Paua Industry Council	SRE	Commercial fishing	2004	2–10 staff	N/A	Private company, industry representative body
FishServe	Industry Administrator	Commercial fishing	1983	11–50 staff	N/A	Seafood NZ subsidiary, industry administrative services
FINNZ	Industry Innovation	Commercial fishing	2003	2–10 staff	N/A	Seafood NZ subsidiary, technological commercialisation
NZ Federation of Commercial Fishermen	Industry Stakeholder	Commercial fishing	1953	2–10 staff	N/A	Owner-operator fishers represesentative body
NZ Fishing Industry Guild	Industry Stakeholder	Commercial fishing	N/A	2–10 staff	N/A	Union of commercial fishers

* Source: https://linkedin.com

2.3   Perceptions, Attitudes and Behaviours

The immense value derived from the marine environment by a diversity of stakeholders, in the context of a long and rich history, are indicative of a wide range of perceptions, attitudes, and behaviours (PABs) towards the NZ marine environment (Arnold, 2004; 2005). The term *perception* refers to "..the process or result of becoming aware of objects, relationships, and events by means of the senses, which includes such activities as recognizing, observing, and discriminating..." (APA, 2020a). The term *attitude* refers to "...a relatively enduring and general evaluation of an object, person, group, issue, or concept on a dimension ranging from negative to positive..." (APA, 2020b). The term *behaviour* refers to "...an organism's activities in response to external or internal stimuli, including objectively observable activities, introspectively observable activities (see covert behavior), and nonconscious processes..." (APA, 2020c). In practice, the terms are interrelated and non-discrete (Pickens, 2016).

New Zealander's PABs towards the marine environment have not been the sole focus of any research to date; however, some insights can be gained from relevant research into related topics. The Lincoln University Public Perceptions of NZ's Environment Survey, carried out biennially between 2000 and 2010 using a postal questionnaire and triennially since 2010 using an online questionnaire, aims "... to measure, analyse and monitor changes in New Zealanders' perceptions, attitudes and preferences towards a range of environmental issues…" (Hughey et al., 2019, p. 2). The research has found that New Zealanders "...consider the state and management of the New Zealand environment to be good, and better than in other developed countries" (Hughey et al., 2019, p. iii). In 2019 (n = 2,073), 92.6% of respondents considered their environmental knowledge to be *adequate* or better and 75.6% considered the state of the NZ environment to be *adequate* or better. NZ's *rivers and lakes* were perceived to be in the worst state, followed by NZ's *marine fisheries* and *coastal waters/beaches* (the only marine categories). These three environmental components were also perceived to be the worst managed. *Sewage/stormwater* (58.6%) and *dumping of solid waste* (26.9%) were perceived as the main causes of damage to *beaches & coastal waters*, while *commercial fishing* and *sewage/stormwater* were considered the main causes of damage to both *marine fisheries* (69.0% and 35.0% respectively) and *marine reserves* (39.0% and 27.6% respectively). 18.8% of respondents had visited a marine reserve during the preceding 12 months and 5.5% had done so on a regular basis (Hughey et al., 2019).

A 2011 survey (n = 1,003) *Measuring New Zealanders' attitudes towards their oceans and marine reserves*, carried out by Colmar Brunton on behalf of WWF NZ, indicated that 71% of New Zealanders perceived the NZ marine environment to be under threat, while 25% did not and 5% were unsure. Commercial fishing (50%), pollution and sewage (47%) and recreational fishing (19%) were perceived as the three biggest threats to the marine environment (Colmar Brunton & WWF, 2011).

The Colmar Brunton Better Futures survey, an online survey carried out in conjunction with the Sustainable Business Council, provides insights "...into consumer perspectives on sustainability and the social and environmental issues that are important to Kiwis and how this has changed over time" (Colmar Brunton, 2020). The 2020[23] survey (n = 1,503) found the *build-up of plastic in the environment* to be the second most concerning issue for both youth (behind *suicide rates*) and adults (behind *protection of NZ children*). While no other environmental matters were in the top 10 issues of concern for adults (n = 1,001), the *pollution of lakes, rivers and seas*; *too much waste/rubbish generated*; *the impact of climate change on NZ*; and the *protection of animals and plants that are native to NZ* were all in the top 10 issues of concern for youth respondents (ages 13–17; n = 502). 52% of respondents were concerned about climate change, with 50% indicating that they had taken individual action on the issue (Colmar Brunton, 2020). Respondents to the 2018 MfE Environmental Attitudes survey (n = 1,004) considered *reducing waste and its impact on the environment* (26%) to be the second largest challenge faced by NZ, behind reducing poverty (27%), with climate change (19%) sixth (MfE, 2018a).

These surveys suggest that New Zealanders consider the environment to be in an acceptable condition, yet the marine environment somewhat less so. There appears to be widespread concern regarding a range of threats to the marine environment, yet these concerns are secondary to pressing (non-environmental) social issues, and climate change is neither considered the largest environmental challenge nor a concern for many people. PABs such as these, and those for which no data exists, are of interest as they influence both individual and organisational stakeholders. PABs are of consequence to the NZ marine environment (Dencer-Brown et al., 2019) and to processes of marine management (Office of the Auditor-

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[23] Carried out between 11th – 26th November 2019.

General, 2019). The surveying of PABs can therefore facilitate opportunities to improve stewardship of the marine environment. Understanding how PABs differ across a population can be achieved through the collection and analysis of demographic variables (in addition to PABs). Understanding why PABs differ across a sample population can be achieved through the collection and analysis of psychographic variables (in addition to PABs). While this research provides insights into *how* PABs towards the marine environment may vary, it is ultimately concerned with *why* they vary.

2.4   Human Values

Human values were debated by pre-Socratic philosophers in ancient Greece (Kluckhohn, 1951), yet their emergence as a distinct subject of inquiry only eventuated over the course of the 20th century, as theoretical conceptualisations of human values began to coalesce (Hanel, et al. 2018). This recent exploration of the content, structure and role of human values has occurred across a range of social science disciplines—notably anthropology (Robbins & Sommerschuh, 2016), sociology (Thome, 2015), and psychology (Oyserman, 2015). Rokeach (1973) considered human values as a concept that could unify all of the sciences concerned with human behaviour. However, the multi-disciplinary history of values research, along with the related abundance of theoretical models, has been suggested as a possible factor behind the relative paucity of values research (Hitlin & Piliavin, 2004). This work is narrowly concerned with the concept of *human values* (hereafter *values*), as currently considered in the discipline of social psychology (Cieciuch et al., 2015). Concepts such as personal value systems, social value systems, worldviews, and ideologies may have been encompassed by the generic term *values* in prior theory and research (Rohan, 2000). Irrespective of context, the principle consistently communicated by the term values (or value) is that of *importance* (Cieciuch & Schwartz, 2017).

Values have been used widely to differentiate between individuals (personal values) and between societies (cultural values) (Fischer & Poortinga, 2012). The theories of Vernon and Allport (1931), Rokeach (1973) and Schwartz (1992) have been influential in the conceptualisation of personal values, which "...express broad, trans-situational motivational goals, affecting individuals' interpretation of situations, preferences, choices, and actions..." (Knafo et al., 2011, p. 178), while the theories of Inglehart (1977), Hofstede (1980) and Schwartz (1999) have been influential in the conceptualisation of cultural values, which "...reflect the solutions groups develop in response to existential challenges and relate to the way social institutions function" (Knafo et al., 2011, p. 178).

Six ideal types of people, postulated by Spranger, Pigors and William (1921), were the basis of 6 values (theoretical, economical, aesthetic, social, political, and religious) measured by the Vernon and Allport (1931) Study of Values (SOV), "...one of the earliest, theoretically well-grounded questionnaires measuring personal values on the basis of declared behavioral preferences" (Oles & Hermans, 2010, p.67). The Rokeach Value Survey (RVS; Rokeach,

1973) then postulated 36 values—18 terminal values, referring to desirable end-states of existence (e.g. true friendship; mature love), and 18 instrumental values, referring to preferable modes of behaviour, or means of achieving one's terminal values (e.g. cheerfulness; ambition). Subsequently, the Theory of Basic Human Values (Schwartz, 1992) has become another widely adopted framework for the consideration of personal values.

Values Orientation Theory (Kluckhohn & Strodtbeck, 1961) posited that a limited number of values provide a limited number of value-based solutions to universal problems—problems faced by all human societies (Hills, 2002). The work of Inglehart (1977) and Hofstede (1980) has focused on values at the societal level. Cultural Dimensions Theory (Hofstede, 1980) established 4 cultural value dimensions, which were subsequently increased to 5 (Hofstede, 1991) and then 6 (Hofstede et al., 2010): power distance (PDI); individualism vs. collectivism (IDV); uncertainty avoidance (UAI); masculinity vs. femininity (MAS); long-term orientation vs. short-term orientation (LTO); and indulgence vs. restraint (IND). These theories have been widely used to map and understand variation in values across and between societies, particularly in regards to the work of the World Values Survey (http://www.worldvaluessurvey.org/, 2020).

Although both Hofstede (1980) and Schwartz (1994) have considered cultural and individual values as theoretically distinct, substantial overlap between dimensions at the two levels has been identified (Fischer & Poortinga, 2012). In any case, values theory continues to develop and expand in influence, with new theories emerging (e.g. Van Lange et al., 1997; Gouveia, 2003) and greater interest in both the undertaking of value-based research and the relevance of research findings (Knafo et al., 2011). This substantial history of research provides an excellent foundation for the exploration of what motivates specific PABs of individuals in a particular population.

This research has adopted the Theory of Basic Human Values (Schwartz, 1992) as a theoretical basis for the discussion and measurement of values. The theory is frequently used for the identification and measurement of universal values—values shared by all human cultures (Fischer & Schwartz, 2011)—and has been applied extensively to research in a variety of academic fields (Simón et al., 2017). The theory and associated measures have been tested extensively in cross-cultural studies (Schwartz & Sagiv, 1995) and revised on multiple occasions since their introduction (Schwartz et al., 2012). The instruments employed

by the theory to measure values have been well established as equal or superior to those of other models (Hanel, et al. 2018). The model is not only used widely within academia but is increasingly used by organisations interested in the role of values and utility of values based research. (e.g. https://valuesandframes.org/, https://www.theworkshop.org.nz/, https://www.thevaluesproject.com/, https://www.discoveryourvalues.com). The most recent version of the Theory of Basic Human Values identifies 19 refined value domains (an extension of 10 original value domains identified in prior versions of the model) that are situated under 4 higher order value domains (Schwartz et al., 2012; *Table 3*).

Table 3. Value domains of the Theory of Basic Human Values[24]

4 Higher Order Values	Abbr.	10 Original Values	Definition	Abbr.	19 Refined Values	Definition (motivational goals)
Openness to change	SD	Self-direction	Independent thought and action, choosing, creating and exploring	SDT	Self-direction Thought	Freedom to cultivate one's own ideas and abilities
				SDA	Self-direction Action	Freedom to determine one's own actions
	ST	Stimulation	Excitement, novelty and challenge in life	ST	Stimulation	Excitement, novelty, and change
	HE	Hedonism	Pleasure and sensuous gratification for oneself	HE	Hedonism	Pleasure and sensuous gratification
Self-enhancement	AC	Achievement	Personal success through demonstrating competence according to social standards	AC	Achievement	Success according to social standards
	PO	Power	Control or dominance over people and resources	POD	Power Dominance	Power through exercising control over people
				POR	Power Resources	Power through control of material and social resources
				FA	Face	Security and power through maintaining one's public image and avoiding humiliation
Conservation	SE	Security	Safety, harmony, and stability of society, relationships, and self	SEP	Security Personal	Safety in one's immediate environment
				SES	Security Societal	Safety and stability in the wider society
	TR	Tradition	Respect, commitment, and acceptance of the customs and ideas that tradition culture or religion provides	TR	Tradition	Maintaining and preserving cultural, family, or religious traditions
	CO	Conformity	The restraint of actions, inclinations, and impulses that are likely to upset or harm others and violate social expectations or norms	COR	Conformity Rules	Compliance with rules, laws, and formal obligations
				COI	Conformity Interpersonal	Avoidance of upsetting or harming other people
				HU	Humility	Recognizing one's insignificance in the larger scheme of things
Self-transcendence	BE	Benevolence	Preservation and enhancement of the welfare of people with whom one is in frequent personal contact	BEC	Benevolence Care	Being a reliable and trustworthy member of the in-group
				BED	Benevolence Dependability	Devotion to the welfare of in-group members
	UN	Universalism	Understanding, appreciation, tolerance, and protection for the welfare of *all* people and of nature	UNC	Universalism Concern	Commitment to equality, justice, and protection for all people
				UNN	Universalism Nature	Preservation of the natural environment
				UNT	Universalism Tolerance	Acceptance and understanding of those who are different from oneself

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[24] Adapted from "Refining the theory of basic individual values," by S. H. Schwartz, 2012, Journal of Personality and Social Psychology, 103, 663–668.

These values are often represented on a circumplex (*Figure 3*), which helps to illustrate their interrelatedness and the antagonistic nature of competing values.
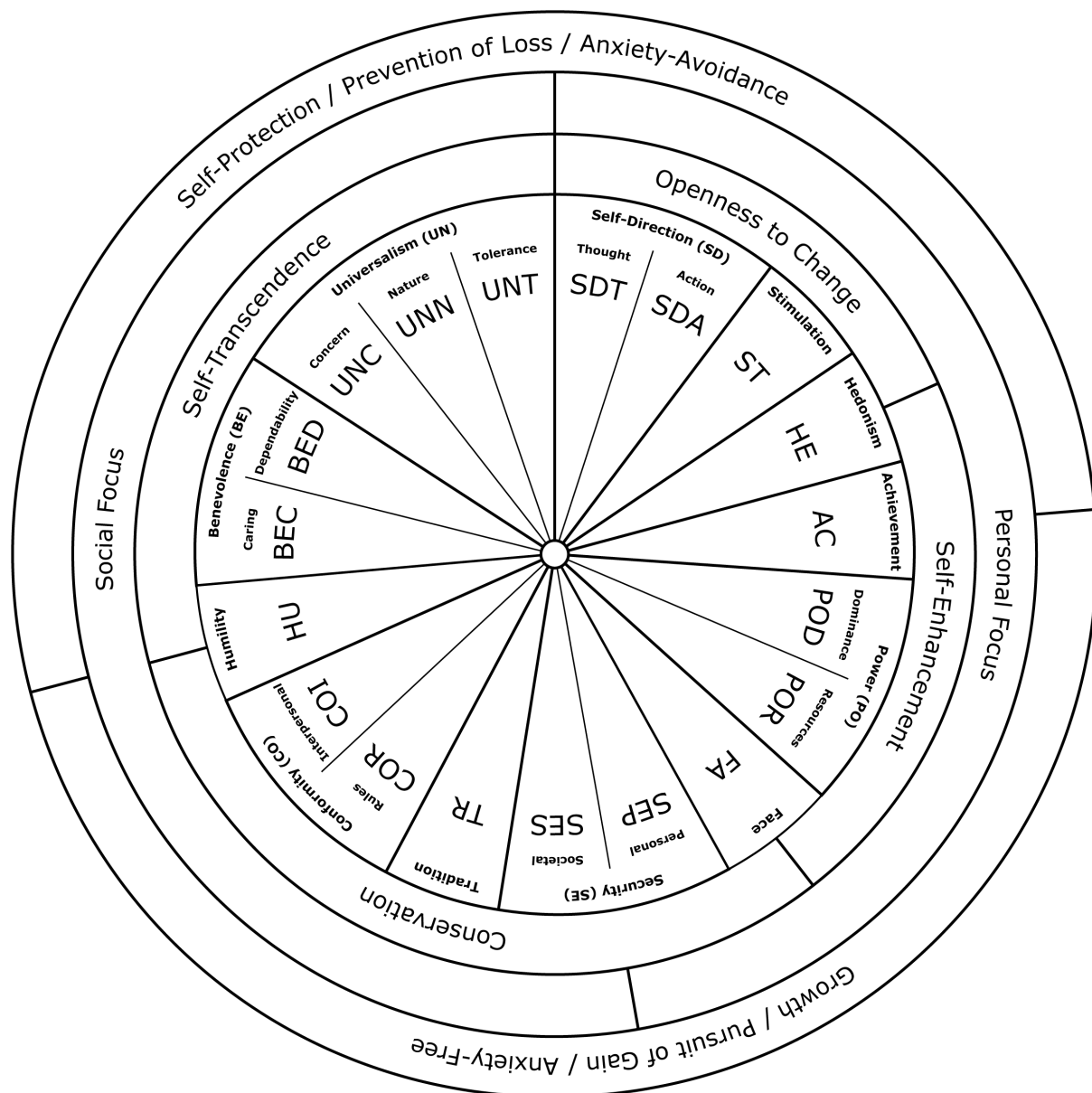
*Figure 3.* The circular motivational continuum of 19 values, with sources that underlie their order[25]

[25] Adapted from "Refining the theory of basic individual values," by S. H. Schwartz, 2012, Journal of Personality and Social Psychology, 103, 663–668.

Ecological Considerations

Both the SVS and the PVQ have been adapted for the purpose of measuring environmental values. The Environmental-SVS (E-SVS; Stern & Dietz, 1994; Steg et al., 2014) and the Environmental-PVQ (E-PVQ; Bouman et al., 2018) were developed to measure four[26] values that underlie the environmental beliefs of individuals; *Biospheric* (concern for the environment), *Altruistic* (concern for others), *Egoistic* (concern for personal resources) and *Hedonic* (concern for pleasure and comfort) values (Bouman et al., 2018). These pro-environmental values relate strongly to *Self-Transcendence* values, which focus on the interests of other people and the environment, and *Self-Enhancement* values, which focus on the interests of the self (Steg et al., 2014). *Self-Transcendence* values (differentiated as *Biospheric* and *Altruistic* values) positively predict, and *Self-Enhancement* values (differentiated as *Egoistic* and *Hedonic* values) negatively predict, environmental concern (Schultz et al., 2005) and pro-environmental behaviour (Karp, 1996). The E-PVQ was considered for use in this research, due to the central relevance of environmental issues to social incongruity in the marine environment; however, the full range of values remained of interest, even if environmental values were to dominate.

Values, worldviews, and environmental concern all explain behaviour-related beliefs and norms, intentions, and behaviour to some extent, although values appear to do so with greater power (Steg et al., 2011). Environmental concern, defined simply as "...the evaluation of the seriousness of environmental problems" (Steg et al., 2011, p. 351), is considered to be the product of environmental issues threatening the values of, or that which is valued by, an individual (Schultz, 2000; 2001; Stern & Dietz, 1994). A worldview is "...a set of beliefs that includes limiting statements and assumptions regarding what exists and what does not (either in actuality, or in principle), what objects or experiences are good or bad, and what objectives, behaviors, and relationships are desirable or undesirable" (Koltko-Rivera, 2004, p. 4). While central to one's identity, worldviews are generally considered more focused and malleable than values, which are adopted earlier in life (Brennan et al., 2014).

Ecological worldviews are environmentally-orientated worldviews, concerned with "...beliefs about humanity's ability to upset the balance of nature, the existence of limits to growth for

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[26] *Hedonic* values were absent from the original three value model of Stern & Dietz (1994) before inclusion by Steg et al. (2014).

human societies, and humanity's right to rule over the rest of nature…" (Dunlap et al., 2000, p. 427). The revised[27] New Ecological Paradigm scale (*NEP*; Dunlap et al., 2000) measures endorsement of a "pro-ecological" worldview and has become the most widely used model for the measurement of environmental concern (Dunlap et al., 2000; Anderson, 2012). Fifteen *NEP* items measure agreement with a range of statements that endorse either the New Ecological Paradigm (*NEP*; 8 items) or the Dominant Social Paradigm (DSP; 7 items). The DSP measures agreement with the prevailing worldview of a population, or at least what was considered to be the prevailing (anti-environmental) worldview of industrialised nations by Pirages and Ehrlich (1974), whereas the *NEP*[28] measures agreement with an environmentally friendly worldview. The *NEP* was included in this research for the purpose of gaining a better understanding of how values relate specifically to ecological worldviews.

A clear relationship between environmental values (*Biospheric* in particular), attitudes and concern has been established (Steg et al., 2011) but the relationship between values and environmental behaviour is less clear. The *norm-activation theory of altruism* (Schwartz, 1968, 1973, 1977; Schwartz & Howard, 1980) "...holds that altruistic (including proenvironmental) behavior occurs in response to personal norms that are activated in individuals who believe that the particular conditions pose threats to others (awareness of adverse consequences, or AC) and that actions they could initiate could avert those consequence (ascription of responsibility to self, or AR)" (Stern, 2000, p. 412). This theory of norm-activation has been used regularly in researching environmental behaviour (Milfont et al., 2010), yet many factors, "..such as generality versus specificity, time frame, and the geographical scale of environmental issues" (Milfont et al., 2010, p. 124) have been shown to be relevant in explaining environmental behaviour (Dunlap & Jones, 2002; Uzzell, 2000). Schwartz' *norm-activation model* has subsequently been incorporated into the *value-belief-norm* (VBN) theory of environmentalism (Stern et al., 1999), which links values, beliefs, personal norms and behaviours. Specifically, VBN theory "...links value theory, norm-activation theory, and the New Environmental Paradigm (*NEP*) perspectives through a causal chain of five variables leading to behaviour: personal values (especially altruistic values), *NEP*, AC and AR beliefs about the general conditions in the biophysical environment, and personal norms for proenvironmental action" (Stern, 2000, p. 412).

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[27] The *NEP* developed in response to criticisms of an original 12-item instrument known as the New Environmental Paradigm (Dunlap & Van Liere, 2008).
[28] The initialism *NEP* has been used to differentiate itself from the original New Environmental Paradigm.
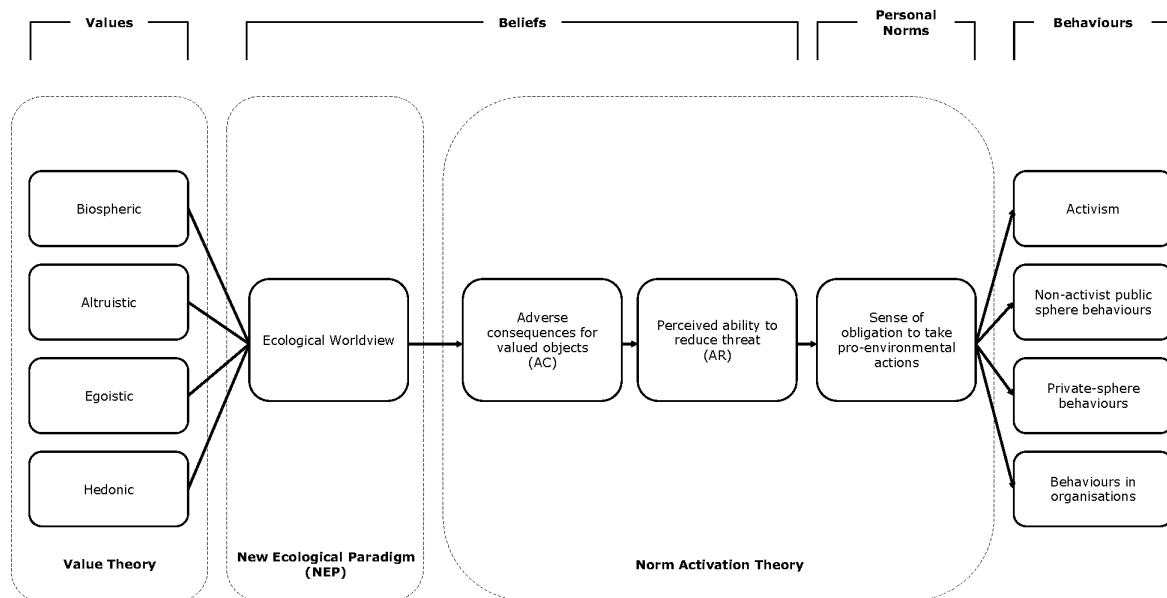
Figure 4. The Value-Belief-Norm (VBN) model[29,30,31]

The VBN model posits that environmental values, via the activation of environmental concern and personal norms, lead to proenvironmental behaviour (Stern, 2000). However, there are both internal and external limitations to this theory. Individuals neither prioritise nor embrace environmental values or beliefs to the same extent and, even in those individuals who do embody environmental values, the gap between values and behaviour is substantial (Verplanken & Holland, 2002).

The indirect influence of values on behaviour is moderated by the extent of value endorsement, value activation, and centrality to the self-concept (Steg & de Groot, 2012). "The more individuals endorse a specific value, the more strongly they are likely to think and behave in line with this value" (Bouman et al., 2018, p. 2). Values will influence attitudes and behaviour when they are both part of an individual's self-concept and cognitively activated (Verplanken & Holland, 2002). When values are made salient their correlation with attitudes and behavioural intentions will strengthen (Maio & Olson, 1995). This *self-activation*

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[29] Adapted from "Toward a coherent theory of environmentally significant behavior," by P. C. Stern, 2000, Journal of Social Issues, 56, 407–424.

[30] Arrows represent postulated direct effects. Direct effects may also be observed on variables more than one level downstream from a causal variable.

[31] Empirically, measures of *Egoistic* values have been negatively correlated with indicators of environmentalism.

hypothesis (Verplanken et al., 2008) postulates that such "priming" of values activates "...associated motivations and goal-directed cognitive and behavioral processes…" (Boer & Fischer, 2013). Furthermore, when directed towards specific targets, values focus attention on value-congruent information that affects related beliefs, norms and behavioural intentions (Stern & Dietz, 1994). This *habit discontinuity hypothesis* postulates "...that when a context change disrupts individuals' habits, a window opens in which behavior is more likely to be deliberately considered" (Verplanken et al., 2008, p. 121). Verplanken et al. (2008, p. 121) linked the *self-activation hypothesis* with the *habit discontinuity hypothesis*, finding "...that context change can activate important values that guide the process of negotiating sustainable behaviors".

Demographic Considerations

Demographic variables are used as a proxy for life circumstances (Schwartz, 2006), which provide or limit "...opportunities to pursue or express some values more easily than others… Life circumstances make the pursuit or expression of different values more or less rewarding or costly" (Schwartz, 2005, p. 13). Generally, values that are attainable will increase in importance while values that are unattainable will decrease in importance (Schwartz & Bardi, 1997). For example, *SD* values increase and *CO* values (see Table 3, p. 30) decrease in people who have lifestyles that afford freedom of choice (Kohn & Schooler, 1983). However, the reverse is true for values relating to security and material well-being (*SE* values, and *PO* values under some circumstances). If one's security is threatened, values pertaining to order, safety and control will be favoured (Schwartz, 2011). *SE* and *PO* values are induced by economic hardship and social upheaval but alleviated by comfort and safety (Inglehart, 1991). Consistent relationships between key demographic variables and values have been identified in cross-cultural values research; relationships that may prove relevant in explaining variation within the (non-representative) sample of this research.

Some gender differences also exist in value prioritisation. Schwartz and Rubel (2005) reviewed the findings of 127 samples from 70 countries[32] and found that men consistently attributed more importance to *PO*, *ST*, *HE*, *AC* and *SD* values than did women. *BE* and *UN*

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[32] The large dataset (n = 77,528) included two small NZ samples. ST (d = -0.45, $p < 0.05$, two-tailed) was the only significant difference reported and in the first sample (n = 143). BE (d = 0.59, p < 0.05, two-tailed), PO (d = -0.48, p < 0.05, two-tailed) and ST (d = -0.44, p < 0.05, two-tailed) were reported as significant in the second sample (n=201).

values, and to a lesser extent *SE* values, were consistently attributed more importance by women than by men.

In relation to the 10 basic value domains, age correlates most positively with *Conservation* values (*TR*, *CO* and *SE*) but also with *Self-transcendence* values (*BE* and *UN*). Age correlates negatively with *Openness to change* values (*SD* and *ST*), *HE* and *Self-enhancement* values (*AC* and *PO*) (Schwartz, 2006). Schwartz's 2017 review also considered the relevance of age and found that the importance of *COR* increases with age but linear correlation was not found with *COI*.

In relation to the 10 basic value domains, Schwartz (2006) found education to correlate positively with *SD*, *ST*, *HE* and *AC* values, and negatively with *SE*, *CO* and *TR* values. Research has established strong links between values, political attitudes (Feldman, 2003) and voting (Schwartz et al., 2010). Piurko et al. (2011) assessed *Basic Personal Values and the Meaning of Left-Right Political Orientations in 20 Countries* from the ESS. In both liberal and traditional countries (but not postcommunist countries) *UN* and *BE* values predicted left-orientation and *CO* and *TR* values predicted right-orientation. Values were found to predict political orientation more strongly than sociodemographic variables in liberal countries, roughly equally in traditional countries, and more weakly in postcommunist countries. In a sample of over 3,000 Italian voters, Capara et al. (2006) found centre-left voters attributed greater importance to *UN*, *BE* and *SD* than centre-right voters, and attributed less importance to *SE*, *PO*, *AC*, *CO* and *TR* values.

This research aims to provide social context to the NZ marine environment by applying our knowledge of values and their influence on the PABs of individuals. The identification of areas where the values of certain individuals align or diverge may facilitate opportunities for improved communication and cooperation between those actively involved in the NZ marine environment. It is therefore hoped that this research will be of importance to any individual or organisation with an interest in the NZ marine environment.

New Zealanders Values

Recent research by MacDonald et al. (2020), which included both the PVQ-21 and the revised *NEP*, is the most substantial and relevant survey of New Zealanders environmental

attitudes to be carried out in the context of Schwartz's Theory of Basic Human Values. However, as the PVQ-21 was developed prior to the PVQ-RR, the questions asked differ and only measure the 10 original value domains. Nevertheless, the sizable (n = 8,199) and representative (based on the 2017 adjusted census) dataset of MacDonald et al. (2020) provides a potentially meaningful baseline of the target population for this research.
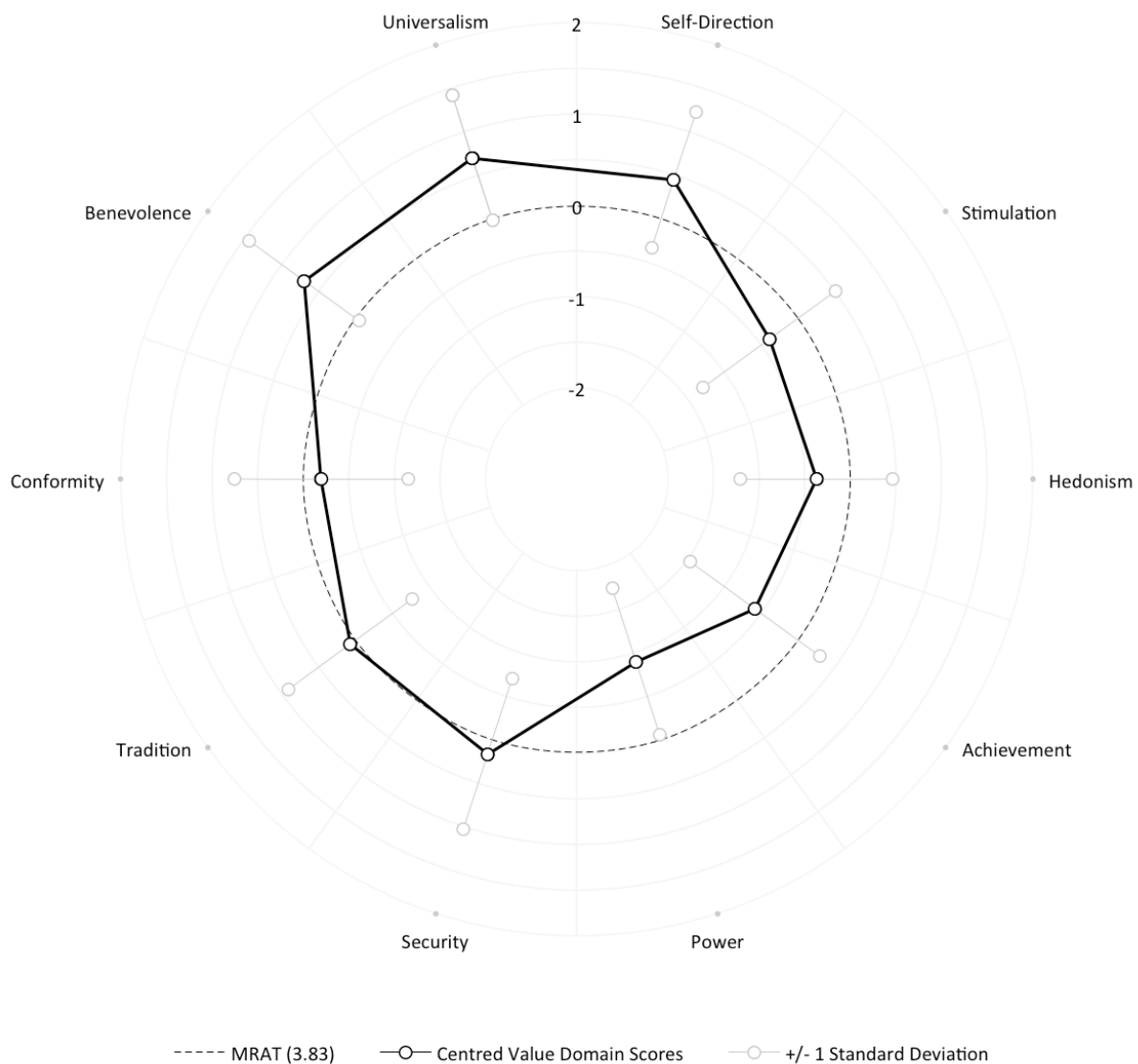
Figure 5. Centred Value Domain Scores of the PVQ-21 for a Nationally Representative Population in New Zealand (formulated and constructed from the data of MacDonald et al., 2020)[33]

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[33] The results and figures presented have been formulated and constructed from the open source data of MacDonald et al. (2020), available via: https://data.bioheritage.nz/dataset/public-opinion-pest-control-methods

The centred value scores from MacDonald et al. (2020) show the prioritisation of *BE* ($M = 0.70$, $s = 0.74$), *UN* ($M = 0.70$, $s = 0.71$), and *SD* ($M = 0.45$, $s = 0.79$) values over *PO* ($M = -0.90$, $s = 0.84$), *AC* ($M = -0.58$, $s = 0.88$), *HE* ($M = -0.37$, $s = 0.83$), and *ST* ($M = -0.39$, $s = 0.87$) values. The revised *NEP* scale from MacDonald et al. (2020) resulted in a mean score of 3.52 and a standard deviation of 0.92.

In a sample of 217 New Zealanders, Schultz (2005) regressed scores from the *NEP* onto those of 11 value types calculated from the 56-item SVS, separating the two environmental universalism items (environmental protection and unity with nature) into a separate value type. The results were highly significant, $F(4, 206) = 17.40$; $p < .001$, with the value types Universalism-environment (.34), tradition (–.26), and power (–.24) producing significant final beta values. The research also demonstrated significant relationships ($p < .05$) when *Self-Transcendence* and *Self-Enhancement* values were correlated with measures of *Egoistic* (-0.21 and 0.14), *Altruistic* (0.21 and -0.19) and *Biospheric* (0.24 and -0.15) values, while no significant relationships were found when *Conservatism* (i.e. *Conservation*) and *Openness* (i.e. *Openness to change*) values were correlated with *Egoistic*, *Altruistic* and *Biospheric* values.

An understanding of the NZ marine environment in the context of the wider global marine environment, and the realities of national and international marine governance, informed the selection of various PABs of interest for this research. Both academic and grey literature then informed the adoption of appropriate measures to place these PABs in the context of social psychology and the study of human values. Surveys exploring New Zealanders PABs and the NZ marine environment then provided guidance on how best to design a survey that would tie these components together.

Chapter 3: Method

The New Zealand Marine Values Survey (NZMVS) sought to develop an understanding of the relationship between human values and PABs towards the NZ marine environment by answering the research question: Do human values predict perceptions, attitudes and behaviours towards the NZ marine environment?

The use of a survey enabled the collection of a substantial amount of data from a large population, and to quantify a range of variables within this sample. Given the lack of prior research into marine-related PABs and their relationship to values, this research should be considered as exploratory and the results indicative of areas where future research may be warranted. A correlational survey design was selected due to the broad range of variables and relationships that were of potential interest, and a cross-sectional methodology was selected due to the interest in measuring the prevalence of these variables within a target population and a specific window of time.

Data was collected via an online questionnaire that included both new and established instruments and items. A large and widely distributed target population, including many sub-populations of interest, led to a focus on the collection of quantitative data (over qualitative data). This approach minimised the survey length, potentially improving the completion rate and increasing the sample size. Testing and validation of the psychological theories relevant to this research was also dependent upon the collection of quantitative data.

Minor adjustments were made to the survey, both before and after pre-testing, including the addition of new items. The exploratory nature of this research also led to the adoption of a number of non-probability sampling methods. Ethics approval was granted for The New Zealand Marine Values Survey by the Human Ethics Committee at VUW (approval #0000027571).

3.1   Participants

Participants in this research consisted of NZ citizens or residents aged 16 years or older—a target population of approximately 4.5 million (including citizens based overseas). This

population was targeted to obtain responses that reflected a diversity of views held towards NZ's marine environment.

3.2   Recruitment

A non-probability sampling method combining convenience sampling, purposive sampling, and snowball sampling, was selected. Convenience sampling refers to the practice of sampling individuals simply because they are "convenient" data sources, which generally relates to how accessible they are (sagepub.com, 2020a). Purposive sampling refers to the practice of sampling individuals who are actively sought because of relevant characteristics they are believed to hold (sagepub.com, 2020b). Snowball sampling refers to the practice of sampling individuals by allowing/encouraging those who are aware of the research to assist in its further dissemination (sagepub.com, 2020c). All of these are non-probability sampling methods (sagepub.com, 2020d) and not designed to achieve representative population samples.

Non-probability sampling methods were selected for a number of reasons. The responses of individuals concerned specifically with the NZ marine environment were of particular interest and a non-probability design could select for these individuals. The length of the questionnaire (communicated as taking approximately 30 minutes to complete) was expected to deter some people from taking it and prevent others from completing it, which was likely to increase response bias (Lavrakas, 2008). A non-probability design would reduce this potential bias and associated measurement error, with the length of the questionnaire facilitating the self-selection of desired respondents (individuals concerned with the NZ marine environment). A non-probability sampling method also allowed for the questionnaire to be disseminated via a larger range of available channels, increasing the sample size and ensuring a variety of views were represented. A large sample size was desirable as it would allow for statistically robust conclusions to be drawn from the data. Larger sample sizes reduce margin of error, enable higher confidence levels, provide higher statistical power, and allow for the detection of smaller effect sizes (Biau et al., 2008). A non-probability design allowed for the purposive sampling of subpopulations assumed more likely to complete the questionnaire and/or those of specific interest (e.g. stakeholder groups). A non-probability sampling method was also favoured as limited resources raised concerns about the feasibility of acquiring a reliable data set through the use of random sampling.

Participants were recruited with the help of a variety of individuals and organisations who assisted in the dissemination of the questionnaire and information about the research project. I developed a website, www.nzmvs.org, to promote the survey, to collect email addresses from potential participants and those wishing to be kept up to date with the progress of this research, and to link to the survey. Simple accounts and pages were created on key social media platforms (Facebook, Twitter, LinkedIn, Instagram). Posts and advertisements were created (on Instagram, Twitter and Facebook) promoted links to the questionnaire and website.

Corresponding and meeting with a range of stakeholders in NZ's marine environment prior to carrying out the survey provided some awareness of the research. Correspondence (via email) was entered into with stakeholder organisations of relevance to this research. Meetings with these organisations were sought wherever possible, yet in many instances email exchanges sufficed. Most but not all organisations were responsive and generally receptive to this research. In order to gain general feedback and investigate potential avenues for dissemination of the NZMVS questionnaire I consulted with representatives from the following organisations: DoC; FNZ; LegaSea; Maritime NZ; TNC; NIWA; Seafood NZ; Te Ohu Kaimoana; WWF NZ. The following consultations and conferences were also attended: FNZ Public Consultations (Whangarei, Auckland, Tauranga, New Plymouth, Nelson and Christchurch but not Dunedin or Invercargill); Federation of Commercial Fishermen Annual Conference 2019 (Paihia); NZ Marine Sciences Society Annual Conference 2019 (Dunedin); Forest and Bird Annual Conference 2019 (Wellington); Seafood Industry Annual Conference 2019 (Queenstown); Cawthron Open Oceans Aquaculture Symposium (Nelson); Moananui Te Paepae o Tangaroa Oceans Symposium (Gisborne).

An email alerting recipients to this research and requesting assistance (via completion and/or further dissemination of the questionnaire) was sent to stakeholder email addresses collected from publicly accessible online sources. Various keywords (e.g. marine, maritime, fisheries, environment, conservation, ecology, etc.) were used to identify relevant stakeholder organisations via the Google search engine. A single email was sent to email addresses compiled from the websites of these stakeholders. These stakeholders were selected based on their being active in the NZ marine environment or their having stated interests in the marine environment.

3.3   Measures

The survey instrument was a confidential online questionnaire, developed using the software Qualtrics[XM] and disseminated via a single anonymous link. The exploratory nature and non-random design of this research resulted in a questionnaire of 200 items across three key sections: *Demographics* (30 items); *Perceptions, Attitudes & Behaviours* (98 items); and *Psychographics* (72 items). A supplementary open response item, allowing for feedback and/or further comments, was presented at the conclusion of the questionnaire. Wherever possible, questionnaire items were drawn from (or referenced against) recent research of relevance to each item's type or purpose. This was done in an effort to reduce errors, improve cultural appropriateness, and allow for more reliable data comparison. The survey was conducted over a period of two months (September and October 2019), spanning 61 days. Incomplete responses could be returned to from the same device and completed within one month of the last data entry, up until the survey was closed (at the end of October).

3.3.1 Demographics

Demographic data was used for the purpose of comparing the sample population with the target population; reporting the characteristics of the sample population; comparing data with other relevant research; and assessing partial response data in reference to complete response data. Twenty-four of 30 items included in the *Demographics* section of the questionnaire were based on those commonly found in statistical and psychological surveys and also drew specifically from The Individual Form of the New Zealand Census of Population and Dwellings (Stats NZ, 2018), the New Zealand Attitudes and Values Study (NZAVS, 2020) and the Public Perceptions of New Zealand's Environment 2019 (Hughey et al., 2019). The six original items asked respondents if they held any qualifications of relevance to the marine environment. The *Demographics* section contained a variety of open-ended, partially open-ended and closed-ended items, including matrix and Likert scale items.

3.3.2 Perceptions, Attitudes & Behaviours

98 items included in the *Perceptions, Attitudes and Behaviours* section measured: perceptions of knowledge (12 items), conditions (12 items), and threats (12 items); attitudes towards

climate change (5 items) and stakeholders (42 items); and frequency of behaviours (15 items). These items consisted entirely of (either 6- or 7-point) likert scale matrices.

3.3.3 Psychographics

Two well established psychological measures were included in the questionnaire: the Portrait Values Questionnaire (PVQ-RR), 57 items on a 6-point likert scale, and the New Ecological Paradigm (*NEP*), 15 items on a 5-point likert scale.

The Portrait Values Questionnaire (PVQ)

The Theory of Basic Human Values measures values using either the Schwartz Value Survey (SVS; Schwartz, 1992) or the Portrait Values Questionnaire (PVQ; Schwartz, 2012). While the SVS is generally administered in person, due to its multi-sectored structure, the PVQ is more suitable for use in online questionnaires (Schwartz, 2009) and has proven "...more concrete and less cognitively complex than the SVS…" (Schwartz et al., 2001, p. 7) and of equal or greater efficacy at measuring values in general populations (Bouman et al., 2018).

The most recent version of the PVQ (revised twice in 2012), the Revised Portrait Values Questionnaire (PVQ-RR), provides portraits of 57 different people in language gender-matched to the respondent (Schwartz, 2012). In answering the question "How much like you is this person?", respondents indicate the importance of values that have been implicitly communicated through the personal goals, aspirations, and wishes of each portrait (Schwartz, 2012). Respondents' values are inferred from their self-reported similarity to these portraits. After being asked "How much like you is this person?", respondents rate each item on a 7-point likert scale ranging from "Very much like me" to "Not like me at all" (Schwartz, 2012). Responses were scored: 6 (Very much like me); 5 (Like me); 4 (Moderately like me); 3 (A little like me); 2 (Not like me); 1 (Not like me at all). The 57 items each correspond to specific values, with 3 items corresponding to each of the 19 basic values. Value scores are calculated by averaging the response ratings of items that correspond to each value. The 19 basic values, 10 original values (from the alternative/previous models) and 4 higher order values were then scored by calculating the average of the items that index them. Cronbach's alpha was calculated for each of these scores to check internal reliability.

The universality, or cross-cultural validity, of the PVQ has been demonstrated with all items displaying "...near-equivalence of meaning across cultures in analyses using multi-dimensional scaling" (Schwartz, 2005). Consistent with the idea that the values identified by the PVQ are universal (each held by everyone), the model measures people's value priorities—the relative importance of each value. This is achieved by computing the mean score of all 57 items (termed *MRAT*) and subtracting it from each value measure, producing relative importance scores. This process centres the scores around the individuals average rating and consequently eliminates variation in the way people respond to the items. Doing so is important as it is common for respondents to favour one end or the middle of the scale (Schwartz, 2003).

The Revised New Ecological Paradigm (NEP)

Responses to items of the *NEP* were scored: 5 (Strongly agree); 4 (Agree); 3 (Unsure); 2 (Disagree); 1 (Strongly disagree), with the 7 items measuring agreement with the DSP reverse-scored (i.e. 1 = 5, 2 = 4, 3 = 3, 4 = 2, 5 = 1). Scores were averaged for each individual, providing an overall *NEP* score. Consequently, the 15 items of the *NEP* only provided a single measure of specific interest, rather than the numerous domains of the PVQ or the various scales subsequently developed from the PAB variables.

3.4   Procedures

An introductory page titled *Information for Participants* provided a variety of information under the following sections: *Who is carrying out this research?*; *What is the aim of the project?*; *What does participation involve?*; *What will happen to the information provided?*; *What will the project produce?*; *Contact*; and *Ethics* (*Appendix 1*). Participants gave their informed consent through check-boxes and, once submitted, a response was automatically entered into the Qualtrics^XM database.

Three branches of the 57-item PVQ were set up in order to accommodate the gender-specific language requirements of the questionnaire. With the exception of this variation, the questionnaire was identical for all respondents. The survey concluded with a single open response item allowing for feedback and/or further comments. 688 (43.91%) responses to this item were recorded. Respondents were then directed to a separate questionnaire (to protect

anonymity and confidentiality) consisting of two optional items, asking for their name and email address, for those interested in hearing the findings and outputs of this research. 796 respondents (50.70%) submitted email addresses via this questionnaire[34]. The final page debriefed participants (directing them to the survey website for further information), asked for their assistance in disseminating the questionnaire further, and thanked them for their participation.

3.5   Data Analysis

Statistical analysis was carried out using a variety of software packages, including: Qualtrics[XM]; SPSS Statistics Version 26; and Microsoft Excel 2011. Analysis was carried out in 4 main stages; Response Scoring, Descriptive Statistics, Summary Statistics, and Statistical Tests. This analysis focused on information relevant to section 2.5 (Aims, Research Objectives & Hypotheses).

The calculation of continuous descriptive statistics from ordial data was considered appropriate as Likert variables with five or more categories are often used as ordinal approximations of continuous variables, without detriment to analyses (Johnson & Creech, 1983; Norman, 2010; Sullivan & Artino, 2013; Zumbo & Zimmerman, 1993).

The exploratory nature of this research led to a preference for avoiding type-I errors and the consequent adoption of a low significance level ($a = .01$) in statistical analyses. The probability value (p) provides a measure of the likelihood that a relationship between two or more variables is due to chance alone (i.e. random variation). This value is referenced against a standard (albeit arbitrary) significance level (a) in order to determine whether or not the relationship is considered significant. Setting a high significance level increases the likelihood of type-I errors, which occur when the null hypothesis (H_0) is falsely rejected (detecting a difference when none exists—a false-positive). Setting a low significance level increases the likelihood of type-II errors, which occur when the null hypothesis (H_0) is falsely accepted (failing to detect a difference when one exists—a false-negative). The adoption of a low significance level ($a = .01$) set a high threshold for the consideration of variables as relevant to this discussion.

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[34] The email addresses for some proportion of the other 49.30% would already have been provided/obtained via the NZMVS website.

Effect sizes were interpreted in reference to Cohen (1988); however, the approach taken in evaluating the strength of significant relationships involving value domains was necessarily different, as the most prominent variables were not necessarily the variables of greatest interest.

Chapter 4: Results

A total of 2,963 responses to the questionnaire were recorded. 12 responses were excluded due to a stated birth year of 2003 or later. Of the remaining 2,951 responses, 1,567 (53.10%) were complete responses and 1,384 (46.90%) were partial responses (see Appendix). Partial responses have been excluded from the focus of this research. As such, any further statistical analysis or use of the term *respondents* should be considered in reference to complete responses only ($n = 1,567$), unless stated otherwise. A total of 1,402 (89.92%) respondents completed the questionnaire within 1 hour, in an average time of 25:34 and a median time of 23:33.

4.1   Response Scoring

Ordinal categorical items were scored objectively using subjective equally spaced scoring methods, as used in both the PVQ and *NEP*. For example, responses rating *Perceived condition* were scored: Don't know = 0, Very poor = 1, Poor = 2, Adequate = 3, Good = 4, Very good = 5. Scores for all response items were calculated to ensure higher scores represented higher levels of the variable being measured, e.g. higher *NEP* scores represented greater acceptance of a pro-ecological worldview. Scores were calculated for the PVQ following the method detailed by Schwartz (2016). Scores were calculated for the *NEP* following the method detailed by Dunlap et al. (2000). Scales for both the PVQ and *NEP* were calculated as mean item scores.

4.2   Descriptive Statistics

Descriptive statistics (including mean, standard deviation, skewness, kurtosis and sample size) were calculated for all quantitative and ordinal variables. Histograms were also generated for all variables in order to provide a visual check of the data for outliers and non-normality. These checks largely indicated acceptable normality across all variables of interest and generally acceptable skewness and kurtosis.

4.3   Summary Statistics

Response data was collated and summarised in order to gain a general understanding of the sample population. Summary tables of responses to quantitative items have been included in the Appendix.

Demographics

A variety of common questionnaire items provided a demographic understanding of the sample population. The average age[35] of respondents was 52-53 and the median age of respondents was 55–56, with a range between 16–17[36] and 91–92. 62.92% (986) of respondents were male, 36.18% (567) were female, 0.26% (4) were gender diverse and 0.64% (10) stated a preference not to say. The questionnaire item allowed for multiple ethnicities to be nominated. 94.19% (1,476) of respondents indicated Pākehā / New Zealand European or European ethnicity. 9.06% (142) of respondents indicated Māori ethnicity. Other ethnicities were under-represented (each < 0.5% of respondents). 77.41% (1,213) of respondents were born in New Zealand, 9.64% (151) in the United Kingdom, 2.55% (40) in Australia, 2.04% (32) in the United States of America, 1.72% (27) in South Africa and the remaining 6.64% (104) in 42 other nations (all less than 1%). 95.09% (1,490) of respondents had lived in New Zealand for more than 10 years.

The geographic distribution of respondents was varied. 53.29% (835) of respondents resided in a large town or city of more than 30,000 people. 9.64% (151) resided in a town of 10,001 to 30,000 people. 15.83% (248) resided in a town of 1,000 to 10,000 people and 21.25% (333) resided in the countryside or a town of less than 1,000 people. Respondents were well distributed across NZ's regions. Relative to the distribution of NZ's population (Stats NZ, 2018), the most under-represented regions were Auckland (-12.13 percentage points) and Canterbury (-5.23 percentage points), while the most over-represented regions were Wellington/Wairarapa (+6.07 percentage points) and Otago (+3.19 percentage points).

Each education category was well represented by respondents but the distribution across these categories was poorly representative of NZ's population. 46.27% (725) of respondents held a bachelor's degree or higher, compared with 24.82% nationally. 18.66% (299) of

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[35] Age was calculated from birth year.
[36] Respondents under the age of 16 were excluded from the analysis as study information indicated that participants must be over the age of 16. 12 responses (9 partial and 3 complete) were excluded due to being aged 15–16 or younger.

respondents held an undergraduate diploma/certificate as their highest form of qualification, compared with 18.66% nationally. 24.06% (377) of respondents held a secondary qualification as their highest form of qualification, compared with 38.34% nationally. 10.59% (166) held no formal qualifications, compared with 18.19% nationally (Stats NZ, 2018). 50.10% (785) of respondents held qualifications of specific relevance to the marine environment. 29.04% (455) of respondents held qualifications in diving, 26.87% (421) in recreational boating, 8.93% (140) in maritime, 4.85% (76) in commercial fishing, and 7.79% (122) in other areas related to the marine environment.

The employment status of respondents varied. 51.44% (806) of respondents were in full-time employment (> 30 hours per week) and 8.81% (138) were in part-time employment (less than 30 hours per week). 21.44% (336) of respondents were retirees and 5.30% (83) were students. 2.55% (40) of respondents were in unpaid voluntary work, 1.53% (24) in home duties and 3.38% (53) were unemployed. 5.55% (87) of respondents selected "Other (please state):", with all but 3 indicating that they were self-employed. A diverse range of occupations were stated by respondents. 53.16% (833) of respondents stated an income of $70,000 or less and 33.44% (524) of respondents stated an income greater than $70,000. 13.40% (210) of respondents stated a preference not to say when asked about their income.

Respondent support for New Zealand's main political parties was widely distributed. Respondents' political self-identification favoured the centre of both conservative/liberal and left-wing/right-wing scales, with 29.04% (455) and 32.04% (502) respectively opting for the central point of the 7-point scales. However, the distribution skewed liberal (52.33%) and left-wing (46.59%) as opposed to the conservative (18.63%) and right-wing (21.38%). This was also the case with respondents identifying themselves as extremely liberal (9.00%) and extremely left-wing (6.25%) as opposed to extremely conservative (1.98%) and extremely right-wing (2.04%).

Significant ($p < .01$) differences in key demographic variables (such as gender, age and education) were found between the sample population and the NZ population as a whole. As gender, age and education have all been shown to exhibit significant relationships with values (Schwartz, 2005) the sample was unlikely to be representative of the NZ population. The sample may be more representative of individuals concerned with the NZ marine environment as it consisted of responses from individuals who took an interest in the research

and completed a lengthy questionnaire. Further research may endeavour to focus on a nationally representative sample.

Perceptions, Attitudes & Behaviours (PABs)

A majority of respondents rated their knowledge above average (Good or Excellent) in three areas: general environmental issues (82.83%); marine environmental issues (72.24%); and recreational fishing practices (56.54%). A majority of respondents rated their knowledge below average (Poor, No knowledge or Don't know) in two areas: Mātauranga Māori (64.77%) and the Māori Fisheries Settlement (59.41%).

NZ's natural environment (M = 2.83, s = 0.98) was considered to be in better condition than the global natural environment (M = 2.25, s = 0.98) by 52.00% of respondents, while 4.91% considered it to be in worse condition and 43.09% considered their conditions to be equal (n = 1,548). NZ's marine environment (M = 2.80, s = 1.01) was considered to be in better condition than the global marine environment (M = 2.12, s = 0.98) by 57.31% of respondents, while 3.92% considered it to be in worse condition and 38.77% considered their conditions to be equal (n = 1,532). NZ's fish stocks (M = 2.55, s = 1.00) were considered to be in better condition than global fish stocks (M = 2.01, s = 0.89) by 49.38% of respondents, while 5.60% considered them to be in worse condition and 45.02% considered them to be equal (n = 1,446). With the exception of NZ's freshwater environments (rivers, lakes, groundwater) (M = 2.22, s = 1.05), which were perceived to be in worse condition than the global natural environment, every component of the NZ environment was perceived to be in better condition than the global natural environment, global marine environment, and global fish stocks.

The condition of NZ's marine environment was considered equal to the condition of NZ's natural environment by 70.47% of respondents, worse by 15.87% and better by 13.76% (n = 1,544). NZ's coastlines (M = 2.95, s = 0.95) were considered to be in the best condition of all components measured; better than both NZ's natural environment and NZ's marine environment. Every aspect of the NZ marine environment was perceived to be in better condition than NZ's freshwater environments (rivers, lakes, groundwater).

These figures exclude responses recorded as "Don't know" (see Appendix). The number of respondents who answered "Don't know" was higher for the more specific items asking about the perceived condition of NZ's marine fauna, and highest for NZ deep sea fish stocks. Interestingly, the number of respondents who answered "Don't know" in respect to NZ's marine fish stocks (101) was nearly twice the number for Global marine fish stocks (55), 6.45% of respondents compared to 3.51% of respondents.

Plastics ($M = 4.12$, $s = 0.86$), nutrient/chemical runoff ($M = 3.88$, $s = 0.78$) and invasive species ($M = 3.81$, $s = 0.79$) were generally seen as the biggest threats to the marine environment, while Māori customary fishing ($M = 2.55$, $s = 1.03$), Recreational fishing ($M = 2.62$, $s = 0.90$) and Commercial aquaculture ($M = 2.92$, $s = 0.85$) were generally seen as the smallest threats. Threats less closely associated with activity within the marine environment appeared to garner more concern than those related to activity within the marine environment.

The vast majority of respondents were of the view that Climate change is real ($M = 6.05$, $s = 1.50$) and Climate change is caused by humans ($M = 5.42$, $s = 1.81$). Respondents were very concerned about climate change ($M = 5.44$, $s = 1.64$) and largely of the view that Climate change is a threat to the marine environment ($M = 5.78$, $s = 1.64$) and to fisheries ($M = 5.66$, $s = 1.63$). Standard deviations (s) for each of the five climate change items were large, relative to most other items in the questionnaire.

Paired sample t-tests were conducted to compare respondents' trust in generic individual stakeholders and their organisational counterparts. Trust in the environmentalist ($M = 3.17$, $s = 1.20$) was found to be greater than trust in environmental NGOs ($M = 2.99$, $s = 1.10$); $t(1,443) = 8.08$, $p < .01$; trust in the commercial fisher ($M = 2.40$, $s = 0.89$) was found to be greater than trust in commercial fishing companies ($M = 2.07$, $s = 0.82$); $t(1,548) = 19.77$, $p < .01$; and trust in the scientist ($M = 3.84$, $s = 1.01$) was found to be greater than trust in research institutes ($M = 3.62$, $s = 0.97$); $t(1,549) = 11.321$, $p < .01$. Contrary to this theme of trust in the individual over trust in the institution was trust in the academic ($M = 3.28$, $s = 1.14$), which was found to be less than that trust in universities ($M = 3.50$, $s = 1.07$); $t(1,528) = -10.37$, $p < .01$. No significant difference in trust was found between the recreational fisher ($M = 2.99$, $s = 0.88$) and recreational fishing organisations ($M = 2.98$, $s = 0.92$); $t(1,541) = 0.70$, $p = .48$, or in trust between the public servant ($M = 2.49$, $s = 0.92$) and government departments ($M = 2.51$, $s = 0.91$); $t(1,538) = -1.40$, $p = .16$.
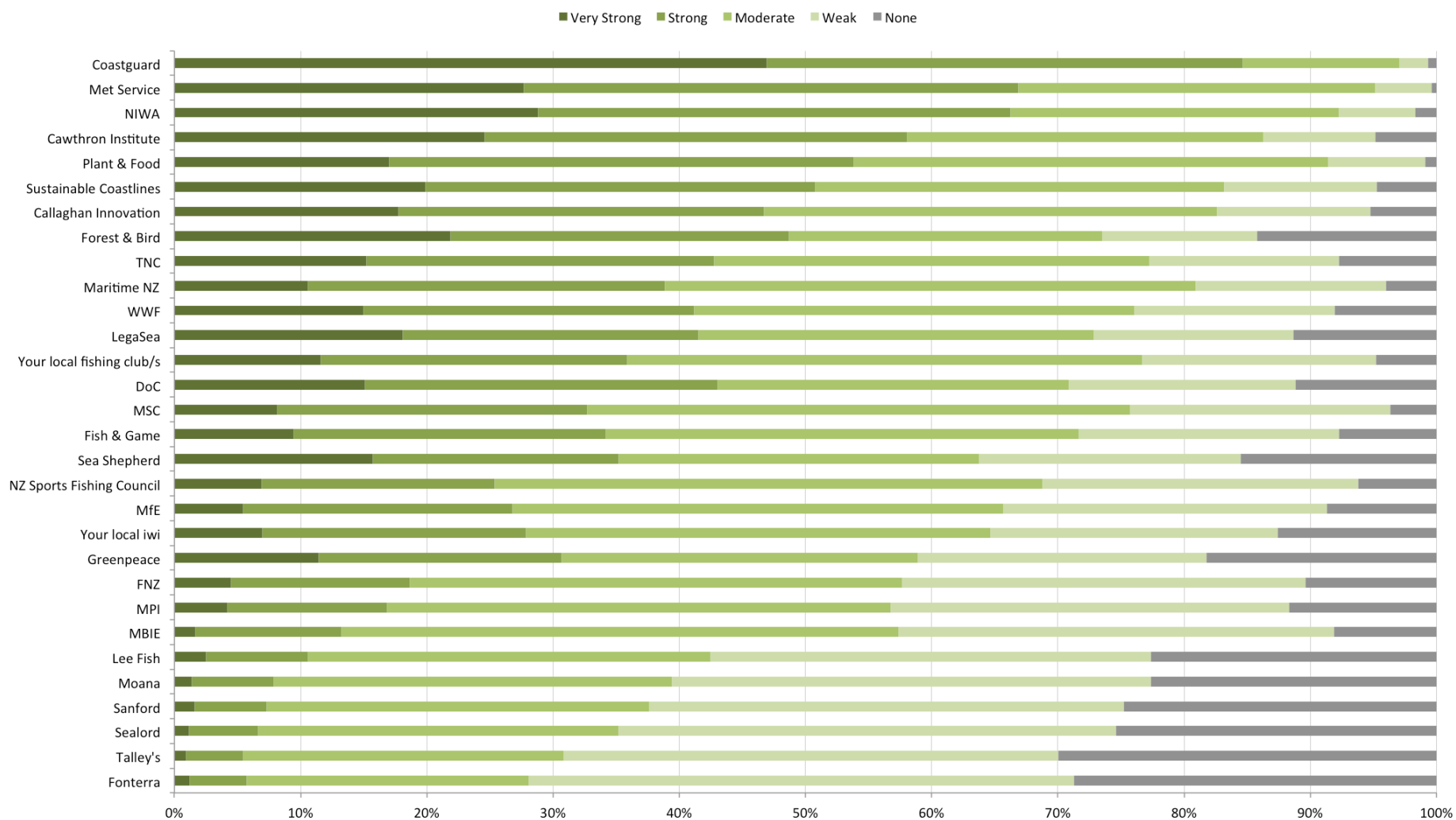
Figure 6. Trust in specific stakeholder organisations, ordered by mean trust scores, highest (top) to lowest (bottom)

Trust in stakeholder organisations was somewhat stratified based on entity type. Given this, and the uncertainty introduced by the non-representative survey design, the differences seen between stakeholders groups (e.g. commercial fishing companies) was typically of greater interest than the overall rankings. Trust was weakest in Fonterra ($M = 2.06$), followed by all five commercial fishing companies ($M = 2.07–2.33$). Trust was highest in Coastguard, which also displayed the least variation ($M = 4.28$, $s = 0.82$), followed by four of the five research organisations ($M = 3.61–3.89$). Considerable variation was seen between ENGOs; Sustainable Coastlines ($M = 3.49$, $s = 1.08$) was the most trusted while Greenpeace ($M = 2.83$, $s = 1.26$) was the least trusted. Standard deviation from the mean was highest in Forest & Bird ($M = 3.30$, $s = 1.32$), Sea Shepherd ($M = 2.99$, $s = 1.29$) and Greenpeace ($M = 2.83$, $s = 1.26$). These statistics exclude responses to the two options "Haven't heard of them" and "Don't know", which were available in each item measuring trust in specific stakeholder organisation and allowed for the relative awareness of stakeholder organisations to be gauged (Appendix *Table 30*). Although Greenpeace was the only organisation with an awareness rating of 100%, 21 of the 30 organisations rated above 93%.

Respondent behaviour indicated a sample population that was strongly connected with the NZ marine environment. Eating seafood ($M = 3.26$, $s = 1.01$), spending time at the beach/coast ($M = 3.17$, $s = 0.99$), and purchasing seafood ($M = 2.69$, $s = 1.31$) were the individual behaviours related to the marine environment that scored highest. Marine fishing from a non-powered craft (e.g. kayak) ($M = 0.57$, $s = 0.93$), Diving for seafood, with or without tanks (e.g. spear fishing) ($M = 0.82$, $s = 1.09$) and Volunteering as an individual working in the marine environment ($M = 0.83$, $s = 1.19$) were the individual behaviours related to the marine environment that scored lowest.

Psychographics

Cronbach's alpha across the 15 *NEP* items was 0.86, indicating good internal reliability (George & Mallery, 2003)*. The mean response of individuals across all 15 items was 3.91, with a standard deviation of 0.69. Correlations, means, standard deviations and internal reliabilities were calculated for each of the 4 higher order value domains, each of the 10 original value domains and each of the 19 value domains of the PVQ-RR. Cronbach's alpha was calculated across all uncentred value items and value domains. Internal reliabilities were referenced against indicative values for the 10 value domains from Schwartz et al. (2001;

2005). Cronbach's alpha for all value domains sat within or above the ranges provided by Schwartz et al. (2005), with the exception of *AC* (α = .64) but this was still well above that of Schwartz et al (2001) (α = .52).

The scores of all respondents (*n* = 1,567) to the PVQ-RR were analysed and results were calculated for the 4 higher order value domains, the 10 original value domains and the 19 revised value domains. Of the 4 higher order value domains, *Self-enhancement* (*M* = -1.29 *s* = 0.61) and *Self-transcendence* (*M* = 0.76, *s* = 0.42) both sat more than 1 SD outside of *MRAT*, while *Openness to change* (*M* = 0.45, *s* = 0.49) and *Conservation* (*M* = -0.24, *s* = 0.47) both sat within 1 standard deviation of *MRAT*.
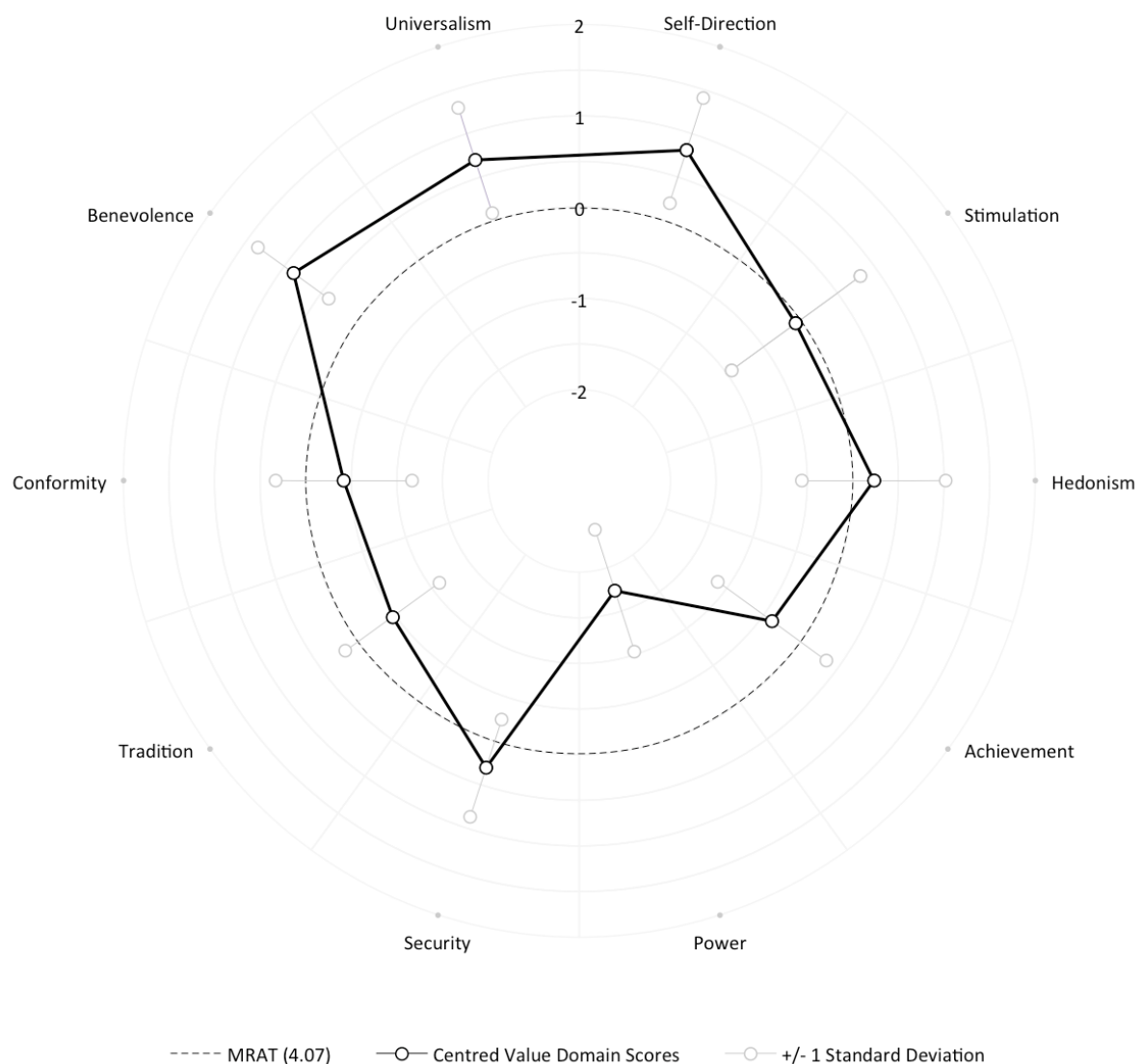
Figure 7. The 10 PVQ-RR centred value domain scores

Figure 8. The 19 PVQ-RR centred value domain scores

Figure 9. Comparison of the 10 PVQ centred value domain scores of the NZMVS and MacDonald et al. (2020)

Potential differences in value priorities between the sample population and the NZ population were considered via comparison with the large representative sample of MacDonald et al. (2020). The centred value domain scores for the 10 original values demonstrated a broadly similar pattern across the two datasets. Eight of the 10 values were prioritised in the same direction (relative to *MRAT*) over both datasets, with *HE* and *TR* being the two exceptions. Respondents to the NZMVS exhibited significantly ($p < .001$) higher levels of *SD* ($t(2,686) = 20.41$, $p < .001$), *ST* ($t(2,247) = 13.50$, $p < .001$), *HE* ($t(2,282) = 27.36$, $p < .001$), *AC*

(t(2,514) = 9.39, p < .001), *SE* (t(3,207) = 8.31, p < .001), and *BE* (t(3,208) = 12.06, p < .01) values, relative to the sample population of MacDonald et al. (2020). Respondents to the NZMVS exhibited significantly (p < .01) lower levels of *PO* (t(2,514) = -41.83, p < .001), *TR* (t(2,717) = -29.07, p < .001) and *CO* (t(2,640) = -10.25, p < .001) values, relative to the sample population of MacDonald et al. (2020). UN was the only value that did not differ significantly between the two samples. Both samples were most averse to PO as a value but the extent of this aversion was far greater in MacDonald et al.'s sample (2020).

Comparison of the two datasets provided useful reference points for further discussion and insights for additional analysis—notably the relative prioritisation of *Openness to change* values and substantial difference in the *PO* value domain. However, concrete conclusions could not be drawn due to an absence of research comparing results of the PVQ-21 and the PVQ-RR. Furthermore, demographic variation between our non-representative sample and the representative sample of MacDonald et al. (2020) was not accounted for.

4.4   Factor Analysis

High internal reliability was found across PAB variable groups but factor analysis was necessary in order to identify latent variables (or factors) within these groups as Cronbach's alpha does not measure dimensionality. Many of the factors (groups of items that elicited similar response patterns) identified were not obvious and provided insight into the division of respondents and assisted in the development of scales for subsequent analysis. High internal reliability (n = 12, α = .91) was found across perceived knowledge items, and factor analysis (with a coefficient threshold of .30) highlighted three components that accounted for 70.75% of variance. The largest of these contained all but three items (General environmental issues; Mātauranga Māori; and The Treaty of Waitangi) and accounted for 38.28% of variance. A second component, consisting of: The Treaty of Waitangi; Mātauranga Māori; the Māori Fisheries Settlement; and the NZ Quota Management System, accounted for 17.03% of the variance and a third component, consisting of: General environmental issues; Marine environmental issues; Marine science; and Fisheries science, accounted for 15.49% of the variance.

Table 4. Factor analysis of perceived knowledge variables

Knowledge component	Factor		
	1	2	3
General environmental issues			.89
Marine environmental issues	.50		.72
Recreational fishing practices	.77		
Commercial fishing practices	.84		
Commercial aquaculture practices	.77		
Marine science	.53		.51
Fisheries science	.74		.32
Mātauranga Māori		.78	
The Treaty of Waitangi / Te Tiriti o Waitangi		.85	
NZ Quota Management System	.79	.31	
Māori Fisheries Settlement	.60	.62	
NZ marine/maritime acts and regulations	.75		
Eigenvalues	5.98	1.35	1.16
% Variance explained	38.28	17.03	15.44
Cronbach's alpha	.92	.78	.83

Factor analysis indicated no notable components within the 12 perceived condition items ($n = 12$, $\alpha = .95$) but identified 3 components across the 12 items measuring perceived threat to the marine environment ($n = 12$, $\alpha = .81$), accounting for 55.98% of variance. Climate change and fishing-related items were absent from the largest of these components, which accounted for 35.62% of variance. This component centred around pollution of the marine environment via land-based sources (sewage, plastics, and nutrient/chemical runoff). A second component, limited to climate change and threats relating specifically to human activity at sea, accounted for 11.01% of variance. This component was centred around the threats of fishing and aquaculture. A third component focused primarily on the threat of climate change, correlated negatively with the threat of Māori customary fishing, and accounted for 9.35% of variance.

Table 5. Factor analysis of perceived threat variables

Threat component	Factor		
	1	2	3
Climate change		.39	.70
Invasive species	.48		
Sedimentation	.52		.36
Nutrient/chemical run-off	.68		.37
Sewage	.81		
Plastics	.78		
Maritime vessel pollution	.67	.35	
Recreational fishing		.65	
Commercial fishing		.69	
Commercial aquaculture		.72	
Māori customary fishing		.51	-.65
Seabed mining & the oil & gas industry	.45	.35	.46
Eigenvalues	4.27	1.32	1.12
% Variance explained	35.62	11.01	9.35
Cronbach's alpha	.81	.72	.73

Factor analysis found the five climate change items to be highly unidimensional (1 component accounting for 84.97% of the variance). Internal reliability was high across all behaviour items ($n = 15$, $\alpha = .80$) and all fishing-specific marine behaviours ($n = 5$, $\alpha = .82$) but was moderate for non-fishing marine recreation behaviours ($n = 5$, $\alpha = .72$) and unsurprisingly low for the other marine related behaviour items ($n = 5$, $\alpha = .47$). Factor analysis highlighted four components across the 15 behaviour items, accounting for 62.19% of variance. The largest of these contained all fishing related behaviours, SCUBA diving / snorkelling, recreational boating and eating seafood. This component accounted for 29.28% of the variance. The second component, responsible for 15.46% of variance, contained all recreational marine activities and the use of marine transport. The final two components consisted of only two items each, volunteering in the marine environment as an individual and as part of a group (10.10% of variance) and the eating and purchasing of seafood (7.34% of variance).

Table 6. Factor analysis of marine-related behaviours

Behaviour	Factor			
	1	2	3	4
Collecting seafood from the coast (e.g. gathering shellfish)	.84			
Diving for seafood, with or without tanks (e.g. spear fishing)	.73			
Fishing from beach/coast (e.g. surf-casting)	.77			
Marine fishing from a non-powered craft (e.g. kayak)	.56			
Marine fishing from a powered craft (e.g. motor boat)	.81			
Spending time at the beach/coast (for any reason other than those listed previously)		.60		
Swimming or water-sports (e.g. surfing)		.73		
SCUBA diving / snorkeling (non-fishing)	.41	.55		
Recreational boating, either non-powered or powered craft (non-fishing)	.47	.52		
Use marine transport (e.g. catch the ferry)		.63		
Eat seafood	.34			.84
Purchase seafood				.91
Visit a marine reserve		.65		
Volunteering as part of a group working in the marine environment			.89	
Volunteering as an individual working in the marine environment			.89	
Eigenvalues	4.39	2.32	1.52	1.10
% Variance explained	29.28	15.46	10.10	7.34
Cronbach's alpha	.82	.74	.86	.73

4.5   Scale Development

A process of scale development was undertaken in order to explore the relationship between respondents' PABs and their values. Knowledge ($n = 12$, $\alpha = .91$), condition ($n = 12$, $\alpha = .95$), threats ($n = 12$, $\alpha = .81$), climate change ($n = 5$, $\alpha = .94$), and behaviours ($n = 15$, $\alpha = .80$), all exhibited high internal reliability. Internal reliability was also sufficiently high in the 10 component groups that arose from the factor analysis of perceived knowledge (*Table 4*), perceived threats (*Table 5*) and behaviours (*Table 6*), to warrant use as scales[37]. Specific emphasis was placed on the development of scales from items that measured respondent trust in stakeholders, as these provided a relative measure of how respondents perceived different stakeholder groups. While Cronbach's alpha was high across these items ($n = 42$, $\alpha = .93$), it was relatively low across items measuring trust in generic individual stakeholders ($n = 6$, $\alpha = .59$) and across items measuring trust in generic organisational stakeholders ($n = 6$, $\alpha = .65$).

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[37] While further analysis was carried out using all of these component groups, results from the three perceived knowledge components and three perceived threat components did not differ substantially from the broader scales in which they were nested (*Perceived knowledge* and *Perceived threat*). Consequently, only the full group scales have been presented in the results that follow. This was not the case with the 4 behaviour components, which have been presented in preference to a larger scale.

A desire for a consistent and reliable measure of support for general stakeholder groups led to the development of several key stakeholder scales that averaged respondent scores across a range of similar variables.

The first step in the development of these scales involved pairing related individual and organisational stakeholder items, which resulted in high internal reliability between the variables of (trust in): the environmentalist & environmental NGOs ($n = 2$, $\alpha = .85$); the commercial fisher & commercial fishing companies ($n = 2$, $\alpha = .83$)l; the recreational fisher & recreational fishing organisations ($n = 2$, $\alpha = .78$); the public servant & government departments ($n = 2$, $\alpha = .81$); the scientist & research organisations ($n = 2$, $\alpha = .83$); and the academic & universities ($n = 2$, $\alpha = .84$)[38]. Further consideration of specific individual stakeholder item results, such as stakeholder awareness (Appendix *Table 17*) and correlation between individual items (section 4.6), led to the development of scales for five key stakeholders (*Table 7*).

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[38] A lack of relevant individual stakeholder items prevented the creation of an academia stakeholder scale.

Table 7. Key stakeholder scales

Scale	Stakeholder item (trust in)	α
Environmental	The environmentalist Environmental NGOs Greenpeace WWF Forest & Bird	.892
Commercial fishing	The commercial fisher Commercial fishing companies Sealord Talley's Sanford	.915
Recreational fishing	The recreational fisher Recreational fishing organisations Your local fishing club/s NZ Sports Fishing Council LegaSea	.877
Public service	The public servant Government departments Ministry for Primary Industries (MPI) Fisheries New Zealand Ministry for Business Innovation & Employment (MBIE)	.816
Science & research	The scientist Research organisations Met Service NIWA Plant & Food	.863

4.6   Bivariate Correlation

As an initial means of scrutinising the data, bivariate correlation analyses were carried out for all relationships between individual response variables of interest, with a focus on PABs as the potential dependent variables. Correlation between the many individual variables was common but typically weak[39], yet the consistency of this correlation across variable groupings provides some indication of broad trends within the sample population. 4,753 bivariate correlation analyses were carried out between PAB variables ($n = 98$). 3,266

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[39] Cohen's effect sizes for Pearson's correlation (r) are referenced to denote relationship strength, with correlations of between .10 and .30 considered small, correlations between .30 and .50 considered medium, and correlations over .50 considered large.

(68.71%) were found to be statistically significant ($p < .01$). 1,274 relationships between PAB variables (n = 98) and demographic variables ($n = 13$) were assessed. 872 (68.45%) of these relationships were found to be statistically significant ($p < .01$).

The number of correlations between each of the 19 value domains and the 98 PAB variables (*Figure 10*) provided an indication of how relevant each value domain might be. Substantial variation in the size, strength and direction of correlations was evident and indicated that some value domains are of far greater relevance that others in relation to PABs towards the NZ marine environment.
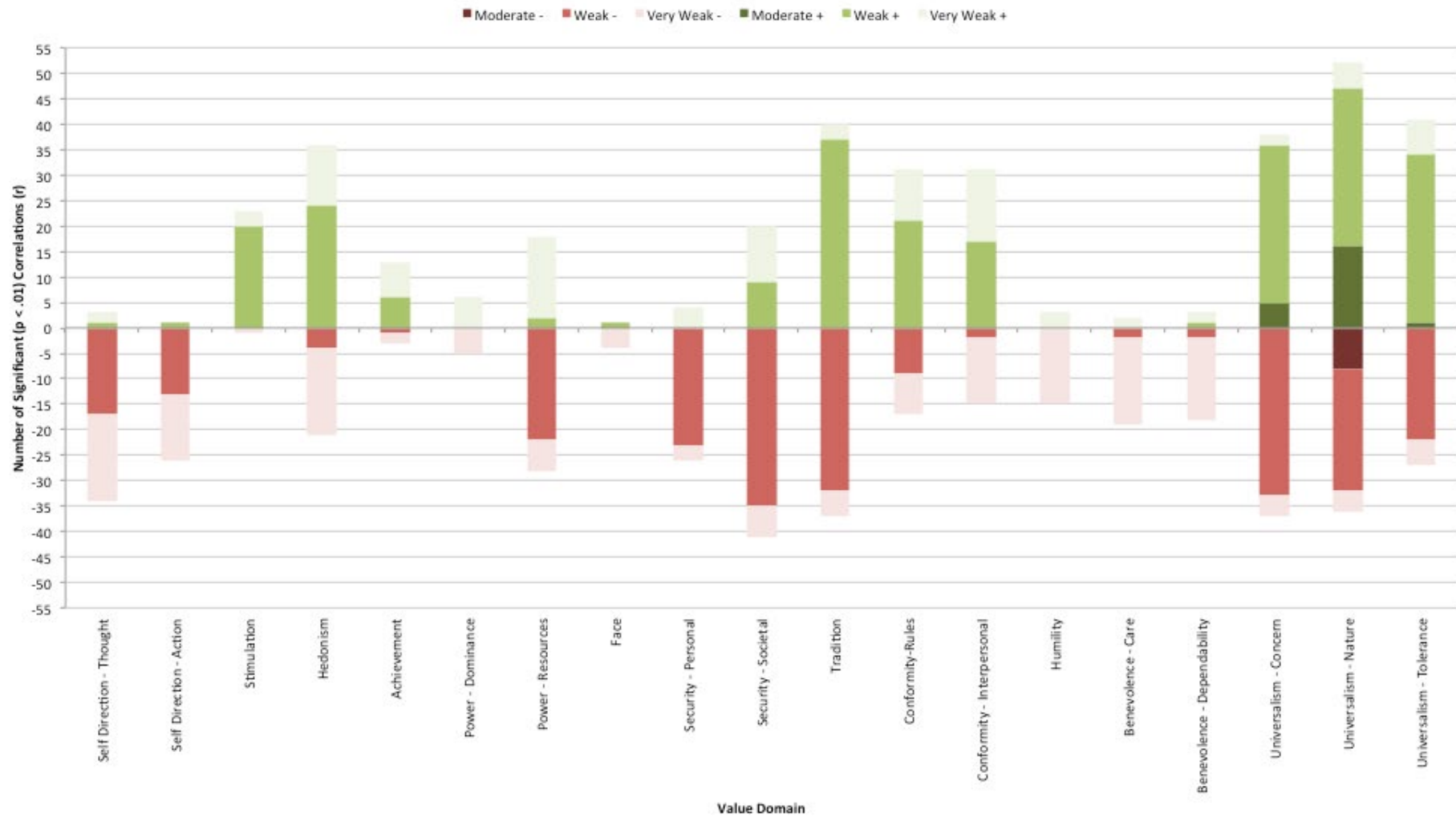
Figure 10. Correlation of the 19 PVQ-RR value domains with PAB variables

Table 8. Correlation of stakeholder scales

Stakeholder	1	2	3	4	5
1. *Environmental*	-				
2. *Commercial fishing*	-.164**	-			
3. *Recreational fishing*	-.135**	.211**	-		
4. *Public service*	.329**	.381**	.134**	-	
5. *Science & research*	.568**	.035	.009	.549**	-

*p < .05
**p < .01

Table 9. Correlation of stakeholder scales with selected individual stakeholders

Stakeholder	*Environmental*	*Commercial fishing*	*Recreational fishing*	*Public service*	*Science & research*
The academic	.619**	-.082**	-.142**	.422**	.688**
Universities	.564**	-.032	-.041	.437**	.751**
Department of Conservation (DoC)	.604**	.085**	-.052*	.575**	.564**
Maritime NZ	.118**	.254**	.305**	.511**	.309**
Fisheries New Zealand (FNZ)	-.005	.540**	.248**	.718**	.237**
Marine Stewardship Council (MSC)	.290**	.284**	.091*	.502**	.547**
NZ Sports Fishing Council	-.155**	.242**	.878**	.186**	.002
LegaSea	.212**	-.151**	.756**	.140**	.217**
Fish & Game	.261**	.138**	.405**	.288**	.292**
Your local iwi	.395**	.115**	-.021	.360**	.356**

*p < .05
**p < .01

The *Trust—environmental* scale correlated significantly ($p < .01$) with all other stakeholder scales and in nine of the 10 additional analyses with individual stakeholders. This suggested that trust in environmental stakeholders was consistently indicative of trust in other stakeholder groups. Trust in Fisheries NZ was the one variable that did not result in significant correlation ($p < .01$). *Trust—science & research* was the only trust scale that did not correlate significantly with the *Trust—commercial fishing* trust scale ($p < .01$). Correlation was also significant in 9 of the 10 additional analyses with individual stakeholders. Trust in Universities was the exception. *Trust—science & research* was the only stakeholder trust scale that did not correlate significantly with the *Trust—recreational*

65

fishing trust scale (*p* < .01), yet correlation was only significant (*p* < .01) in 6 of the 10 additional analyses between individual stakeholders and *Trust—recreational fishing*. Significant positive correlation (*p* < .01) resulted between the *Trust—public service* trust scale, all other stakeholder trust scales and all 10 additional analyses with individual stakeholders. Significant positive correlation (*p* < .01) also resulted in all analyses involving the *Trust—science & research* scale, except for non-significant relationships (*p* > .01) with the *Trust—commercial fishing* scale, the *Trust—recreational fishing* scale and the NZ Sports Fishing Council.

Table 10. Correlation of stakeholder scales with selected PAB scales

	Environmental	Commercial fishing	Recreational fishing	Public service	Science & research
Knowledge	-.129**	.042	.028	-.001	.030
Condition	-.374**	.421**	.185**	.117**	-.108**
Threat	.475**	-.301**	-.218**	-.038	.179**
Climate Change	.650**	-.208**	-.253**	.202**	.473**
Behaviour - fishing	-.318**	.057*	.297**	-.078**	-.153**
Behaviour - recreation	.084**	-.056*	.001	.045	.120**
Behaviour - volunteering	.135**	-.078**	-.086**	-.013	.083**
Behaviour - seafood	-.103**	.212**	.138**	.057*	-.047

*p < .05
**p < .01

The *Trust—environmental* trust scale correlated significantly with all 8 of the PAB scales, most notably *Perceived threat* and *Climate change* (and to a lesser extent, in the opposite direction, Perceived condition). The *Trust—commercial fishing* scale correlated significantly with 6 of the 8 PAB scales analysed, all but *Perceived knowledge* (*p* > .01) and *Behaviour - fishing* (*p* > .01).The *Trust—recreational fishing* scale also correlated significantly with 6 of the 8 PAB scales analysed, all but *Perceived knowledge* (*p* > .01) and *Behaviour - recreation* (*p* > .01). While the *Trust—public service* scale correlated significantly with all other trust variables, it only correlated significantly with 3 of the 8 PAB scales analysed. The *Trust— science & Research* scale correlated significantly with 6 of the 8 PAB scales analysed, all but *Perceived knowledge* (*p* > .01) and *Behaviour—seafood* (*p* > .01).

Table 11. Correlation of *Perceived threat*, *Perceived condition* and *Attitudes towards climate change* scales

| Stakeholder	1	2	3
1. Condition	-		
2. Threat	-.435**	-	
3. Climate Change	-.393**	.532**	-

*p < .05
**p < .01

Table 12. Correlation of selected PAB scales with the 19 PVQ-RR value domains

Value Domain	Knowledge	Condition	Threat	Climate change	Behaviour - fishing	Behaviour - recreation	Behaviour - volunteering	Behaviour - seafood	NEP
SDT	.059*	-.063*	-.054*	-0.046	-.064*	-.035	.017	-.052*	.090**
SDA	.011	-.021	-.051*	-.060*	-.046	.021	.036	-.065*	.057*
ST	.153**	.003	.012	.007	.212**	.286**	.130**	-.037	.052*
HE	.104**	.140**	-.102**	-.094**	.294**	.196**	.030	-.015	-.074**
AC	.080**	.045	-.027	-.014	.022	.108**	.046	-.063*	-.123**
POD	.030	.051*	-.038	-.051*	.068**	.075**	.054*	.010	-.104**
POR	-.054*	.099**	-.138**	-.130**	.061*	-.003	-.111**	.060*	-.219**
FA	-.064*	.012	.044	.032	-.062*	-.047	-.059*	.013	-.030
SEP	-.238**	.002	.038	-.029	-.227**	-.200**	-.162**	.035	-.014
SES	-.086**	.113**	-.072**	-.212**	-.005	-.176**	-.122**	.091**	-.166**
TR	.119**	.250**	-.136**	-.253**	.206**	-.060*	.004	.132**	-.268**
COR	.022	.134**	-.083**	-.100**	.033	-.105**	-.044	.063*	-.118**
COI	-.122**	-.008	-.012	.072**	-.079**	-.066**	-.086**	.011	-.02
HU	-.070**	-.088**	.040	.073**	-.077**	-.085**	-.032	-.071**	.114**
BEC	-.018	.052*	-.039	-.100**	.025	-.050*	-.069**	.016	-.064*
BED	.000	.027	-.079**	-.057*	.070**	-.030	-.037	.025	-.006
UNC	-.062*	-.282**	.210**	.324**	-.243**	-.057*	.035	-.022	.281**
UNN	.095**	-.382**	.359**	.389**	-.147**	.163**	.257**	-.169**	.514**
UNT	-.009	-.191**	.152**	.280**	-.136**	.055*	.096**	-.028	.218**

*p < .05
**p < .01

Figure 11. Correlation of condition, threat, and climate change scales with the 19 PVQ-RR value domains
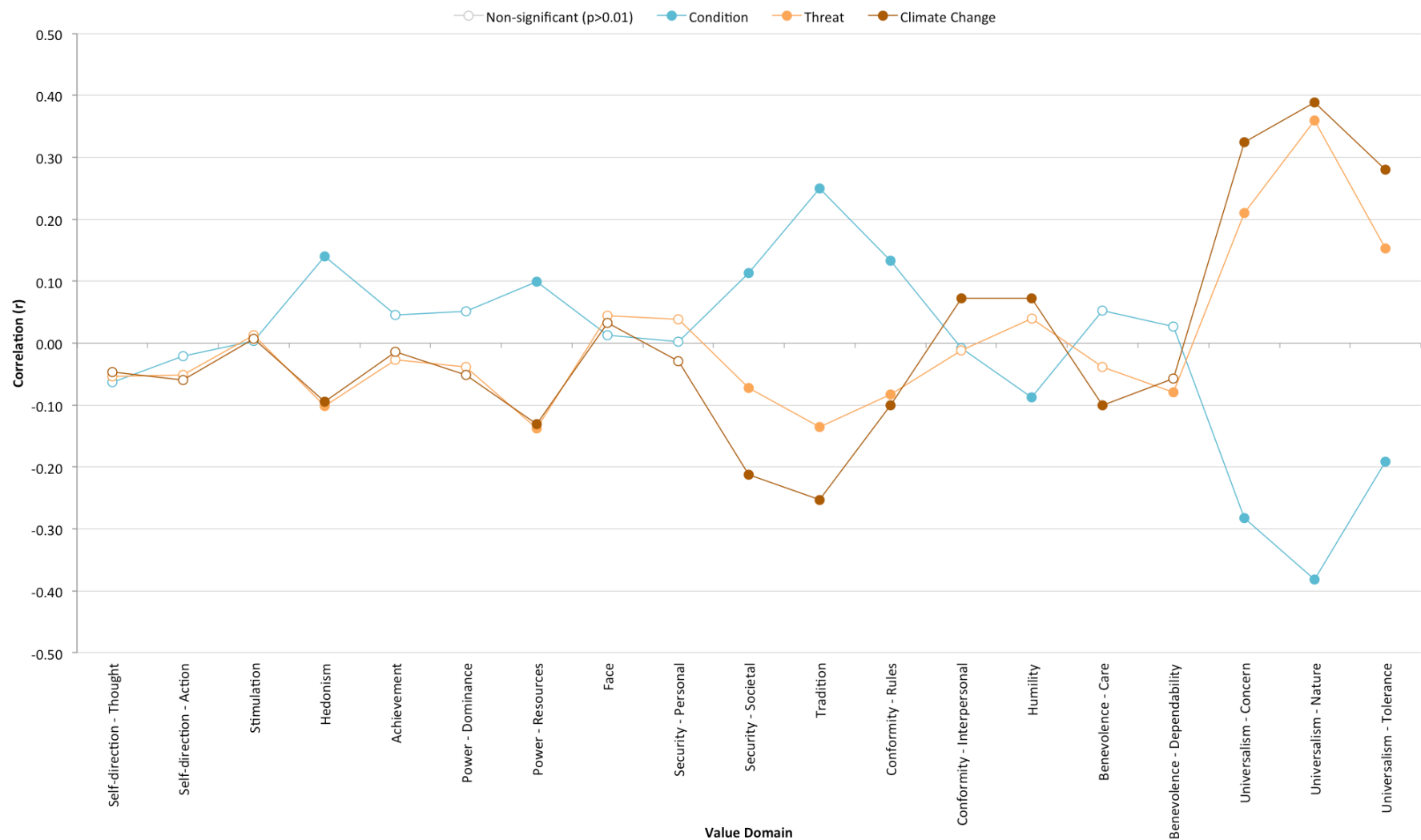
A significant ($p < .01$) medium negative correlation ($r = -.435$) between the *Perceived condition* and *Perceived threat* scales indicated an inverse relationship between the two variables—respondents who considered environmental conditions to be poor tended to be more concerned about threats to the environment and vice versa. A significant ($p < .01$) yet weaker medium negative correlation ($r = -.393$) was seen between the *Perceived condition* and *Attitudes towards climate change* scales. Unsurprisingly, a significant ($p < .01$) strong positive correlation ($r = .532$) was found between the *Perceived threat* and *Attitudes towards climate change* scales.

Analysis of correlations between each of the 19 value domains and the *Perceived condition, Perceived threat* and *Attitudes towards climate change* scales saw these relationships highlighted in some value domains but absent in others. Significant correlation was seen across all three scales in the Value domains of HE, *PO, SES, TR, COR, UNC, UNN* and *UNT.* Perhaps surprisingly, given the correlations seen between the three scales, the *Attitudes towards climate change* scale displayed much larger divergence from the *Perceived condition* scale across several variables (*SES, TR, UC* and *UT*).
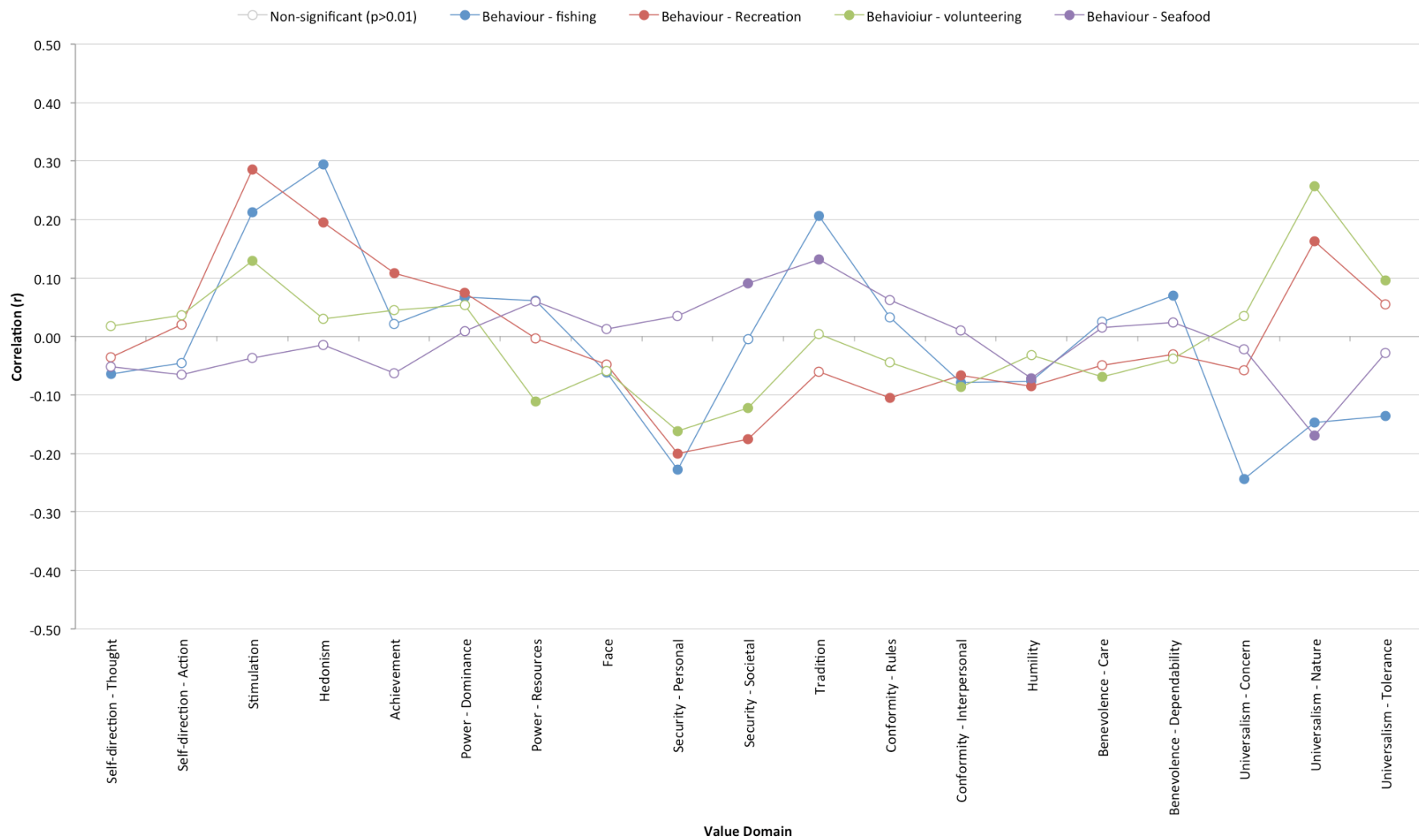
Figure 12. Correlation of the behaviour scales with the 19 PVQ-RR value domains

Correlation between the four behaviour scales and the 19 value domains produced results that were notably different to those from both the perception and attitude correlations with the 19 value domains. *UNN* was still a divisive value, correlating positively with the *Behaviour — recreation* ($r = 0.16$, $p < .01$) and *Behaviour — volunteering* ($r = 0.26$, $p < .01$) scales but negatively with the *Behaviour — fishing* ($r = -.15$, $p < .01$) and *Behaviour — seafood* ($r = -.17$, $p < .01$) scales. *UNT* correlated positively with the *Behaviour — volunteering* ($r = .10$, $p < .01$) scale and negatively with the *Behaviour — fishing* ($r = .14$, $p < .01$) scale. *Behaviour — fishing* ($r = -.24$, $p < .01$) was the only scale to correlate with *UNC*. The *Behaviour — seafood* sale correlated significantly with *TR* ($r = .13$, $p < .01$), *SES* ($r = .09$, $p < .01$), and *HU* ($r = .07$, $p < .01$) but indicated few similarities or differences with the associations of the other behaviour scales. With the exception of *UNN*, the other 3 behaviour scales were rarely antagonistic in their correlation with the 19 value domains. The scales shared close similar associations with a number of variables, notably *ST* and *SEP*. *ST* correlated positively with the *Behaviour — fishing* ($r = .21$, $p < .01$), *Behaviour — recreation* ($r = .29$, $p < .01$) and *Behaviour — volunteering* ($r = .13$, $p < .01$) scales. *HE* also correlated positively with the *Behaviour — fishing* ($r = .29$, $p < .01$) and *Behaviour — recreation* ($r = .20$, $p < .01$) scales. *SEP* correlated negatively with the *Behaviour — fishing* ($r = -.23$, $p < .01$), *Behaviour — recreation* ($r = -.20$, $p < .01$) and *Behaviour — volunteering* ($r = -0.16$, $p < .01$) scales. *SES* also correlated negatively with the *Behaviour — recreation* ($r = .??$, $p < .01$) and *Behaviour — volunteering* ($r = .??$, $p < .01$) scales. Although weak, *COI* also correlated negatively with the three scales; *Behaviour — fishing* ($r = .??$, $p < .01$), *Behaviour — recreation* ($r = .??$, $p < .01$) and *Behaviour — volunteering* ($r = .??$, $p < .01$). Positive correlations between *TR* and the *Behaviour — fishing* ($r = .21$, $p < .01$) and *Behaviour — Seafood* ($r = .13$, p $< .01$) scales were also notable.

Table 13. Correlation of stakeholder scales with the 19 PVQ-RR value domains

| Value Domain	Environmental	Commercial fishing	Recreational fishing	Public service	Science & research
SDT	-.074**	-.136**	-.106**	-.201**	-.062*
SDA	-.048	-.136**	-.090**	-.186**	-.044
ST	-.005	-.042	-.001	-.054*	.020
HE	-.101**	.022	.182**	-.001	-.023
AC	-.038	.056*	-.017	.085**	.031
POD	-.060*	.024	-.004	-.010	-.025
POR	-.158**	.101**	.066**	.034	-.066**
FA	-.005	.020	-.022	.021	.006
SEP	.035	.025	-.025	.060*	.009
SES	-.202**	.051*	.156**	-.094**	-.157**
TR	-.236**	.212**	.221**	-.044	-.213**
COR	-.111**	.176**	.089**	.130**	-.010
COI	.103**	.095**	.007	.177**	.096**
HU	.069**	-.068**	-.048	-.013	-.011
BEC	-.097**	-.007	.055*	-.048	-.069**
BED	-.087**	-.014	.045	-.071**	.000
UNC	.330**	-.188**	-.208**	.052*	.185**
UNN	.441**	-.302**	-.242**	-.057*	.211**
UNT	.269**	-.061*	-.158**	.091**	.143**

*$p < .05$
**$p < .01$
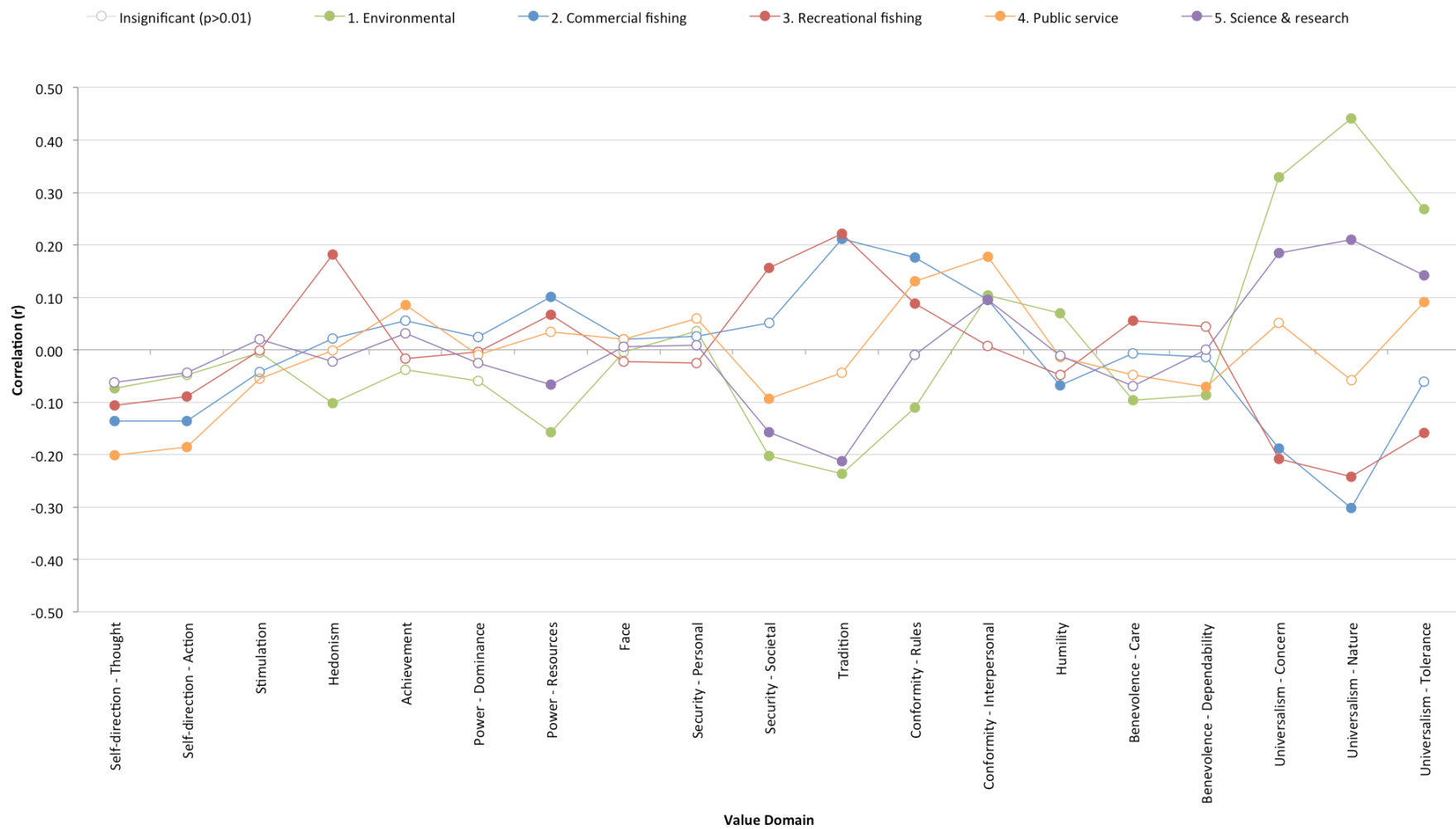
Figure 13. Correlation of stakeholder scales with the 19 PVQ-RR value domains

Correlation of the 5 stakeholder trust scales and the 19 value domains showed several areas of divergence. *UNN* produced a clear separation of the *Environmental* ($r = .44$, $p < .01$) and *Science & research* ($r = .21$, $p < .01$) trust scales from the *Commercial fishing* ($r = -.30$, $p < .01$) and *Recreational fishing* ($r = -.21$, $p < .01$) trust scales. This divergence was also present in the adjacent *UNC* and *UNT* value domains. *TR* produced divergence between the same scales but in opposite directions. The *Environmental* ($r = -.24$, $p < .01$) and *Science & research* ($r = -0.22$, $p < .01$) trust scales diverged from the *Commercial fishing* ($r = .21$, $p < .01$) and *Recreational fishing* ($r = .22$, $p < .01$) trust scales. This divergence was also seen in the adjacent *SES* and *COR* value domains. Although weaker, *POR* also produced the same divergence between stakeholder trust scales. The *Environmental* ($r = -.16$, $p < .01$) and *Science & research* ($r = -.07$, $p < .01$) trust scales diverged from the *Commercial fishing* ($r = .10$, $p < .01$) and *Recreational fishing* ($r = .07$, $p < .01$) trust scales. The *Environmental* and *Recreational fishing* trust scales also diverged in the *HE* and *BEC* value domains. The *Public service* trust scale tended not to align consistently with any of the other scales. Of all 5 scales, it correlated most negatively with the values of *SDT* ($r = -.20$, $p < .01$) and *SDA* ($r = -.19$, $p < .01$), and most positively with the values of *AC* ($r = .09$, $p < .01$) and *COI* ($r = .18$, $p < .01$).

UN values correlated positively with the revised *NEP*, with *UNN* ($r = .51$, $p < .01$), *UNC* ($r = .28$, $p < .01$), *UNT*, the three largest positive correlations. These were balanced by negative correlation with *TR* ($r = -.27$, $p < .01$) and *POR* ($r = -.22$, $p < .01$) and *SES* ($r = -.17$, $p < .01$). A further 6 value domains: *AC* ($r = -.12$, $p < .01$); *COR* ($r = -.12$, $p < .01$); *HU* ($r = .11$, $p < .01$); *POD* ($r = -.10$, $p < .01$); *SDT* ($r = .09$, $p < .01$); and *HE* ($r = .07$, $p < .01$), exhibited significant correlation with the *NEP* at weaker levels.
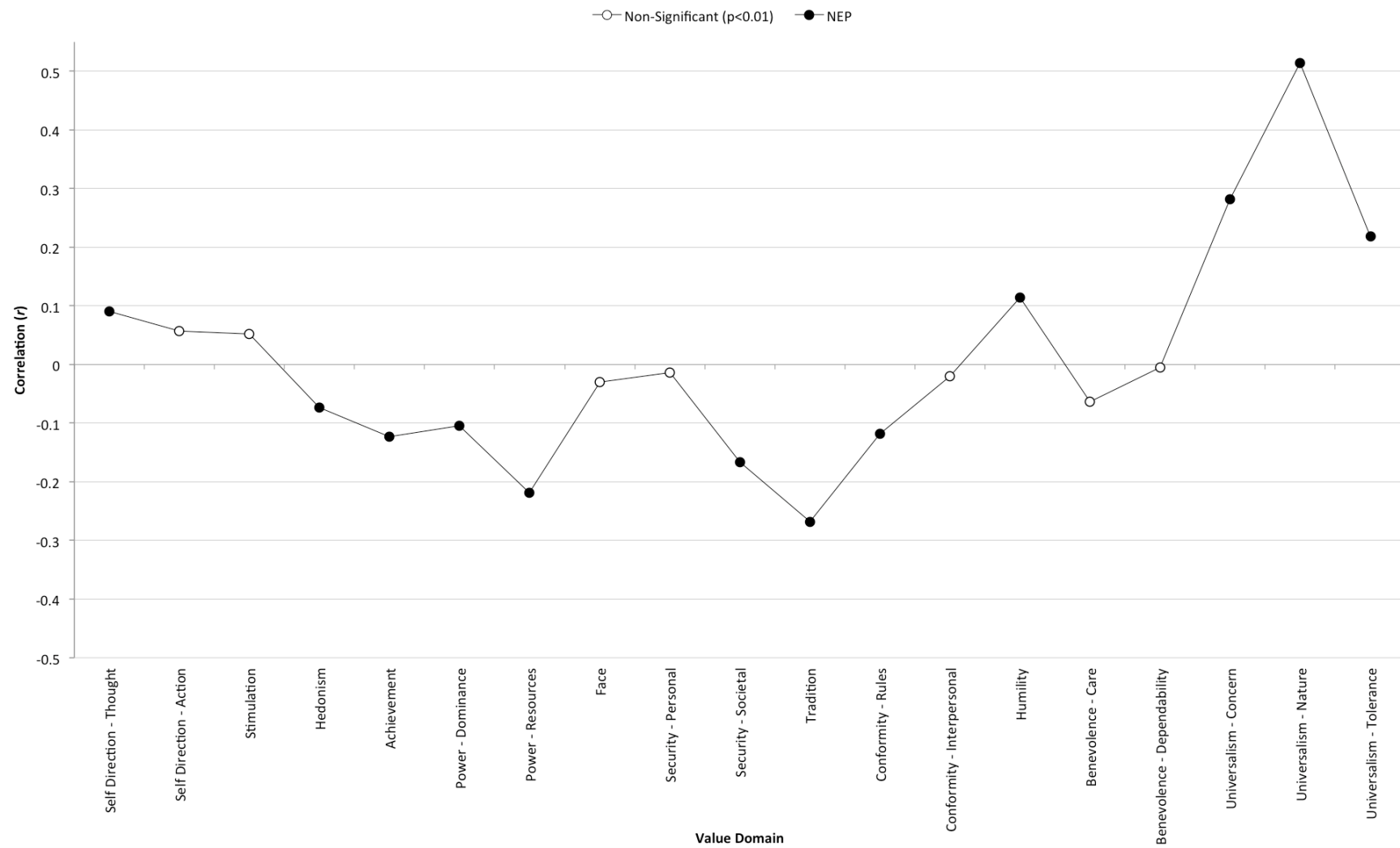
Figure 14. Mean *NEP* score correlation with the 19 PVQ-RR value domains

Bivariate correlation between the mean *NEP* score of individuals and their 19 value domain scores showed large correlations with *UNN* ($r = .51$) and small correlation with both *UNC* ($r = .28$) and *UNT* ($r = .22$). The correlation with the original *UN* domain was of medium size ($r = .44$). *HU* ($r = .11$) and *SDT* ($r = .09$) were the only other value domain to demonstrate positive significant ($p < .01$) correlation with Mean *NEP* scores.

This positive correlation was offset by small negative correlation in two groups of values domains, the first comprising *TR* ($r = -.27$), *SES* ($r = -.17$), and *COR* ($r = -.12$), and the second comprising *POR* ($r = .22$), *POD* ($r = .10$) and *AC* ($r = .12$), and potentially *HE* ($r = .07$).

4.7   Regression Analysis

The 19 value domains combined to significantly ($p < .001$) predict all three perception and attitude scales and the *Climate Change* scale, explaining at least a third (*Knowledge*) and as much as half (*Climate Change*) of the PAB scale variance. While correlation provides a measure of the relationship between individual value domains and PABs, regression analysis enables us to determine how much of the variance seen in individual PABs can potentially be explained by value domains as a whole, and also the relative contribution of each individual value domain in explaining this variance. This is important given that individuals are likely to prioritise values that are closely aligned with one another on the values circumplex. For example, if *tradition* values were a strong causal factor of a certain attitude (perhaps that businesses should close to observe religious holidays) then it is probable that *conformity* values would also correlate positively with this attitude, even if they had little influence on the formation of the attitude.

In this analysis, multiple linear regression indicated a collective significant effect between the 19 value domains (as a whole) and each of the 14 scales tested as dependent variables.

Table 14. Regression analysis of 19 value domains as predictors of PAB scales

Value Domain	Knowledge		Condition		Threat		Climate change	
	B	β	B	β	B	β	B	β
SDT	.096	.101**	-.008	-.007	-.034	-.044	-.113	-.052
SDA	-.026	-.028	.062	.060	-.040	-.055	-.149	-.072*
ST	.037	.053	.013	.016	.015	.028	-.040	-.025
HE	.073	.100**	.110	.131**	-.044	-.076*	-.072	-.043
AC	.067	.088**	.019	.022	-.009	-.014	.019	.011
POD	.035	.045	.007	.007	.040	.062*	.070	.039
POR	-.035	-.045	-.019	-.022	-.022	-.035	.025	.014
FA	-.013	-.020	-.027	-.036	.052	.101**	.122	.083**
SEP	-.182	-.225**	-.020	-.021	.053	.082**	.011	.006
SES	-.062	-.088**	.023	.029	-.005	-.009	-.188	-.117**
TR	.103	.183**	.113	.176**	-.030	-.066*	-.218	-.170**
COR	.066	.114**	.064	.096**	-.028	-.060*	-.048	-.036
COI	-.039	-.064*	-.004	-.005	-.024	-.048	.046	.032
HU	-.024	-.031	-.014	-.015	.013	.021	.001	.001
BEC	.016	.018	.085	.084**	-.011	-.015	-.236	-.118**
BED	.009	.010	.013	.013	-.073	-.100**	-.019	-.009
UNC	-.016	-.022	-.110	-.127**	.057	.095**	.285	.166**
UNN	.124	.158**	-.282	-.310**	.225	.356**	.591	.329**
UNT	-.015	-.020	-.020	-.024	.031	.053	.244	.145**
Constant	2.134		2.717		2.678		4.084	
Multiple R	.379		.465		.443		.533	
$R^2_{adjusted}$	.133		.207		.186		.275	
$F(19,1547) =$	13.64		22.42		19.88		32.34	

*$p < .05$
**$p < .01$

Table 15. Regression analysis of 19 value domains as predictors of trust in stakeholder scales

Value Domain	Environmental		Commercial fishing		Recreational fishing		Public service		Science & research	
	B	β	B	β	B	β	B	β	B	β
SDT	-.109	-.077**	.008	.007	-.007	-.007	-.074	-.074*	-.042	-.040
SDA	-.033	-.025	-.038	-.038	-.003	-.003	-.079	-.085**	-.030	-.029
ST	-.024	-.023	.029	.038	-.027	-.034	-.006	-.008	.012	.015
HE	-.050	-.046	.012	.015	.192	.223**	.030	.040	.004	.005
AC	-.004	-.003	.048	.057	-.039	-.044	.104	.131**	.033	.038
POD	.076	.065*	.009	.011	.005	.005	.024	.029	.039	.044
POR	.003	.002	.055	.064*	.059	.065*	.053	.066*	.019	.022
FA	.019	.020	-.038	-.052	-.044	-.058	-.043	-.065*	-.010	-.014
SEP	.109	.091**	.009	.010	-.067	-.070*	.048	.057	.030	.032
SES	-.121	-.117**	-.002	-.002	.087	.104**	-.060	-.082**	-.083	-.106**
TR	-.116	-.139**	.086	.136**	.104	.156**	-.054	-.092**	-.119	-.189**
COR	-.063	-.074**	.088	.135**	.035	.051	.085	.142**	.037	.056
COI	.077	.085**	.051	.074*	.010	.014	.083	.130**	.071	.102**
HU	-.003	-.003	-.014	-.016	.021	.024	-.003	-.003	-.050	-.058*
BEC	-.125	-.096**	.016	.016	.080	.077*	-.015	-.016	-.084	-.085**
BED	-.075	-.056	.003	.003	.047	.044	-.032	-.034	.075	.073*
UNC	.184	.164**	-.079	-.094**	-.057	-.063	.056	.072*	.116	.136**
UNN	.469	.402**	-.207	-.234**	-.116	-.124**	-.037	-.045	.162	.182**
UNT	.125	.114**	.090	.109**	-.042	-.048	.099	.130**	.042	.050
Constant	1.569		2.109		2.214		2.159		2.795	
Multiple *R*	.576		.386		.405		.350		.374	
$R^2_{adjusted}$	.324		.139		.154		.112		.129	
F(19,1547) =	40.45		14.28		15.97		11.35		11.35	

*p < .05
**p < .01

The 19 value domains combined to significantly (*p* < .001) predict all five stakeholder trust scales, explaining at least a third (*Public service*) and as much as half (*Environmental*) of the PAB scale variance.

Table 16. Regression analysis of 19 value domains as predictors of *NEP* and behaviour scales

Value Domain	*Fishing*		*Recreation*		*Volunteering*		*Seafood*		*NEP*	
	B	β	B	β	B	β	B	β	B	β
SDT	-.057	-.054	-.086	-.084**	-.034	-.022	.032	.022	.027	.028
SDA	-.017	-.017	.017	.017	.041	.028	-.045	-.032	-.030	-.032
ST	.087	.114**	.128	.174**	.048	.044	.045	.043	.010	.014
HE	.217	.268**	.096	.123**	.028	.024	-.009	-.008	-.026	-.036
AC	-.051	-.061	.031	.039	.069	.056	-.143	-.124**	-.091	-.118**
POD	.025	.029	.073	.086**	.152	.119**	.026	.021	.001	.002
POR	.001	.002	-.018	-.022	-.133	-.107**	.103	.088**	-.031	-.040
FA	-.034	-.047	-.023	-.033	-.013	-.012	.005	.005	.052	.079**
SEP	-.200	-.224**	-.103	-.119**	-.156	-.120**	.037	.030	.039	.047
SES	-.034	-.044	-.096	-.127**	-.084	-.074*	.060	.056	-.074	-.104**
TR	.118	.190**	-.001	-.002	.076	.084**	.086	.101**	-.092	-.163**
COR	.058	.090**	.005	.008	.024	.026	.031	.035	-.026	-.044
COI	-.035	-.051	-.003	-.004	-.044	-.044	-.010	-.011	-.017	-.027
HU	-.017	-.019	-.034	-.041	-.033	-.027	-.099	-.085**	.022	.029
BEC	.044	.046	.006	.006	-.062	-.044	-.012	-.009	-.093	-.105**
BED	.127	.126**	.026	.027	-.027	-.018	.060	.043	.013	.014
UNC	-.112	-.133**	-.084	-.104**	-.056	-.046	.102	.088*	.055	.072*
UNN	-.048	-.055*	.161	.191**	.354	.278**	-.184	-.152**	.373	.466**
UNT	-.034	-.042	.070	.089**	.093	.078*	.027	.024	.016	.021
Constant	1.455		1.257		-.217		2.758		2.981	
Multiple *R*	.477		.405		.364		.246		.572	
$R^2_{adjusted}$	.218		.154		.122		.049		.318	
F(19,1547) =	24.00		16.02		12.43		5.23		39.51	

*p < .05
**p < .01

The 19 value domains (*p < .001*) predicted all four *Behaviour* scales and the *NEP*, explaining roughly one quarter (*Behaviour — seafood*) to roughly one half (*Behaviour — fishing*) of the *Behaviour* scale variance and over one half of the *NEP* variance.

Chapter 5: Discussion

The results of this research support the hypothesis (H_1) that there is a relationship between human values and perceptions, attitudes and behaviours (PABs) towards the New Zealand marine environment. Significant relationships were identified between all 19 refined value domains in the Theory of Basic Human Values (Schwartz, 2012) and PABs towards the NZ marine environment. These associations determined values to consistently predict PABs towards the NZ marine environment and established every value domain as relevant. The number and strength of significant relationships varied, with certain values appearing to be of greater relevance than others. This was not unexpected, given variation seen in other values-based research and the inherent link between certain motivational goals and aspects of the marine environment, e.g. excitement, novelty and change (the motivational goals of *ST* values) and the wild and unpredictable nature of the marine environment. The clear associations identified support the consideration of values in any process concerned with or affected by PABs towards the NZ marine environment. Insights into the motivations that underlie PABs towards the NZ marine environment can be used to improve communication and engagement, potentially resulting in improved cooperation between stakeholders. The variation in some PABs towards the NZ marine environment (e.g. *Perceived threat*) demonstrates, at least in part, why improved cooperation is necessary.

5.1   Perceptions, Attitudes and Behaviours

5.1.1   Perceptions

Perceived knowledge

Respondents' perceived knowledge of general environmental issues was high, in comparison with the 2019 Public Perceptions of New Zealand's Environment (PPNZE) survey (Hughey et al., 2020). This was unsurprising, given a sample population that was both highly educated (compared with the NZ population) and very engaged with the marine environment. Self-selected respondents were also be expected to have a greater interest in (and therefore knowledge of) the marine environment. The large number of respondents with marine-related qualifications appeared to be evidence of this. The results provided a clear indication of the areas respondents perceived themselves to be more or less knowledgeable in and suggested a sample population who were confident in their PABs towards the NZ marine environment.

However, self-reported knowledge is likely an imprecise measure of knowledge at the individual level and an unreliable gauge of expertise (Snibsøer et al., 2018). A range of cognitive biases, such as the Dunning-Kruger Effect (Kruger & Dunning, 1999) and various forms of illusory superiority (Hoorens, 1993) will ensure response bias (Wetzel et al., 2017). In a scientific context, data provided by non-scientists can prove inconsistent and unreliable but also invaluable. Respondents who lack formal training in disciplines of direct relevance to the marine environment would, in many cases, still hold extensive knowledge and experience from working and spending time in the marine environment. A nuanced understanding of specific issues and practices can demand first-hand experience, yet proximity does not ensure accuracy and increases subjectivity, which is why "...conventional notions of objectivity assume distance..." (Oreskes, 2019).

While the most prominent group of respondents held a broad level of perceived knowledge across marine issues, others had specific perceived expertise in two areas, described here as *Māori-centric* and *environmental issue-centric* knowledge. The *Māori-centric* component centred on the Treaty of Waitangi and Mātauranga Māori and was reinforced with perceived knowledge of the Māori Fisheries Settlement and the NZ Quota Management System. The *environmental issue-centric* component centred on environmental issues (both general and marine) and was reinforced with perceived knowledge of marine and fisheries science. While respondents perceived knowledge of The Treaty of Waitangi rated fifth-highest of the twelve knowledge items, the Māori Fisheries Settlement and Mātauranga Māori rated eleventh and twelfth respectively. Furthermore, The Treaty of Waitangi, the Māori Fisheries Settlement and Mātauranga Māori recorded the highest number of 'Don't know' responses, reinforcing this lack of awareness.

A lack of knowledge and awareness regarding these issues is problematic as the Treaty of Waitangi, the Māori Fisheries Settlement and Mātauranga Māori are all of central importance to the recent history and current management of NZ's marine environment. The Māori Fisheries Settlement, which addressed Crown breaches of The Treaty of Waitangi, is of central importance to the NZ QMS—the system that underpins the management of NZ's fisheries and has wide-ranging implications for the broader NZ marine environment. While the concept of mātauranga Māori may not be as widely known as the Treaty of Waitangi, or the Māori Fisheries Settlement, its principles and practices have been incorporated into

existing management frameworks and are increasingly being embraced by stakeholder organisations—notably in the public service (Te Puni Kōkiri, 2020) and science & research communities (Broughton et al., 2015). Knowledge of mātauranga Māori is important in understanding Māori perspectives on the sustainable use, management and conservation of the marine environment. Ignorance of the connection between Māori and the marine environment, the history of Māori and the marine environment, and the importance of Māori to the kaitiakitanga of the NZ marine environment appears to be a substantial issue.

Perceived condition

NZ was viewed favourably in all three components gauging both global and national condition (the natural environment, the marine environment, and marine fish stocks). However, NZ's natural environment, coastlines and marine fisheries were all considered to be in worse condition in the NZMVS than in the PPNZE (Hughey et al., 2020). Negative perceptions of current environmental conditions were likely due, at least in part, to the prevalence of respondents who held ecological worldviews, with medium negative correlations seen between the *NEP* and each perceived condition variable.

NZ's coastlines were considered to be in the better condition than any other environmental component, while NZ's freshwater environments (rivers, lakes, groundwater) were perceived to be in worse condition than any other aspect of the NZ environment and in poorer condition than the global natural environment. This was unsurprising, given regular coverage of the poor state of NZ's freshwater environments by mainstream media in recent years (NZ Herald, 2011), with declining freshwater quality being discussed hand-in-hand with the environmental impacts of NZ's dairy industry (stuff.co.nz, 2018). Many of the issues faced by NZ's freshwater environments (e.g. sedimentation and nutrient/chemical run-off) also affect NZ's coastlines (often as a direct result of freshwater outflows) and many of the potential solutions are also highly contingent on human dimensions.

Perceived threat

In line with the rest of NZ (Colmar Brunton, 2020), respondents' considered plastic pollution as the greatest threat to the marine environment. Nutrient/chemical run-off, closely associated with the state of NZ's freshwater environments, was considered the second greatest threat to

the marine environment. These findings were unsurprising as numerous political campaigns and extensive media coverage have placed both of these issues top-of-mind for many New Zealanders. Both issues are also largely terrestrial in origin[40], making them less controversial and less partisan within the marine environment. In the context of research into the assimilation of new information (CCF, 2016), threats that conflict with the PABs (or values) of an individual are more likely to be minimised or dismissed, in order to maintain a consistent worldview. Conversely, threats that do not conflict with the PABs (or values) of an individual are more likely to be embraced, as they face fewer cognitive barriers to acceptance.

The three groups identified in analysis of the perceived threat variables communicated clear themes, offering an indication of different perspectives within the sample population. The first group did not consider climate change or fishing as prominent threats but instead focused on the threats of pollution, invasive species and non-renewable resource extraction. The second group was largely the inverse, concerned predominantly with the threat of fishing but also climate change, and the third group focused primarily on the threat of climate change. These components suggested respondents' views on the threats posed by climate change and fishing (both commercial and recreational) were a source of substantial division.

In testing the VBN theory, Slimak and Dietz (2006) found the *NEP* and Schwartz's altruism to be the most consistent predictors of risk rankings. Indeed, in this research the *NEP* correlated strongly with all 6 climate change variables and significantly with 11 of the 12 perceived threat variables[41]. These findings provided evidence of the expected relationship between *awareness of adverse consequences* (*AC*) and the *NEP*. The *NEP* correlated weakly with 2 of the 3 value domains representative of Schwartz's altruism (*UNT* and *UNC* but not *BEC*). Perhaps the most noticeable of the relationships involving perceived threats were those involving variables of perceived condition.

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[40] Approximately 70–80% of marine plastic pollution originates from terrestrial sources (Ritchie, 2018).
[41] Māori customary fishing was the only insignificant variable and was also considered the threat of least concern, accurately communicating the insignificant risk that it poses to the NZ marine environment.

Threat condition antagonism

Consistent negative correlation existed between perceived condition variables and perceived threat variables—as the perceived condition of the environment decreased, the gravity of perceived threats to the environment increased and vice versa. Significant negative correlation was seen between all perceived condition variables and every perceived threat variables, except for five *sewage* and all 12 *Māori customary fishing* variables, and between all perceived condition variables and every climate change variable. Furthermore, the value domains that correlated with the *Perceived threat* and *Perceived condition* scales did so in a highly antagonistic manner (*Table 12* & *Figure 11*). This antagonistic relationship was even more diametric between the *Perceived threat* and *Attitudes towards climate change* scales. These differences were reflected most strongly across the three *UN* value domains, *TR*, *SES*, *HE*, *POR*, *COR*, and *HU*. A sinusoidal relationship between the variables was also indicative of the theory underlying the values circumplex, although the strongest axis of variation was between the higher order value domains of *Conservation* and *Self-transcendence*.

This threat-condition antagonism may seem expected, if not inevitable, but the presence of these relationships warrants further consideration. The effect is unsurprising given that environmental conditions could be expected to have been deteriorated by the presence of persistent threats, yet the disparities appear to represent contrasting optimism and pessimism towards the marine environment. This is highlighted by the stronger correlations seen in the relationships with climate change variables. Although climate change undoubtedly poses a huge threat to the marine environment, the worst effects of climate change have yet to occur. In this respect, there would appear to be little reason for climate change to correlate negatively with perceived conditions, yet consistent negative correlation was seen between *Attitudes towards climate change* and all perceived condition variables.

5.1.2   Attitudes

Attitudes towards climate change

Attitudes towards climate change skewed strongly towards agreement about the reality of anthropogenic climate change as a threat to the marine environment. However, comparison with recent research (stuff.co.nz, 2019; Kerr, 2020) suggests that New Zealanders who do not

believe climate change is caused by humans were over-represented (17.7% versus 12.7%) while those who were unsure (6.0% versus 7.9%) and those who agreed that climate change is caused by humans (76.3% versus 79.5%) were both slightly underrepresented.

Trust

Trust is an attitude that reflects the "reliance on or confidence in the dependability of someone or something" (APA, 2020d). Trust can be held towards an individual, an organisation, or even more abstract entities (e.g. trust in science) and reflects a belief or expectation that an entity is trustworthy, where "…ideally, those whom we trust will be trustworthy, and those who are trustworthy will be trusted" (McLeod, 2015). Trust is integral to the social success of both individuals and organisations within society, and to society as a whole, as it facilitates effective cooperation (Hosmer, 1995). Paired with the media cycle, trust in stakeholder organisations has been shown to predict public support (Marques et al., 2015). Furthermore, "Individuals are more likely to adhere to messages and information from sources they trust and discount the information from sources they distrust" (MacDonald et al., 2020, p. 4; Williams, 2001).

In respect to generic stakeholders, respondents to the NZMVS trusted *the scientist* and *research institutes* most and *the commercial fisher* and *commercial fishing companies* least. Commercial fishing was not held in high regard by respondents, as the two generic and five specific commercial fishing stakeholders took seven of the bottom eight places after ranking all stakeholder items by score (see Appendix x), only above Fonterra—the lowest of all ranked stakeholders. Similarly, the public service was poorly regarded by respondents, with the two generic and three specific (excluding the Department of Conservation and the Ministry for the Environment) governmental stakeholders ranked just ahead of the commercial fishing stakeholders. The remaining stakeholders were less segmented in their distribution among the rankings. Given the non-representative sample, trust held in specific organisations relative to similar organisations is possibly of greatest interest in interpreting these results.

Devos, Spini & Schwartz (2002) predicted and confirmed that levels of trust in institutions correlated positively with values relating to stability, protection, and preservation of traditional practices, and negatively with values relating to independent thought and action

and values favouring change. Their research also found trust in institutions was greater in left-wing supporters than right-wing supporters.

5.1.3 Behaviour

The consumption of seafood was the most common marine related behaviour undertaken by respondents to the survey, with the purchasing of seafood the third most common behaviour. Spending time at the beach/coast was the most common means of direct interaction with the marine environment and the second most common marine related behaviour overall. Two broad groups were identified in the behaviours of respondents, the first generally consisting of fishing related behaviours and the second of non-fishing marine recreation behaviours. Two narrow components were also identified, the first limited to volunteering in the marine environment and the second to the consumption and purchasing of seafood.

5.2   Value Domains

Values are just one of many factors that influence people's PABs but they are of particular interest because of their influence on other relevant variables and because they are often overlooked when attempting to understand people's PABs. In this respect, their importance should be considered relative to the extent that people's PABs are of concern. The importance of values is itself remarkable, given the power and prominence of other influential factors in the formation of people's PABs (e.g. environmental and socio-economic factors). Interpreting each of the 19 value domains in respect to their influence on PABs towards the NZ marine environment requires more than a simple consideration of effect size. This is because some of the significant relationships are especially intuitive while others are rather ambiguous. Interpretation of the results need occur in the context of a specific understanding of both values theory and the NZ marine environment, which is why effect size was not of primary concern to this discussion.

By way of example, the 19 refined value domains explained 57% of the total *NEP* variance, and while *UNN* was the strongest predictor of this variance, the fact that being motivated by the *preservation of nature* (Schwartz et al., 2012) predicts an ecological worldview is unlikely to be of any particular surprise, interest or use. Asymmetrically, *FAC* was the weakest significant predictor of the *NEP*, yet the fact that being motivated by *security and*

power through maintaining one's public image and avoiding humiliation (Schwartz et al., 2012) predicts, and is the only other refined value domain besides *UNN* that positively predicts, an ecological worldview could potentially be of surprise, interest or use. This dynamic—the presence of (and intended focus on) interesting albeit weak predictors in the company of relatively strong albeit uninteresting predictors—was another reason for the adoption of a low significance level (a = .01). The following discussion provides an overview and interpretation of each value domain, in the context of values theory and the NZ marine environment, beginning with analysis of how well the results of this research aligned with the expectations of values theory.

The results of this research support the idea that values influence ecological worldviews and environmental concern, yet the importance of the specific value domains postulated by Stern (2000) and Bouman et al. (2018) varied between analyses. Where relevant, bivariate correlation provided strong support for values relationships of the VBN model, with *Biospheric* (represented by the *UNN* value domain), *Altruistic* (represented by the *UNT*, *UNC* and *BEC* value domains), *Egoistic* (represented by the *POD*, *POR* and *AC* value domains) and *Hedonic* values (represented by the *HE* value domain) all correlating significantly with the *NEP*, except for *BEC*, and all correlating in the expected direction. However, regression analysis provided far weaker support for the model.

Biospheric values are synonymous with *UNN* values, which pertain to concern for the protection of nature (Schwartz, 2012). Results strongly supported their role underpinning ecological worldviews and concern for the environment (at least to the extent that *Perceived threat* is a proxy for concern), with *UNN* being the only value domain to successfully predict the *NEP* (positively) of the four *Self-transcendence* value domains stipulated. *UNN* values were the strongest predictor of the *NEP* and other scales considered to be of relevance to an ecological worldview (*Perceived condition*; *Perceived threat*; *Attitudes towards climate change*; *Trust—environmental*).

Altruistic values were poor predictors of these same scales. Neither *UNT* nor *UNC* predicted the *NEP* at the *p* < .01 significance level, although both predicted the *Trust—environmental* and *Attitude towards climate change* scales and *UNC* predicted the *Perceived condition* (negatively) and *Perceived threat* scales. Unexpectedly, *BEC* proved to be a significant negative predictor of the *NEP*, *Trust—environmental* and *Attitude towards climate change*

scales and a positive predictor of the *Perceived condition* scale. *Egoistic* values were also poor predictors of these scales, with *AC* as a negative predictor of the *NEP* proving to be the only significant relationship of relevance. *Hedonic* values were also poor predictors of these scales, with *HE* as a predictor of *Perceived condition*, proving to be the only significant relationship of relevance.

These results cast doubt on the importance of *Altruistic*, *Egoistic* and *Hedonic* values to ecological worldviews, with AC the only value of the four stipulated *Self-enhancement* value domains to predict the *NEP* (negatively) and *BEC* a negative (when it was expected to be positive) predictor of the *NEP*. The *NEP* was predicted positively by *UNN* values and negatively by *TR*, *AC*, *BEC* and *SES* values. These findings suggest that ecological worldviews may not be contingent on relationships with certain values, such as an aversion to *POR* and *POD* values. While the inclusion of these value domains in instruments such as the E-SVS and E-PVQ may be necessary in respect to understanding pro-environmental behaviour, it would appear that a focus on *Biospheric/UNN* values may suffice in the identification of ecological worldviews.

Universalism (*UN*) values derive from the survival needs of individuals and groups as applied to the benefit of all people and of the natural world (Schwartz, 2012). UN values were prioritised strongly and equally by both our sample population and that of MacDonald et al. (2020) and were vary relevant in analyses of PABs. This would suggest UN values likely exert substantial influence on peoples PABs towards the marine environment, yet they do not appear to be more or less prevalent in those who have an interest in the marine environment.

Universalism-Nature (*UNN*) values were the most persistent in our analyses, correlating significantly with the greatest number of PABs (80/98). *UNN* was a positive predictor of the *NEP*, *Behaviour—volunteering*, *Behaviour—recreation*, *Perceived threat*, *Perceived knowledge*, *Attitudes towards climate change*, *Trust—environmental* and *Trust—science & research* scales. *UNN* was a negative predictor of *Behaviour—seafood*, *Perceived condition*, *Trust—commercial fishing* and *Trust—recreational fishing*. The only regression analyses that did not find *UNN* to be a significant ($p < .01$) predictor were those relating to *Trust—public service* and *Behaviour—fishing*. These relationships indicated a social divide along lines of environmentalism and trust in fishing stakeholders.

Universalism-Tolerance (*UNT*), which pertains to being broadminded and tolerant (Schwartz, 2012), was a positive predictor of *Behaviour—recreation*, *Attitudes towards climate change*, *Trust—public service*, *Trust—environmental* and *Trust—commercial fishing*. *UNT* values provide potential links between public service, environmental, and commercial fishing stakeholder groups—links that could be expanded to include science & research stakeholders if combined with the *COI* value domain. Although intuitive, given the motivational basis of *UNT* values, these relationships indicate that *UNT* values are prioritised by individuals who exhibit greater levels of trust in a diverse range of stakeholders. UNT values may therefore be of value in the consideration of communication strategies aimed at increasing trust or cooperation between stakeholder groups.

Universalism—Concern (*UNC*) values, which pertain to concern for social equality and justice (Schwartz, 2012), were a negative predictor of *Behaviour—fishing* and *Behaviour—recreation*. UNC values appeared to be held by individuals who were concerned with but not highly engaged with the marine environment. This conclusion was supported by *UNC* as a negative predictor of *Perceived condition* and *Trust—commercial fishing*, and a positive predictor of *Attitudes towards climate change*, *Perceived threat*, *Trust—environmental* and *Trust—science & research*. The prioritisation of *UNC* appears to correspond with a narrow group of values and may therefore be of limited utility within the marine environment. To the extent that ENGOs frame their communication and marketing in the language of *UNC* values, such messaging may only appeal to a narrow audience and provoke a negative response from those active within the marine environment.

Benevolence (*BE*) values, which derive from the in-group benefits of social coherence and an individual need for affiliation, are primarily focused on family, immediate social relationships and in-groups, declining with social distance (Schwartz, 2012). *BE* scored the highest of the 10 value domains in our sample and highest (equal with *UN*) in the sample of MacDonald et al. (2020), indicating they are of clear importance and relevance to New Zealanders and the marine environment. While *BE* values did not prove divisive within our sample population, it's likely that they are important to the social dynamics of NZ's marine environment, given the in-group focus of *BE* values and the high priority placed on them across the sample population. *BE* values may promote in-group out-group ideologies within individuals, resulting in division between stakeholder groups and undermining the consideration of shared values and hopes for the marine environment.

Benevolence—Dependability (*BED*) values owe to one's reliability and trustworthiness as a member of an in-group (Schwartz, 2012) and were a positive predictor of *Behaviour—fishing* and a negative predictor of *Perceived threat*, suggesting a link to fishers. *Benevolence— Caring* (*BEC*) values pertain to concern for the welfare of in-group members (Schwartz, 2012) and were a negative predictor of the *NEP*, *Attitudes towards climate change*, *Trust— environmental* and *Trust—science & research*. *BEC* was also a positive predictor of *Perceived condition*. As an unexpected negative predictor of the *NEP*, it's possible that an association with the marine environment promotes *BEC* values in those who might not otherwise prioritise them. This unexpected prioritisation could, in part, explain a high aversion to PO values within the NZMVS sample; however, such an assertion is difficult to make given variation in the location of *BE* values on the values circumplex (Schwartz, 2012).

Power (*PO*) values derive from benefits attained via social status and status differentiation (Schwartz, 2012) and function to facilitate dominance/submission dimensions that are typical of interpersonal relationships (Lonner, 1980). *PO* values not only scored the lowest of the 10 value domains but the mean negative score was substantially lower than in the sample of MacDonald et al. (2020), suggesting that the sample population may prioritise *PO* values considerably less than the NZ population. This would be unexpected as *PO* values are generally prioritised to a greater extent in men and tend to correlate positively with age (Schwartz & Rubel, 2005; Schwartz, 2006). Men were overrepresented in the sample population, which was also skewed toward an older demographic. A politically left-leaning sample population may have been a factor in this unexpected difference as PO values have been shown to correlate with right-wing political orientations (Piurko et al., 2011).

As this research did not set out to confirm the relative position of each value domain (which would have required multidimensional scaling analysis), it was unclear which value domains were positioned counter to *PO*. This uncertainty was compounded by variation seen in the location of the *BE* and *UN* value domains in previous research (Schwartz, 2012). Nevertheless, all of the value domains positioned opposite PO on the values circumplex (BE, UN, and SD) were strongly prioritised by the NZMVS sample, offering some support to the explanation of the unexpected *BE* and *PO* results. In relation to the data of MacDonald et al. (2020), *BE* and *SD* exhibited small yet significant differences in the direction expected

(greater prioritisation) but *UN* was the one value domain that did not differ significantly from the nationally representative sample.

Another potential explanation of the extreme aversion to *PO* values could be that concerns of social status and status differentiation are of little relevance in the marine environment. However, *Power—Dominance* (*POD*), which pertains to the dominance of people (Schwartz, 2012), was found to be a positive predictor of *Behaviour—recreation* and *Behaviour—volunteering*. It is difficult to know what to make of these results, as the activities encapsulated by the *Behaviour—recreation* scale have no clear connection with the motivational goals of PO values and those implied by *Behaviour—volunteering* would appear to sit in contradiction to them. The *Behaviour—volunteering* scale was possibly too general to read into as it offers little indication of the type of volunteering. *Power Resources* (*POR*), which pertains to the control of resources (Schwartz, 2012), was found to be a negative predictor of *Behaviour—volunteering* and a positive predictor of *Behaviour—seafood*. These relationships were more intuitive, as the behaviour of purchasing or consuming seafood is directly associated with various resources (time, money, seafood, etc.) and *Behaviour—volunteering* is antithetical to the motivational goals of *PO* values.

Despite similar distributions across the sample as a whole, the two *PO* value domains did show marked differences in subsequent analyses, with *POR* appearing to be of greater relevance than *POD* in respect to PABs toward the NZ marine environment. *POR* correlated significantly with 50% of PABs, while *POD* only correlated significantly with 11% (all of which were very weak). Both *POD* and *POR* correlated negatively with the *NEP* but failed to predict it in regression analysis. *POR* also correlated negatively with *Behaviour—volunteering*, *Trust—environmental* and *Trust—science & research*, and positively with *Trust—recreational fishing* and *Trust—commercial fishing*. These results may reflect that the marine environment is a resource-rich and often resource-intensive to operate within but it is not a highly social environment, with the possible exception of in-groups such as fishing clubs, etc. Values relating to the control of the resources within the marine environment could be expected to be of greater relevance than those relating to the control of the people associated with it

Tradition (*TR*) values, which derive from shared cultural and religious ideas and social norms, pertain to the maintenance of cultural, religious and social traditions (Schwartz,

2012). *TR* scored second lowest (behind *PO*) of the 10 value domains and was prioritised to a lesser extent than the sample of MacDonald et al. (2020), which was somewhat surprising given the wealth of cultural traditions that exist in relation to the marine environment. However, these links were still evident in the significant relationships found. *TR* was a positive predictor of *Behaviour—fishing, Behaviour—volunteering* and *Behaviour—seafood*, and a negative predictor of the *NEP*. *TR* was a positive predictor of *Perceived knowledge* and *Perceived condition* and a negative predictor of *Perceived threat* and *Attitudes towards climate change*. *TR* was a positive predictor of *Trust—recreational fishing* and *Trust—commercial fishing*, and a negative predictor of *Trust—Science & Research, Trust—environmental* and *Trust—public service*. *TR* was one of the most relevant values in our analyses, correlating with the second greatest number of PABs (77/98) behind *UNN* (80/98). The potential effect of demographic variation is unclear as *TR* would be expected to correlate positively with age and negatively with education (Schwartz, 2006).

TR, being central to the higher order domain of *Conservation* (or *Conservatism*), was highly divisive and appeared to be prioritised by those supportive of fishers and unsupportive of other stakeholders in the marine environment. This prioritisation is unsurprising, given the historical relevance and present day enthusiasm for recreational fishing (Holdsworth et al., 2016). The motivational goals of *TR* values (the maintenance and preservation of cultural, family, or religious traditions; Schwartz, 2012) are largely complementary to those of fishing and they often complement each other (McGoodwin, 2019; Lowe et al., 2019). In contrast, the motivational goals of *TR* values and/or fishing often clash with ideological commitments associated with science & research, environmentalism, and governance. *TR* values are clearly of great relevance to the marine environment as they relate significantly to trust in every stakeholder group. The use of TR values in the framing of communication would likely prove effective with fishers but detrimental to non-fishers.

Conformity (*CO*) values derive from the individual benefits of social cohesion, obtained through the suppression of socially disruptive interactions, and were of considerable relevance in our analyses of PABs (Schwartz, 2012). *Conformity-Rules* (*COR*) pertains to compliance with social norms (Schwartz, 2012) and was a positive predictor of *Behaviour—fishing, Perceived knowledge, Perceived condition, Trust—commercial fishing* and *Trust—public service*. COR was a negative predictor of *Trust—environmental* and correlated negatively with the *NEP*. *COR* also correlated positively with *Trust—recreational fishing* and

negatively with *Behaviour—recreation*. *COR* provided a link between *Trust—public service* and *Trust—commercial fishing*. Although criticisms relevant to *COR* values are often levelled at both the commercial fishing industry (in respect to issues of compliance) and the public service (in respect to issues of regulation and enforcement), prioritisation of *COR* values by these stakeholder organisations appears rational. Commercial fishers and public organisations rely on the effective establishment, implementation, compliance, enforcement and continued development of relevant regulations in order to ensure effective operational stability and economic sustainability.

Conformity—Interpersonal (*COI*) pertains to the maintenance of social harmony (Schwartz, 2012) and was a positive predictor of *Trust—environmental*, *Trust—public service*, and *Trust—science & research* and correlated positively with *Trust—commercial fishing* and *Attitudes towards climate change* scales. *COI* correlated negatively with *Perceived knowledge*, *Behaviour—fishing*, *Behaviour—recreation* and *Behaviour—volunteering*. *COI* provided a link between *Trust—public service* and *Trust—science & research*. The mandated social responsibilities of public service and science & research stakeholders is one potential explanation of such a link. Interestingly, *Trust—environmental* was predicted negatively by *COR* but positively by *COI*, suggesting that those who trust environmental stakeholders may have a greater regard for social norms than laws and similarly formalised regulations.

Stimulation (*ST*) values, which derive from a need for variety and a desire for experience and optimal arousal (Schwartz, 2012), pertain to excitement, novelty and change. *ST* was a predictor of *Behaviour—recreation* and *Behaviour—fishing*. *ST* also correlated positively with these two scales, *Behaviour—volunteering* and *Perceived knowledge*. *Hedonism* (*HE*) values "...derive from organismic needs and the pleasure associated with satisfying them..." (Schwartz, 2012, p.5) and pertain to pleasure, sensuous gratification and enjoyment of life. *HE* was also a predictor of *Behaviour—fishing* and *Behaviour—recreation* and a predictor of *Perceived knowledge*, *Perceived condition* and *Trust—recreational fishing*. While also showing significant positive correlation with these scales, *HE* correlated negatively with *Perceived threat*, *Attitudes towards climate change*, *NEP* and *Trust—environmental*.

Both *ST* and *HE* were prioritised to a greater extent in our sample than that of MacDonald et al. (2020). These differences could potentially be explained by demographic variables, as men tend to prioritise *ST* and *HE* to a greater extent than women (Schwartz & Rubel, 2005)

and both value domains also correlate positively with education, although negatively with age (Schwartz, 2006). Men were overrepresented in the sample population, which was also highly educated but also skewed toward an older demographic. *ST* and *HE* appear to be important values for those who choose to spend time interacting with the marine environment. *HE* was prioritised to a greater extent by those who partake in recreational fishing while *ST* was prioritised to a greater extent by those who partake in non-fishing related recreational activities. Furthermore, those who prioritised *HE* were more positive about the current state of the marine environment and less concerned about environmental issues. These findings suggest that *ST* and *HE* may be prioritised by individuals whose values and interests may otherwise not align. *ST* in particular, as it appears to be less divisive than *HE* in respect to other PABs, may be a value shared by a diverse group of people with an active interest in NZ's marine environment. The use of *ST* values in the framing of communication could provide an effective means of connecting with a wide range of people who interact with the marine environment, while *HE* values would likely appeal directly to those who partake in recreational fishing.

Security (*SE*) values, which derive from the basic requirements of individuals and groups (Schwartz, 2012), were prominent in the analyses of PABs. *Security-Personal* (*SEP*) pertains to being cared about and the avoidance of danger (Schwartz, 2012). *SEP* was a negative predictor of *Perceived knowledge* and all *Behaviour* scales. *SEP* was a positive predictor of *Perceived threat* and *Trust—environmental*. As a negative predictor of all three *Behaviour* scales, *SEP* values appear to be prioritised by those who spend less time in the marine environment. Furthermore, the negative relationship between the *SEP* and *Perceived knowledge* may be associated with the behaviour of individuals, in that *Perceived knowledge* of the marine environment may result from engagement with the marine environment. The perceived threat of environmental degradation to the personal security of individuals who are physically detached from the marine environment may foster trust in environmental stakeholders, who promise to address these threats. Alternatively, environmental stakeholders' communication may heighten concern regarding perceived threats to the personal security of individuals who are physically detached from the marine environment. The absence of any relationship between *SEP* and the *NEP* supports such notions as it suggests that concerns about personal security are not tied to a broader ecological worldview.

Security—Societal (*SES*) pertains to social order and government stability (Schwartz, 2012). *SES* was a negative predictor of *Behaviour—recreation*, *Behaviour—volunteering*, the *NEP*, *Attitudes towards climate change*, *Perceived knowledge*, *Trust—environmental*, *Trust—public service* and *Trust—science & research*. *SES* was a positive predictor of *Trust—recreational fishing* and correlated positively with *Behaviour—seafood*. These results suggest an aversion to *SES* values in non-fishers who are engaged with the marine environment and favour an ecological worldview. The negative relationship between *SES* and institutional stakeholders, particularly *Trust—public service*, appears counterintuitive as a positive relationship was expected (Devos et al., 2002). *SES* may be a value that aligns with concern for the interests of recreational fishers.

The sample population prioritised *Self-Direction* (*SD*) values, which derive from a need for control and a desire for autonomy and independence (Schwartz, 2012), second only *BE* and to a greater extent than the sample population of MacDonald et al. (2020). *Self-Direction—Thought* (*SDT*) pertains to autonomy of thought in respect to values such as creativity, curiosity and interest. *SDT* was found to be a positive predictor of *Perceived knowledge* and a negative predictor of *Trust—environmental* and *Behaviour—recreation*. *SDT* correlated negatively with all five *Trust* scales and most negatively with *Trust—public service*. *Self-Direction—Action* (*SDA*) pertains to autonomy of action in respect to the pursuit of goals, self-determination and independence. *SDA* was a negative predictor of *Trust—public service* and correlated negatively with all five *Trust* scales, in the same order as *SDT*.

Although *SD* values were not divisive (i.e. significant relationships involving *SD* values were fairly consistent, in both direction and strength, across scales and variables of interest) or especially strong predictors of PABs, their importance to the population as a whole should not be overlooked. Devos et al. (2002) found that correlation with *Trust in institutions* was greater for *SD* ($r = .29$) than any of the other 10 basic value domains. This was expected because "...individuals who strive for freedom of thought and action are more likely to criticize institutions because institutions potentially restrain liberties" (Devos et al., 2002, p. 484). To the extent that *Trust* scales were representative of institutions (which seems reasonable, given all but one item in each scale related to organisations), the consistent negative correlation of *Trust* scales with *SD* values could be seen as highly supportive of this expected negative relationship with *Trust in institutions*. Increased prioritisation of *SD* values corresponded to decreased trust in stakeholders and the public service in particular. To the

extent that *Trust* scales were representative of individual stakeholders themselves (i.e. to the extent that the *Trust—environmental* scale was representative of environmentalists, etc.), consistent and relatively strong negative correlation of *SD* values and the public service could be interpreted as supportive of a security-seeking stereotype of the public servant (Baldwin, 1990).

Achievement (*AC*) values derive from the benefits attained via individual accomplishment and pertain to "...personal success through demonstrating competence according to social standards" (Schwartz, 2012, p.5), rather than via mastery of knowledge or skill (motivations encapsulated within the *SD* domains). *AC* was a negative predictor of both *Behaviour—seafood* and the *NEP* but a positive predictor of *Perceived knowledge* and *Trust—public service*. *Trust—public service* was the only *Trust* scale predicted by *AC* values, which may reflect the hierarchical organisational structure common to many of NZ's public institutions, which provides an environment where AC values are important* and can be pursued. *AC* also correlated positively with *Behaviour—recreation*. *AC* was not an especially relevant variable across the analyses undertaken and the significant relationships discovered were of questionable meaning.

Humility (*HU*) pertains to the recognition of one's insignificance in the world. *HU* was a negative predictor of *Behaviour—seafood*, correlated positively with the *NEP* and *Trust—environmental*, and correlated negatively with *Trust—commercial fishing*. *HU* was one of the least significant values in relation to individual PABs towards the NZ marine environment, yet these significant relationships appear fairly intuitive. *Face* (*FA*) pertains to maintaining one's reputation or image (Schwartz, 2012) and was a positive predictor of the *NEP*, *Perceived threats* and *Attitudes towards climate change* but did not correlate significantly with any of the PAB scales. *FA* correlated significantly with only 5% of PAB variables, the fewest of the 19 value domains. *FA* appears to be a value of little relevance to the NZ marine environment but may be important to individuals who outwardly express an ecological worldview as part of their identity.

5.3   Implications

5.3.1   Communication

The views of those who work and recreate in the marine environment can be especially strong as a consequence their personal experiences, yet when these views do not align with those of other stakeholders, distrust and conflict can arise. Discussing the guardianship and protection, or kaitiakitanga, of NZ's marine environment is challenging. The marine environment is of great importance to many people, for many reasons, but those who value it do so in different ways and exhibit different PABs towards it—and those who are associated with it. As this research has indicated, substantial variation exists in the perceived condition of the marine environment and the perceived severity of threats faced by the marine environment.

Openly discussing issues of relevance to the marine environment can quickly see people shoe-horned into stereotypes of individual stakeholders (e.g. the commercial fisher, the recreational fisher, the environmentalist, the scientist, the public servant)—caricatures that generally have little in common (except, perhaps, being seen as close-minded). People are quick to make assumptions about what others think and do and why they think and do it. Yet stakeholders do hold different views on how and why the marine environment should be managed. These differences generally correspond to differences in the importance placed on the diverse sources of value accessible via the marine environment.

Any individual's views on the appropriate means of and reasons for management of the marine environment sit in relation to how they consider the cultural, ecological, economic, intrinsic, recreational and social value generated through the marine environment. For example, commercial fishing companies tend to consider the economic value generated by the marine environment to be of greater importance than do ENGOs, who tend to consider the intrinsic value generated by the marine environment to be of greater importance than do commercial fishing companies. In this respect, agreement on *why* the marine environment should be managed is highly unlikely. Reaching agreement on *how* the marine environment should be managed is less problematic but challenging nonetheless. The motivations of stakeholders need not align in order to agree on common management objectives, e.g. the biological sustainability of fish stocks is likely in the interest of all stakeholders, even though

the different motivations of stakeholders will likely result in different management preferences, such as target biomass and stock recovery timeframes. Even when common ground can be found, establishing agreement on how shared goals are to be achieved can prove equally problematic.

Improving the management of NZ's marine environment is no easy task. Especially as improvement is itself a subjective term. For example, the sustainable harvest of whale species that exist at or near their ecological carrying capacity could be considered an improvement to our management of the marine environment. The practice of whaling has previously generated cultural and economic value (as it still does in certain societies) and could do so again without significantly undermining the integrity of the marine environment (in respect to the other forms of value that the marine environment provides), yet many would not approve of such a practice. Ultimately, the reason that many individuals would not approve of whaling being reintroduced to the NZ marine environment is that the practice does not align with their values. While this may be considered an extreme example, the same principle (of PABs towards the NZ marine environment being driven by values) applies to many issues of relevance to the management of NZ's marine environment.

The human dimensions of complex issues (those relating to the marine environment in particular) are rarely acknowledged, let alone appreciated or understood. This may be, in part, because acquiring an understanding of these dimensions can prove difficult, especially when the underlying motivations of stakeholders are unclear. Contentious issues are often framed in the language of science or economics in order to progress partisan agendas. Such framing can be deliberate but it can also result from an ignorance of the values that underlie our PABs. As this research has demonstrated, PABs are not objective but affected by the values we hold. If one is naive to this reality then it's likely that they will believe their views to be far less subjective than they in fact are, and their communication will reflect this. Consequently, disagreements between stakeholders extend beyond the how and why of management to PABs themselves. While a lack of adequate data makes it difficult to assess many aspects of the marine environment, controversy often persists in areas where ample information (and scientific consensus) leaves little room for dispute. Disagreements regarding the reality of anthropogenic climate change or the biological sustainability of certain fish stocks have little to do with a lack of sufficient reliable information.

Traditionally, demographic variables have been used in combination with specific variables of interest (e.g. PABs) in questionnaires seeking to obtain information that can be used to improve communication. Such an approach can be effective in determining either who *is* being communicated with (i.e. the demographics of a target population) or who *should* be communicated with (i.e. the target demographics of a population) but has limited utility in providing information on *how* to communicate with a target population. Understanding the psychological importance of values and how values relate to PABs of relevance has the potential to facilitate improved communication, increasing trust and reducing conflict. Effective communication is reliant upon a large number of variables, such that the potential utility of insights into the values of a population will vary depending on circumstance. In any case, an understanding and appreciation of values relevant to a specific context can offer general guidance on effective communication strategies.

While each of the stakeholder scales developed in this research displayed unique attributes in their correlation with both PABs and values, general similarities could be seen within the *Trust—commercial* and *Trust—recreational* scales that were in opposition to those seen within the *Trust—environmental*, *Trust—public service*, and *Trust—science* scales. This divergence would suggest two distinct value orientations that likely contribute significantly to divisions between stakeholders in the marine environment. However, the possession of similar value orientations are unlikely to be indicative of stakeholder harmony. Those who indicate trust in recreational and commercial fishers may hold broadly similar values, yet the interest of these two stakeholder groups are frequently in conflict and are a notable source of division in NZ's fisheries management issues.

Openseas.org.nz (2019). *Fishing rules*. https://openseas.org.nz/fishing-rules/

Royal Society Te Apārangi (n.d.). *Code of Professional Standards and Ethics*. https://www.royalsociety.org.nz/who-we-are/our-rules-and-codes/code-of-professional-standards-and-ethics/

While shared value priorities may not be indicative of healthy and cooperative stakeholder relationships, they may provide means of improving communication by framing communications in values that appeal to target audiences. This research indicates which values would likely prove effective in communicating to different groups, yet these values would vary depending on the target audience. Those supportive of commercial fishers and science and research organisations may be more responsive to communications framed in

COR values but this same messaging would likely be poorly received by those supportive of ENGOs. This makes intuitive sense; commercial fishers and scientists rely on *COR* values and invoke them in defence of their activities (e.g. Openseas.org.nz, 2019; Royal Society Te Apārangi, n.d.), whereas ENGOs are predominantly motivated by UNN values and possibly view compliance with rules, laws, and formal obligations as a distraction from or even impediment to achieving their goals. In this respect, some values may be of high utility with narrow audiences but of low utility with broad audiences. Framing communications in UNN values would be obvious if communicating solely with environmentalists, yet the use of COI values (focusing on the avoidance of upsetting or harming other people) may achieve the most positive response in wider audiences. *COI* and *UNT* were notable as each positively predicted trust in three of five stakeholder groups, with *Trust—Recreational* fishing being the only scale not predicted by either value domain. *HE* positively predicted *Trust—Recreational fishing* and did not negatively predict any other group, so could potentially plug this gap.

Manfredo et al. (2016) consider values from a much broader social perspective (a social-ecological systems approach) as concepts that are "...deeply embedded in the world around us, in our material culture, collective behaviors, traditions, and social institutions"; concepts that "...define and bind groups, organisatizations, and societies" (Manfredo et al. 2016, p. 772). Values are thought to have an adaptive role and to be generally stable across generations, with change building upon prior value structures and abrupt change only occurring in response to disruption of the social-ecological context (Manfredo et al. 2016). The authors conclude that "...deliberate efforts to orchestrate value shift for conservation are unlikely to be effective. Instead, there is an urgent need for research on values with a multi-level and dynamic view that can inform innovative conservation strategies for working within existing value structures" (Manfredo et al. 2016, p. 772).

Consideration of the role that values play in the PABs of individuals has the potential to benefit anyone operating in relation to the NZ marine environment, irrespective of their intentions. A substantial amount of literature (some of it touched on in this thesis) has endeavoured to understand how people's PABs can be changed, in order to further *the cause*—be it acceptance of new technology, support for political change, or adoption of pro-environmental behaviours. Although effective strategies have been devised and implemented, values are neither easily manipulated nor easily changed. Coming to understand this fact has led some to the realisation that it may be more effective to focus on understanding and

accepting the different values people hold (Manfredo et al., 2016)—learning to work with, rather than against, the psychological tide. If stakeholders are sincerely interested in working towards outcomes of mutual benefit (as rational actors should be) then a values-based approach to such a project would likely benefit anyone who was to adopt one.

5.3.2   Opportunities & Limitations

This research raises numerous opportunities for further research into social aspects of relevance to the management of NZ's marine environment. Efforts to manage NZ's marine environment effectively are being undermined by a lack of scientific data, which also hinders discourse on issues of significance to the NZ marine environment. Deficiencies in the physical and biological sciences will require substantial investments of time and resources to overcome, which will also require substantial political will to acquire. Obtaining a better understanding of influential social factors in the NZ marine environment could not only benefit processes aimed at addressing issues such as these but could also provide a better understanding of how to address social issues of relevance to the marine environment. Many barriers to progress within the marine environment are largely social and merely exacerbated by a lack of scientific data.

The PABs of respondents also indicated that the promotion of existing knowledge and information on the NZ marine environment could achieve both social and practical outcomes. Opportunities to educate New Zealanders on the relevant history and current management of the marine environment (with particular emphasis on The Treaty of Waitangi, the Māori fisheries settlement and mātauranga Māori) should be considered for both ethical and pragmatic reasons. Educational initiatives could provide benefits to all New Zealanders and the marine environment. The management of NZ's marine environment is heavily influenced by the management of NZ's fisheries, with strong rights having been established for both iwi and fisheries quota holders (including iwi) through legislation and related legal proceedings. While not unprecedented (MPI, 2016), achieving substantial change in how NZ's marine environment is managed is difficult without the support of iwi and/or industry. An improved understanding of the relevant history and current management regimes would therefore be of likely benefit, irrespective of one's PABs.

One aspect of the survey data indicated some interesting results that could be of interest in understanding social influences relating to the NZ marine environment. While the number of 'Don't know' responses was significantly greater for the Global natural environment than the NZ Natural environment, the number of 'Don't know' responses was significantly less for global marine fish stocks than for NZ marine fish stocks and less (albeit non-significantly) for the Global marine environment than the NZ marine environment. These results are of interest as they appear counter-intuitive, in that it could be expected that one's knowledge of local environmental conditions would be greater than that of those elsewhere. Inconsistent public communication from stakeholder organisations in regards to the state of NZ's fisheries and their management is one possible factor that could have contributed to this discrepancy. A potential unwillingness to respond to the question from professionals working in the marine sector is another possible factor. A relative deficit of information regarding the state of NZ's fisheries is yet another.

Although the items included in the questionnaire were adequate for the purpose of achieving the aims of this research, some potential questions were not included in order to avoid being perceived as pursing an agenda outside of honest academic enquiry. It was important that this research was accurately perceived as politically neutral as a large and diverse sample of New Zealanders was desired, and politically loaded questions may have deterred certain respondents from completing the questionnaire[42]. Nevertheless, New Zealanders PABs towards many important issues within the marine environment remain largely unknown and would likely be of value in improving management processes and outcomes.

This research also endeavoured to move away from traditional demographic-centric approaches to survey research, making a point of focusing on psychographic measures rather than measures relating to identity. Consequently, many of the conclusions drawn involve assumptions about the respondents associated with certain PABs. Conclusions can be drawn, for example, about people who trust commercial fishers but not about commercial fishers themselves. There are pros and cons to such an approach; in some instances the broader group of people who support a stakeholder may be of interest, while in other instances the specific stakeholder may be of interest. As this research did not specifically ask questions

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[42] Despite every attempt being made to position the survey as politically neutral, numerous accusations were made, both by respondent and non-respondents, as to the purpose of this research—highlighting the strong views of some.

about affiliation with stakeholders, further research into the PABs of specific stakeholders would likely be of merit.

At the broadest level, in respect to research into human values, a comprehensive nationwide survey of New Zealanders values, based on the Theory of Basic Human Values would provide a meaningful baseline for any future research in the values space. The Values Project (https://www.thevaluesproject.com/) is an example of such research in an Australian context. Unfortunately much of the research carried out to date utilised the earlier model of 10 original values domains, rather than the 19 revised value domains. This research supports the use of the revised model, with significant differences identified both in the scoring of the individual value domains and in the relationships they exhibited with other variables.

Values were of clear relevance to the PABs of New Zealanders towards the marine environment, yet the anonymity of respondents limited the conclusions that could be drawn regarding specific stakeholders. This was expected, given the broad exploratory nature of the survey. Furthermore, for reasons explained in the Methods chapter (p. x), the NZMVS was non-representative by design and did not attempt to create a representative sample, such that this research is not representative of the NZ population as a whole. This placed limitations on both the interpretation and extrapolation of results.

Although this research has provided evidence of how values relate to the PABs towards the NZ marine environment, many questions regarding the social dynamics of NZ's marine environment remain. It is hoped that this research may provide guidance for any individual or organisation looking to engage thoughtfully in communication with New Zealanders on issues of significance to the NZ marine environment.

Chapter 6: Conclusion

The central aim of this thesis was to establish if a relationship exists between human values and perceptions, attitudes and behaviours towards the New Zealand marine environment (H_1).

The global marine environment is of critical importance to the maintenance of life on Earth, yet human activity threatens to destabilise many of the natural processes (physical, chemical, biological, ecological, etc.) that support this existence. Humans derive immense value from the marine environment, yet climate change, pollution, habitat change/loss, invasive species, and overfishing devalue the marine environment and undermine global stability. International governance of the marine environment has largely developed over the past 75 years. Although this international cooperation has failed to adequately address the multitude of threats faced by the marine environment, it has empowered coastal nations with greater rights over an increasingly large portion of what was once a global commons. Today, the purview and efficacy of marine governance varies considerably between nations, delivering a wide range of outcomes for the marine environment and those who interact with it.

The NZ marine environment is vast and has avoided much of the environmental degradation seen in other regions of the world, largely as a result of temporal and geographic isolation. NZ's history is closely tied to the ocean and the people of NZ obtain immense value (cultural, economic, environmental, recreational, social, intrinsic, etc.) from the NZ marine environment. The diversity of stakeholder interests and organisations of relevance to the NZ marine environment are indicative of these diverse sources of value. Governance of the NZ marine environment is currently achieved via numerous organisations with varying responsibilities operating under a variety of disjointed legislation. The management and commercial development of NZ's fisheries, largely over the past 40 years, has been of notable consequence to the management of NZ's marine environment. Today, NZ's fisheries legislation and the NZ QMS are of central importance to the management of NZ's marine environment.

Despite being relatively well positioned globally, many New Zealanders are understandably dissatisfied and frustrated with the current state of the marine environment and its management. Multi-stakeholder processes, aimed at progressing management outcomes of mutual benefit have proven fraught. In many instances, irreconcilable differences between

stakeholders (which certainly do exist) stymie the possibility of agreement in less contentious areas. Nevertheless, the potential for agreement to be reached between stakeholders will always vary. Some stakeholders will staunchly defend the status quo, while others will not budge on ideological commitments.

The purpose of this research was not to call into question the views of, nor the political approach of, any individual or organisational stakeholder. On the contrary, by highlighting the importance of values in the formation of individual PABs and establishing some indication of how this psychological process manifests in the NZ marine environment, I hope to provide individuals and organisations with a greater appreciation of their views and the views of those who they tend to disagree with. As values influence people's PABs, their importance should be considered relative to the extent that people's PABs are of concern.

Values are representative of our broadest motivations, and the principles that guide our perceptions, our attitudes and our behaviours. The Theory of Basic Human Values is a widely adopted theoretical conceptualisation of values that, in its most recent form, identifies 19 distinct value domains that encapsulate the motivational goals of closely associated values. This research has established that these value domains, as measured by the Portrait Values Questionnaire, exhibit significant correlation and association with key PABs towards the NZ marine environment. Furthermore, all 19 refined value domains predict a range of key PABs towards the NZ marine environment with varying ability.

While some may insist that stakeholder disagreement is inevitable as a consequence of systemic dysfunction (RescueFish, 2020), and they may well be right, the reality is that achieving progress within the NZ marine environment will require stakeholders with incongruent views to work together and their ability to do so will affect outcomes. Social problems require social solutions.

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Table 17. Summary of partial responses

Page #	Page of Termination	Respondents	Did Not Complete	All Respondents
0	Information / Permissions	596	43.06%	20.20%
1	Gender, Ethnicity, Residence	157	11.34%	5.32%
2	Education & Employment	108	7.80%	3.66%
3	Political Orientation	126	9.10%	4.27%
4	Knowledge	27	1.95%	0.91%
5	Condition	66	4.77%	2.24%
6	Threats	32	2.31%	1.08%
7	Climate Change	6	0.43%	0.20%
8	Trust	49	3.54%	1.66%
9	Behaviour	20	1.45%	0.68%
10	PVQ	153	11.05%	5.18%
11	NEP	42	3.03%	1.42%
12	Final Question	2	0.14%	0.07%
	TOTAL	1,384	100.00%	46.90%

Table 18. Demographic characteristics of sample population and comparison with the NZ Census of Population and Dwellings 2018

	NZMVS 2019 n	NZMVS 2019 %	2018 Census %	Difference p.p.	Difference %
Age*					
16–19**	36	2.30	7.99	-5.69	-71.16
20–29	150	9.60	17.53	-7.92	-45.21
30–39	173	11.08	16.22	-5.14	-31.71
40–49	224	14.34	16.23	-1.89	-11.63
50–59	383	24.52	16.19	8.33	51.46
60–69	424	27.14	12.97	14.17	109.23
70–79	151	9.67	8.38	1.29	15.37
80–89	20	1.28	3.69	-2.41	-65.30
90–99	1	0.06	0.79	-0.72	-91.87
>100	0	0.00	0.02	-0.02	-100.00
Which country were you born in?					
New Zealand	1,213	77.41	72.60	4.81	6.62
United Kingdom of Great Britain and Northern Ireland	151	9.64	4.50	5.14	114.14
Australia	40	2.55	1.63	0.92	56.60
United States of America	32	2.04	0.60	1.44	240.35
South Africa	27	1.72	1.54	0.18	11.89
Other (42)	104	6.64	19.13	-12.49	-65.31
What is your gender?					
Prefer not to say	10	0.64	-	-	-
Diverse	4	0.26	-	-	-
Male	986	62.92	49.35	13.57	27.50
Female	567	36.18	50.65	-14.47	-28.56
Which ethnic group/s do you belong to?					
Pākehā / New Zealand European or European	1,476	94.19	70.17	24.02	34.24
Māori (please specify iwi)	142	9.06	16.51	-7.45	-45.11
Other/s	137	8.74	13.32	-4.58	-34.36
How many years (total) have you lived in New Zealand?					
Less than 1 year	7	0.45	1.57	-1.12	-71.55
1-5 years	36	2.30	6.06	-3.76	-62.09
6-10 years	34	2.17	4.37	-2.20	-50.35
11-15 years	58	3.70	4.00	-0.30	-7.47
16-20 years	50	3.19	2.84	0.35	12.35
More than 20 years / All my life	1,382	88.19	81.16	7.03	8.67

	NZMVS 2019 n	NZMVS 2019 %	2018 Census %	Difference p.p.	Difference %
Do you live in:					
A large town or city of more than 30,000 people	835	53.29	-	-	-
A town of 10,001 to 30,000 people	151	9.64	-	-	-
A town of 1,000 to 10,000	248	15.83	-	-	-
The countryside or a town of less than 1,000 people	333	21.25	-	-	-
Which region do you live in?					
Auckland	334	21.31	33.44	-12.13	-36.26
Wellington/Wairarapa	264	16.85	10.78	6.07	56.28
Waikato/Coromandel	131	8.36	9.75	-1.39	-14.26
Otago	125	7.98	4.79	3.19	66.53
Canterbury	118	7.53	12.76	-5.23	-40.99
Bay of Plenty	115	7.34	6.56	0.78	11.87
Northland	92	5.87	3.81	2.06	54.10
Manawatu/Wanganui	66	4.21	5.08	-0.87	-17.09
Hawkes Bay	55	3.51	3.54	-0.03	-0.85
Marlborough	53	3.38	1.01	2.37	234.88
Southland	52	3.32	2.07	1.25	60.31
Taranaki	46	2.94	2.50	0.44	17.42
Nelson	45	2.87	1.08	1.79	165.90
Tasman	38	2.43	1.11	1.32	118.47
Gisborne/Poverty Bay	15	0.96	1.01	-0.05	-5.22
West Coast	11	0.70	0.67	0.03	4.77
Currently living overseas	7	0.45	0.01	0.44	4367.13
What is the highest level of formal education you have completed?					
Postgraduate qualification	393	25.08	10.19	14.89	146.12
Bachelor's degree	332	21.19	14.63	6.56	44.84
Undergraduate diploma/certificate	299	19.08	18.66	0.42	2.25
High school, with qualifications	377	24.06	38.34	-14.28	-37.25
High school, without qualifications	160	10.21	18.19	-7.98	-43.87
Primary school, intermediate school	6	0.38	-	-	-
Please indicate if you hold qualifications in any of these areas:					
Diving (e.g. PADI)	455	29.04	-	-	-
Recreational boating	421	26.87	-	-	-
Maritime (excluding commercial fishing)	140	8.93	-	-	-
Commercial fishing	76	4.85	-	-	-
Other (relevant to the marine environment)	122	7.79	-	-	-

	NZMVS 2019 n	NZMVS 2019 %	2018 Census %	Difference p.p.	Difference %
Which of the following best describes your current situation?					
Paid employment, working 30 or more hours per week	806	51.44	-	-	-
Retired	336	21.44	-	-	-
Paid employment, working less than 30 hours per week	138	8.81	-	-	-
Student	83	5.30	-	-	-
Unpaid voluntary work	40	2.55	-	-	-
Unemployed	53	3.38	-	-	-
Home duties	24	1.53	-	-	-
Other (please state):	3	0.19	-	-	-
Self employed	84	5.36	-	-	-
What is your personal annual income from all sources before tax?					
Prefer not to say	210	13.40	-	-	-
Loss	12	0.77	0.55	0.22	40.00
Zero income	29	1.85	6.81	-4.96	-72.83
$1–$10,000	53	3.38	10.28	-6.90	-67.12
$10,001–$20,000	119	7.59	16.88	-9.29	-55.04
$20,001–$30,000	151	9.64	13.68	-4.04	-29.53
$30,001–$40,000	124	7.91	10.56	-2.65	-25.09
$40,001–$50,000	122	7.79	9.66	-1.87	-19.36
$50,001–$60,000	107	6.83	8.19	-1.36	-16.61
$60,001–$70,000	116	7.40	6.21	1.19	19.16
$70,001–$100,000	278	17.74	9.57	8.17	85.37
$100,001–$150,000	156	9.96	4.67	5.29	113.28
$150,001 or more	90	5.74	2.94	2.80	95.24

* Calculated from "Which year were you born in?" and rounded down (n = 1,562)

** Census 2018 data for ages 15–19

Table 19. Political orientation: NZ political party support

NZ Political Party		Strongly oppose	..	…	….	……	……	Strongly support	Total	M	SD
The National Party	n	385	281	199	235	178	150	139	1567	3.35	1.98
	%	24.57	17.93	12.70	15.00	11.36	9.57	8.87	100		
The Labour Party	n	251	170	167	273	255	292	159	1567	4.04	1.95
	%	16.02	10.85	10.66	17.42	16.27	18.63	10.15	100		
The Act Party	n	679	270	190	241	93	49	45	1567	2.44	1.65
	%	43.33	17.23	12.13	15.38	5.93	3.13	2.87	100		
The Green Party	n	383	149	137	249	204	198	247	1567	3.84	2.17
	%	24.44	9.51	8.74	15.89	13.02	12.64	15.76	100		
The Māori Party	n	319	206	270	486	172	76	38	1567	3.23	1.57
	%	20.36	13.15	17.23	31.01	10.98	4.85	2.43	100		
The NZ First Party	n	373	349	313	319	122	47	44	1567	2.86	1.55
	%	23.80	22.27	19.97	20.36	7.79	3.00	2.81	100		

Table 20. Political orientation: liberal / conservative

	Extremely liberal	..	…	….	…..	……	Extremely conservative	Total	M	SD
n	141	369	310	455	187	74	31	1567	3.33	1.41
%	9.00	23.55	19.78	29.04	11.93	4.72	1.98	100		

Table 21. Political orientation: left-wing / right-wing

	Extremely left-wing	..	…	….	…..	…..	Extremely right-wing	Tota	M	SD
n	98	306	326	502	220	83	32	1567	3.52	1.36
%	6.25	19.53	20.80	32.04	14.04	5.30	2.04	100		

Table 22. Perceived knowledge

Knowledge component		Excellent	Good	Average	Poor	No knowledge	Don't know	Total	M	SD
General environmental issues	n	390	908	244	21	3	1	1567	4.06	0.69
	%	24.89	57.95	15.57	1.34	0.19	0.06	100		
Marine environmental issues	n	335	797	363	67	3	2	1567	3.89	0.79
	%	21.38	50.86	23.17	4.28	0.19	0.13	100		
Recreational fishing practices	n	324	562	415	217	44	5	1567	3.58	1.05
	%	20.68	35.86	26.48	13.85	2.81	0.32	100		
Commercial fishing practices	n	131	393	603	342	90	8	1567	3.09	1.02
	%	8.36	25.08	38.48	21.83	5.74	0.51	100		
Commercial aquaculture practices	n	72	322	573	452	137	11	1567	2.83	1.00
	%	4.59	20.55	36.57	28.84	8.74	0.70	100		
Marine science	n	124	343	571	418	106	5	1567	2.98	1.04
	%	7.91	21.89	36.44	26.68	6.76	0.32	100		
Fisheries science	n	58	267	553	501	173	15	1567	2.70	1.00
	%	3.70	17.04	35.29	31.97	11.04	0.96	100		
Mātauranga Māori	n	17	152	383	521	363	131	1567	2.26	0.99
	%	1.08	9.70	24.44	33.25	23.17	8.36	100		
The Treaty of Waitangi / Te Tiriti o Waitangi	n	53	382	674	350	74	34	1567	2.99	0.90
	%	3.38	24.38	43.01	22.34	4.72	2.17	100		
NZ Quota Management System	n	110	359	575	383	126	14	1567	2.96	1.04
	%	7.02	22.91	36.69	24.44	8.04	0.89	100		
Māori Fisheries Settlement	n	33	176	427	585	293	53	1567	2.39	0.99
	%	2.11	11.23	27.25	37.33	18.70	3.38	100		
NZ marine/maritime acts and regulations	n	83	310	491	456	206	21	1567	2.75	1.09
	%	5.30	19.78	31.33	29.10	13.15	1.34	100		

Table 23. Perceived condition

Environmental component		Very good	Good	Adequate	Poor	Very poor	Don't know	Total	M	SD
Global natural environment	n	37	138	350	674	351	17	1567	2.25	0.98
	%	2.36	8.81	22.34	43.01	22.40	1.08	100		
Global marine environment	n	30	125	289	660	444	19	1567	2.12	0.98
	%	1.91	7.98	18.44	42.12	28.33	1.21	100		
Global marine fish stocks	n	14	78	280	674	466	55	1567	2.01	0.89
	%	0.89	4.98	17.87	43.01	29.74	3.51	100		
NZ natural environment	n	67	342	509	541	101	7	1567	2.83	0.98
	%	4.28	21.83	32.48	34.52	6.45	0.45	100		
NZ marine environment	n	81	309	494	545	117	21	1567	2.80	1.01
	%	5.17	19.72	31.53	34.78	7.47	1.34	100		
NZ marine fish stocks	n	48	205	442	575	196	101	1567	2.55	1.00
	%	3.06	13.08	28.21	36.69	12.51	6.45	100		
NZ deep sea fish stocks	n	25	157	406	549	191	239	1567	2.45	0.94
	%	1.60	10.02	25.91	35.04	12.19	15.25	100		
NZ inshore fish stocks	n	40	164	401	615	222	125	1567	2.43	0.97
	%	2.55	10.47	25.59	39.25	14.17	7.98	100		
NZ marine mammal populations	n	41	217	456	544	206	103	1567	2.55	1.00
	%	2.62	13.85	29.10	34.72	13.15	6.57	100		
NZ seabird populations	n	55	280	516	458	152	106	1567	2.75	1.00
	%	3.51	17.87	32.93	29.23	9.70	6.76	100		
NZ coastlines	n	66	375	591	412	87	36	1567	2.95	0.95
	%	4.21	23.93	37.72	26.29	5.55	2.30	100		
NZ freshwater environment (rivers, lakes, groundwater)	n	35	171	329	550	443	39	1567	2.22	1.05
	%	2.23	10.91	21.00	35.10	28.27	2.49	100		

Table 24. Perceived threat

Threat		Catastrophic	Major	Moderate	Minor	Insignificant	Don't know	Total	M	SD
Climate change	n	342	621	319	176	92	17	1567	3.61	1.12
	%	21.83	39.63	20.36	11.23	5.87	1.08	100		
Invasive species	n	269	790	394	68	9	37	1567	3.81	0.79
	%	17.17	50.41	25.14	4.34	0.57	2.36	100		
Sedimentation	n	143	721	508	83	13	99	1567	3.61	0.77
	%	9.13	46.01	32.42	5.30	0.83	6.32	100		
Nutrient/chemical run-off	n	306	824	340	67	5	25	1567	3.88	0.78
	%	19.53	52.58	21.70	4.28	0.32	1.60	100		
Sewage	n	160	705	543	119	9	31	1567	3.58	0.80
	%	10.21	44.99	34.65	7.59	0.57	1.98	100		
Plastics	n	591	651	243	63	11	8	1567	4.12	0.86
	%	37.72	41.54	15.51	4.02	0.70	0.51	100		
Maritime vessel pollution	n	103	502	597	244	21	100	1567	3.29	0.87
	%	6.57	32.04	38.10	15.57	1.34	6.38	100		
Recreational fishing	n	26	209	601	544	149	38	1567	2.62	0.90
	%	1.66	13.34	38.35	34.72	9.51	2.43	100		
Commercial fishing	n	246	734	447	104	11	25	1567	3.71	0.84
	%	15.70	46.84	28.53	6.64	0.70	1.60	100		
Commercial aquaculture	n	48	251	680	347	55	186	1567	2.92	0.85
	%	3.06	16.02	43.40	22.14	3.51	11.87	100		
Māori customary fishing	n	72	154	425	544	190	182	1567	2.55	1.03
	%	4.59	9.83	27.12	34.72	12.13	11.61	100		
Seabed mining & the oil & gas industry	n	445	430	323	233	83	53	1567	3.61	1.21
	%	28.40	27.44	20.61	14.87	5.30	3.38	100		

Table 25. Attitudes towards climate change

Statement		Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree	Total	M	SD
Climate change is real	n	911	288	165	73	51	33	46	1567	6.05	1.50
	%	58.14	18.38	10.53	4.66	3.25	2.11	2.94	100		
Climate change is caused by humans	n	629	295	271	95	114	80	83	1567	5.42	1.81
	%	40.14	18.83	17.29	6.06	7.28	5.11	5.30	100		
I am deeply concerned about climate change	n	635	318	215	149	81	82	87	1567	5.44	1.82
	%	40.52	20.29	13.72	9.51	5.17	5.23	5.55	100		
Climate change is a threat to the marine environment	n	765	333	181	115	54	65	54	1567	5.78	1.64
	%	48.82	21.25	11.55	7.34	3.45	4.15	3.45	100		
Climate change is a threat to fisheries	n	665	379	200	146	59	66	52	1567	5.66	1.63
	%	42.44	24.19	12.76	9.32	3.77	4.21	3.32	100		

Table 26. Trust in generic individual stakeholders

Stakeholder		Very Strong	Strong	Moderate	Weak	None	Don't know	Total	M	SD
The environmentalist	n	224	402	459	315	150	17	1567	3.15	1.19
	%	14.29	25.65	29.29	20.10	9.57	1.08	100		
The commercial fisher	n	27	119	520	662	224	15	1567	2.40	0.89
	%	1.72	7.59	33.18	42.25	14.29	0.96	100		
The recreational fisher	n	69	325	744	354	64	11	1567	2.99	0.88
	%	4.40	20.74	47.48	22.59	4.08	0.70	100		
The public servant	n	25	169	556	579	215	23	1567	2.49	0.92
	%	1.60	10.78	35.48	36.95	13.72	1.47	100		
The scientist	n	482	523	402	122	29	9	1567	3.84	1.01
	%	30.76	33.38	25.65	7.79	1.85	0.57	100		
The academic	n	246	425	483	282	106	25	1567	3.27	1.14
	%	15.70	27.12	30.82	18.00	6.76	1.60	100		

Table 27. Trust in generic organisational stakeholders

Stakeholder		Very Strong	Strong	Moderate	Weak	None	Don't know	Total	M	SD
Environmental NGOs	n	142	315	520	346	131	113	1567	2.99	1.10
	%	9.06	20.10	33.18	22.08	8.36	7.21	100		
Commercial fishing companies	n	9	58	358	744	391	7	1567	2.07	0.82
	%	0.57	3.70	22.85	47.48	24.95	0.45	100		
Recreational fishing organisations	n	80	327	677	400	62	21	1567	2.98	0.92
	%	5.11	20.87	43.20	25.53	3.96	1.34	100		
Government departments	n	24	167	600	566	202	8	1567	2.52	0.90
	%	1.53	10.66	38.29	36.12	12.89	0.51	100		
Research institutes	n	296	600	469	155	35	12	1567	3.62	0.98
	%	18.89	38.29	29.93	9.89	2.23	0.77	100		
Universities	n	280	539	477	176	74	21	1567	3.50	1.06
	%	17.87	34.40	30.44	11.23	4.72	1.34	100		

Table 28. Trust in specific stakeholder organisations

Stakeholder		Very Strong	Strong	Moderate	Weak	None	Don't know	Haven't heard of them	Total	M	SD
NIWA	n	434	564	393	91	25	23	37	1567	3.86	0.96
	%	27.70	35.99	25.08	5.81	1.60	1.47	2.36	100		
Met Service	n	430	609	440	69	6	8	5	1567	3.89	0.87
	%	27.44	38.86	28.08	4.40	0.38	0.51	0.32	100		
Plant & Food	n	235	507	519	106	12	97	91	1567	3.61	0.89
	%	15.00	32.35	33.12	6.76	0.77	6.19	5.81	100		
Cawthron Institute	n	204	278	234	74	40	221	516	1567	3.64	1.09
	%	13.02	17.74	14.93	4.72	2.55	14.10	32.93	100		
Callaghan Innovation	n	136	222	275	93	40	257	544	1567	3.42	1.08
	%	8.68	14.17	17.55	5.93	2.55	16.40	34.72	100		
MSC	n	63	189	331	159	28	271	526	1567	3.13	0.95
	%	4.02	12.06	21.12	10.15	1.79	17.29	33.57	100		
MBIE	n	24	166	632	495	116	99	35	1567	2.64	0.85
	%	1.53	10.59	40.33	31.59	7.40	6.32	2.23	100		
DoC	n	236	436	435	281	174	2	3	1567	3.18	1.22
	%	15.06	27.82	27.76	17.93	11.10	0.13	0.19	100		
MfE	n	82	320	583	385	130	43	24	1567	2.89	1.01
	%	5.23	20.42	37.20	24.57	8.30	2.74	1.53	100		
MPI	n	65	194	612	485	179	28	4	1567	2.66	0.98
	%	4.15	12.38	39.06	30.95	11.42	1.79	0.26	100		
FNZ	n	65	206	566	464	151	85	30	1567	2.70	0.98
	%	4.15	13.15	36.12	29.61	9.64	5.42	1.91	100		
Maritime NZ	n	149	398	592	212	56	137	23	1567	3.26	0.97
	%	9.51	25.40	37.78	13.53	3.57	8.74	1.47	100		
Your local fishing club/s	n	141	296	497	226	58	248	101	1567	3.19	1.02
	%	9.00	18.89	31.72	14.42	3.70	15.83	6.45	100		
NZ Sports Fishing Council	n	82	220	516	297	74	274	104	1567	2.95	0.98
	%	5.23	14.04	32.93	18.95	4.72	17.49	6.64	100		
LegaSea	n	150	194	260	131	94	243	495	1567	3.21	1.24
	%	9.57	12.38	16.59	8.36	6.00	15.51	31.59	100		
Fish & Game	n	136	355	538	296	111	93	38	1567	3.08	1.07
	%	8.68	22.65	34.33	18.89	7.08	5.93	2.43	100		
Coastguard	n	712	572	189	34	10	39	11	1567	4.28	0.82
	%	45.44	36.50	12.06	2.17	0.64	2.49	0.70	100		
Your local iwi	n	92	274	484	299	165	224	29	1567	2.87	1.10
	%	5.87	17.49	30.89	19.08	10.53	14.29	1.85	100		
Sanford	n	21	74	394	489	322	104	163	1567	2.22	0.94
	%	1.34	4.72	25.14	31.21	20.55	6.64	10.40	100		
Sealord	n	17	81	420	580	374	73	22	1567	2.18	0.91
	%	1.08	5.17	26.80	37.01	23.87	4.66	1.40	100		
Talley's	n	13	63	356	549	420	87	79	1567	2.07	0.90
	%	0.83	4.02	22.72	35.04	26.80	5.55	5.04	100		
Moana	n	15	72	347	418	249	173	293	1567	2.26	0.93
	%	0.96	4.59	22.14	26.68	15.89	11.04	18.70	100		
Lee Fish	n	24	76	302	330	214	188	433	1567	2.33	0.99
	%	1.53	4.85	19.27	21.06	13.66	12.00	27.63	100		
Fonterra	n	19	69	342	662	440	32	3	1567	2.06	0.89
	%	1.21	4.40	21.83	42.25	28.08	2.04	0.19	100		

Stakeholder		Very Strong	Strong	Moderate	Weak	None	Don't know	Haven't heard of them	Total	M	SD
Sea Shepherd	n	226	280	410	298	223	55	75	1567	2.99	1.29
	%	14.42	17.87	26.16	19.02	14.23	3.51	4.79	100		
Greenpeace	n	179	300	441	357	285	5	0	1567	2.83	1.26
	%	11.42	19.14	28.14	22.78	18.19	0.32	0.00	100		
Forest & Bird	n	337	413	382	189	219	12	15	1567	3.30	1.32
	%	21.51	26.36	24.38	12.06	13.98	0.77	0.96	100		
WWF	n	227	396	528	240	122	41	13	1567	3.24	1.13
	%	14.49	25.27	33.69	15.32	7.79	2.62	0.83	100		
TNC	n	148	267	335	146	75	192	404	1567	3.27	1.13
	%	9.44	17.04	21.38	9.32	4.79	12.25	25.78	100		
Sustainable Coastlines	n	210	325	342	127	50	174	339	1567	3.49	1.08
	%	13.40	20.74	21.83	8.10	3.19	11.10	21.63	100		

Table 29. Trust in specific stakeholder organisations, ordered highest to lowest

Stakeholder	M	SD
Coastguard	4.28	0.82
Met Service	3.89	0.87
NIWA	3.86	0.96
The scientist	3.84	1.01
Cawthron Institute	3.64	1.09
Research institutes	3.62	0.98
Plant & Food	3.61	0.89
Universities	3.50	1.06
Sustainable Coastlines	3.49	1.08
Callaghan Innovation	3.42	1.08
Forest & Bird	3.30	1.32
TNC	3.27	1.13
The academic	3.27	1.14
Maritime NZ	3.26	0.97
WWF	3.24	1.13
LegaSea	3.21	1.24
Your local fishing club/s	3.19	1.02
DoC	3.18	1.22
The environmentalist	3.15	1.19
MSC	3.13	0.95
Fish & Game	3.08	1.07
Sea Shepherd	2.99	1.29
The recreational fisher	2.99	0.88
Environmental NGOs	2.99	1.10
Recreational fishing organisations	2.98	0.92
NZ Sports Fishing Council	2.95	0.98
MfE	2.89	1.01
Your local iwi	2.87	1.10
Greenpeace	2.83	1.26
FNZ	2.70	0.98
MPI	2.66	0.98
MBIE	2.64	0.85
Government departments	2.52	0.90
The public servant	2.49	0.92
The commercial fisher	2.40	0.89
Lee Fish	2.33	0.99
Moana	2.26	0.93
Sanford	2.22	0.94
Sealord	2.18	0.91
Talley's	2.07	0.90
Commercial fishing companies	2.07	0.82
Fonterra	2.06	0.89

Table 30. Awareness of specific stakeholder organisations

Stakeholder	Haven't heard of them		Awareness
	Respondents	%	%
Greenpeace	0	0.00	100.00
DoC	3	0.19	99.81
Fonterra	3	0.19	99.81
MPI	4	0.26	99.74
Met Service	5	0.32	99.68
Coastguard	11	0.70	99.30
WWF	13	0.83	99.17
Forest & Bird	15	0.96	99.04
Sealord	22	1.40	98.60
Maritime NZ	23	1.47	98.53
MfE	24	1.53	98.47
Your local iwi	29	1.85	98.15
FNZ	30	1.91	98.09
MBIE	35	2.23	97.77
NIWA	37	2.36	97.64
Fish & Game	38	2.43	97.57
Sea Shepherd	75	4.79	95.21
Talley's	79	5.04	94.96
Plant & Food	91	5.81	94.19
Your local fishing club/s	101	6.45	93.55
NZ Sports Fishing Council	104	6.64	93.36
Sanford	163	10.40	89.60
Moana	293	18.70	81.30
Sustainable Coastlines	339	21.63	78.37
TNC	404	25.78	74.22
Lee Fish	433	27.63	72.37
LegaSea	495	31.59	68.41
Cawthron Institute	516	32.93	67.07
MSC	526	33.57	66.43
Callaghan Innovation	544	34.72	65.28

Table 31. Frequency of marine related behaviour

Behaviour		Every day	Once or more per week	Once or more per month	Once or more per year	Less than once per year	Never	M	SD
Collecting seafood from the coast (e.g. gathering shellfish)	n	1	52	229	491	367	427	1.44	1.14
	%	0.06	3.32	14.61	31.33	23.42	27.25		
Diving for seafood, with or without tanks (e.g. spear fishing)	n	0	28	118	296	234	891	0.82	1.09
	%	0.00	1.79	7.53	18.89	14.93	56.86		
Fishing from beach/coast (e.g. surf-casting)	n	3	35	204	401	321	603	1.21	1.16
	%	0.19	2.23	13.02	25.59	20.49	38.48		
Marine fishing from a non-powered craft (e.g. kayak)	n	2	11	70	190	246	1048	0.57	0.93
	%	0.13	0.70	4.47	12.13	15.70	66.88		
Marine fishing from a powered craft (e.g. motor boat)	n	6	70	328	411	257	495	1.51	1.27
	%	0.38	4.47	20.93	26.23	16.40	31.59		
Spending time at the beach/coast (for any reason other than those listed previously)	n	139	438	592	348	45	5	3.17	0.99
	%	8.87	27.95	37.78	22.21	2.87	0.32		
Swimming or water-sports (e.g. surfing)	n	17	210	451	558	175	156	2.28	1.16
	%	1.08	13.40	28.78	35.61	11.17	9.96		
SCUBA diving / snorkelling (non-fishing)	n	5	43	160	402	275	682	1.12	1.18
	%	0.32	2.74	10.21	25.65	17.55	43.52		
Recreational boating, either non-powered or powered craft (non-fishing)	n	15	91	317	481	299	364	1.69	1.24
	%	0.96	5.81	20.23	30.70	19.08	23.23		
Visit a marine reserve	n	15	44	168	604	514	222	1.58	1.01
	%	0.96	2.81	10.72	38.54	32.80	14.17		
Use marine transport (e.g. catch the ferry)	n	16	33	94	516	543	365	1.32	1.03
	%	1.02	2.11	6.00	32.93	34.65	23.29		
Eat seafood	n	11	768	585	104	19	80	3.26	1.01
	%	0.70	49.01	37.33	6.64	1.21	5.11		
Purchase seafood	n	2	494	557	228	95	191	2.69	1.31
	%	0.13	31.53	35.55	14.55	6.06	12.19		
Use marine transport (e.g. catch the ferry)	n	16	33	94	516	543	365	1.32	1.03
	%	1.02	2.11	6.00	32.93	34.65	23.29		
Volunteering as part of a group working in the marine environment	n	15	45	95	221	318	873	0.83	1.15
	%	0.96	2.87	6.06	14.10	20.29	55.71		
Volunteering as an individual working in the marine environment	n	18	49	105	200	293	902	0.83	1.19
	%	1.15	3.13	6.70	12.76	18.70	57.56		

Table 32. Mean frequency of marine related behaviour, ordered highest to lowest

Behaviour	M	SD
Eat seafood	3.26	1.01
Spending time at the beach/coast (for any reason other than those listed previously)	3.17	0.99
Purchase seafood	2.69	1.31
Swimming or water-sports (e.g. surfing)	2.28	1.16
Recreational boating, either non-powered or powered craft (non-fishing)	1.69	1.24
Visit a marine reserve	1.58	1.01
Marine fishing from a powered craft (e.g. motor boat)	1.51	1.27
Collecting seafood from the coast (e.g. gathering shellfish)	1.44	1.14
Use marine transport (e.g. catch the ferry)	1.32	1.03
Fishing from beach/coast (e.g. surf-casting)	1.21	1.16
SCUBA diving / snorkelling (non-fishing)	1.12	1.18
Volunteering as part of a group working in the marine environment	0.83	1.15
Volunteering as an individual working in the marine environment	0.83	1.19
Diving for seafood, with or without tanks (e.g. spear fishing)	0.82	1.09
Marine fishing from a non-powered craft (e.g. kayak)	0.57	0.93

Table 33. Individual item responses to the revised *NEP*

NEP Item #	Item	M	SD
1	We are approaching the limit of the number of people the Earth can support.	3.97	1.21
2	Humans have the right to modify the natural environment to suit their needs.	3.59	1.24
3	When humans interfere with nature it often produces disastrous consequences.	4.12	1.13
4	Human ingenuity will ensure that we do not make the Earth unlivable.	3.19	1.26
5	Humans are seriously abusing the environment.	4.36	1.10
6	The Earth has plenty of natural resources if we just learn how to develop them.	2.92	1.37
7	Plants and animals have as much right as humans to exist.	4.25	1.11
8	The balance of nature is strong enough to cope with the impacts of modern industrial nations.	4.12	1.11
9	Despite our special abilities, humans are still subject to the laws of nature.	4.50	0.84
10	The so-called "ecological crisis" facing humankind has been greatly exaggerated.	3.76	1.47
11	The Earth is like a spaceship with very limited room and resources.	3.98	1.15
12	Humans were meant to rule over the rest of nature.	4.05	1.24
13	The balance of nature is very delicate and easily upset.	4.11	1.10
14	Humans will eventually learn enough about how nature works to be able to control it.	3.70	1.17
15	If things continue on their present course, we will soon experience a major ecological catastrophe.	4.09	1.24

Table 34. Correlations, means, standard deviations, and Cronbach's alpha for the 4 higher order value domains of the PVQ-RR

Value Domain	1	2	3	4	M	SD	α
1. *Openness to change*	-				4.52	0.62	.83
2. *Self-enhancement*	.341**	-			2.79	0.71	.82
3. *Conservation*	.191**	.292**	-		3.84	0.74	.86
4. *Self-transcendence*	.401**	.054*	.433**	-	4.84	0.60	.86

*p < .05
**p < .01

Table 35. Correlations, means, standard deviations, and Cronbach's alpha for the 10 original value domains of the PVQ-RR

Value Domain	1	2	3	4	5	6	7	8	9	10	M	SD	α
1. *SD*	-										4.88	0.66	.79
2. *ST*	.353**	-									4.01	0.99	.74
3. *HE*	.269**	.568**	-								4.31	0.93	.79
4. *AC*	.252**	.385**	.372**	-							3.69	0.89	.64
5. *PO*	.070**	.235**	.274**	.559**	-						2.34	0.75	.79
6. *SE*	.247**	.092**	.278**	.305**	.230**	-					4.38	0.77	.76
7. *TR*	.119**	.130**	.206**	.143**	.115**	.445**	-				3.61	0.82	.65
8. *CO*	-.005	.01	.169**	.186**	.134**	.479**	.493**	-			3.65	0.94	.82
9. *BE*	.341**	.241**	.297**	.290**	.117**	.518**	.461**	.376**	-		4.95	0.68	.81
10. *UN*	.299**	.250**	.150**	.131**	-.153**	.251**	.289**	.261**	.422**	-	4.77	0.73	.85

*p < .05
**p < .01

Table 36. Correlations, means, standard deviations, and Cronbach's alpha for the 19 value domains of the PVQ-RR

Value Domain	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	M	SD	α
1. *SDT*	-																			5.00	0.71	.70
2. *SDA*	.629**	-																		4.76	0.75	.65
3. *ST*	.281**	.354**	-																	4.01	0.99	.74
4. *HE*	.202**	.281**	.568**	-																4.31	0.93	.79
5. *AC*	.181**	.272**	.385**	.372**	-															3.69	0.89	.64
6. *POD*	.028	.122**	.197**	.200**	.437**	-														2.35	0.86	.71
7. *POR*	-.015	.080**	.210**	.273**	.531**	.500**	-													2.33	0.88	.76
8. *FA*	.072**	.144**	.169**	.237**	.457**	.344**	.362**	-												3.49	1.05	.72
9. *SEP*	.105**	.216**	.004	.210**	.302**	.144**	.235**	.397**	-											4.21	0.84	.06
10. *SES*	.206**	.226**	.143**	.262**	.225**	.103**	.203**	.276**	.465**	-										4.56	0.97	.76
11. *TR*	.032	.056*	.102**	.185**	.203**	.207**	.203**	.243**	.300**	.408**	-									3.10	1.21	.81
12. *COR*	.041	.058*	-.030	.097**	.169**	.105**	.088**	.233**	.420**	.372**	.402**	-								3.97	1.17	.88
13. *COI*	-.085**	-.036	.049	.184**	.138**	.073**	.116**	.389**	.367**	.206**	.271**	.365**	-							3.34	1.10	.83
14. *HU*	.155**	.125**	.102**	.128**	-.013	-.053*	-.136**	.136**	.234**	.205**	.211**	.251**	.338**	-						4.12	0.88	.43
15. *BEC*	.257**	.220**	.206**	.255**	.223**	.050*	.072**	.238**	.391**	.388**	.313**	.296**	.240**	.286**	-					4.95	0.77	.72
16. *BED*	.321**	.311**	.227**	.279**	.299**	.135**	.107**	.307**	.403**	.410**	.340**	.321**	.253**	.358**	.610**	-				4.95	0.75	.70
17. *UNN*	.234**	.236**	.267**	.143**	.159**	.008	-.117**	.098**	.203**	.142**	.033	.103**	.118**	.228**	.232**	.263**	-			4.90	0.86	.79
18. *UNC*	.207**	.190**	.120**	.069**	.058*	-.094**	-.171**	.112**	.228**	.151**	.056*	.124**	.250**	.395**	.334**	.308**	.428**	-		4.84	0.09	.76
19. *UNT*	.251**	.200**	.225**	.153**	.105**	-.124**	-.141**	.076**	.196**	.141**	.139**	.183**	.272**	.362**	.356**	.346**	.399**	.635**	-	4.56	0.92	.78

*p < .05
**p < .01

Introduction

The New Zealand Marine Values Survey 2019

INFORMATION FOR PARTICIPANTS

You are invited to participate in this research. Please read this information before deciding whether or not to do so. If you decide to take part, thank you. If you decide not to take part, thank you for considering this request.

Who is carrying out this research?

Hamish Howard is carrying out this research to fulfil the requirements of a Master of Science at Victoria University of Wellington's Centre for Science in Society.

What is the aim of the project?

The aim of the New Zealand Marine Values Survey (NZMVS) is to gain an understanding of the relationship between New Zealanders' values and their perceptions, attitudes, and behaviours towards the marine environment.

What does participation involve?

Participation involves filling out a questionnaire that takes around 30 minutes to complete. Questions will ask you about who you are and what you think. The survey can be exited at any point by closing the browser window. Incomplete surveys can be returned to at a later time via the same device. Data from partially completed surveys may be used in this research.

What will happen to the information provided?

This research is confidential. No information will be released that could identify you as an individual. By answering questions, you are giving your consent for your answers to be used in this research. Responses are required for all questions, unless stated otherwise. Once your answers

have been submitted you will not be able to retract them. All responses will be aggregated, with results presented in the form of summary statistics.

If you would like to be updated as our research progresses, an option to provide your name and email address is provided at the conclusion of the questionnaire. If you choose to provide this information, it will be separated from your responses by the survey software (Qualtrics). Names and email addresses will only be used for correspondence relating to the NZMVS (e.g. if the survey is run again in future) and will never be shared with any other party. All correspondence will provide the option to unsubscribe from all communications and to be removed from the NZMVS database.

All data will be encrypted and stored in a secure database. Only the NZMVS research team will have access to this database. Anonymous response data will be stored indefinitely and may be shared on a case-by-case basis for research purposes. Data from this research may also be reused in further study.

What will the project produce?

Information from this research will contribute to a Master of Science thesis, and potentially also: reports, academic publications, and conference presentations. Wherever possible, this information will be made public via www.nzmvs.org

Contact

If you have any questions or queries regarding the NZMVS, please contact: Hamish Howard (Student and Lead Researcher) via email (howardhami@myvuw.ac.nz) or Dr Courtney Addison (Supervisor) via email (courtney.addison@vuw.ac.nz) or phone (+64 4 463 9974).

More information on the NZMVS can be found at www.nzmvs.org

Ethics

This research has been approved by The Victoria University of Wellington Human Ethics Committee (Application #0000027571). If you have any concerns about the ethical conduct of this research you may contact the VUW HEC Convenor: Dr Judith Loveridge via email (hec@vuw.ac.nz) or phone (+64 4 463 6028).

CONSENT

Please check to confirm:

☐ I have read and understand the 'Information for Participants' page (previous).

☐ I understand that my data will remain confidential at all times.

☐ I understand that my anonymity will be preserved in the publication of any results.

☐ I understand that my contact details (if provided) will never be shared with anyone outside the immediate research team and will only be used for correspondence relating to the NZMVS.

☐ I understand that once answers have been submitted it will not be possible to retract them.

☐ I consent to participate in the New Zealand Marine Values Survey 2019.

Demographics

For the purpose of understanding how respondents to this questionnaire compare with the general population of New Zealand, the following questions ask for some basic demographic data.

Which year were you born in? (YYYY)

☐

Which country were you born in?

☐

What is your gender?

○ Female

○ Male

○ Diverse

○ Prefer not to say

Which ethnic group/s do you belong to?

☐ Pākehā / New Zealand European

☐ [   ] Māori (please specify iwi):

☐ Samoan

☐ Cook Island Maori

☐ Tongan

☐ Niuean

☐ Chinese

☐ Indian

☐ [   ] Other/s (please specify):

How many years (total) have you lived in New Zealand?

[▾]

Do you live in:

○ The countryside or a town of less than 1,000 people

○ A town of 1,000 to 10,000

○ A town of 10,001 to 30,000 people

○ A large town or city of more than 30,000 people

Which region do you live in?

[dropdown ▼]

What is the highest level of formal education you have completed (or the equivalent outside of New Zealand)?

○ Primary school, intermediate school
○ High school, without qualifications
○ High school, with qualifications
○ Undergraduate diploma/certificate
○ [   ] Bachelors degree (please specify):

○ [   ] Postgraduate qualification (please specify):

Please indicate if you hold qualifications in any of these areas (please state):

☐ Recreational boating

[   ]

☐ Diving (e.g. PADI)

[   ]

☐ Maritime (excluding commercial fishing)

[   ]

☐ Commercial fishing

[   ]

☐ Other (relevant to the marine environment)

[   ]

Which of the following best describes your current situation?

○ Paid employment, working 30 or more hours per week
○ Paid employment, working less than 30 hours per week
○ Unemployed
○ Retired
○ Unpaid voluntary work
○ Home duties
○ Student
○ Other (please state):

What is your occupation?

What is your personal annual income from all sources before tax?

○ Loss
○ Zero income
○ $1–$10,000
○ $10,001–$20,000
○ $20,001–$30,000
○ $30,001–$40,000
○ $40,001–$50,000
○ $50,001–$60,000
○ $60,001–$70,000
○ $70,001–$100,000
○ $100,001–$150,000
○ $150,001 or more
○ Prefer not to say

Please rate how strongly you oppose or support each of the following political parties:

	Strongly oppose	.	..	...	....	.....	Strongly support
The National Party	◯	◯	◯	◯	◯	◯	◯
The Labour Party	◯	◯	◯	◯	◯	◯	◯
The ACT Party	◯	◯	◯	◯	◯	◯	◯
The Green Party	◯	◯	◯	◯	◯	◯	◯
The Māori Party	◯	◯	◯	◯	◯	◯	◯
The NZ First Party	◯	◯	◯	◯	◯	◯	◯

Please rate how politically liberal versus conservative you see yourself as being:

	Extremely liberal	.	..	...	....	.....	Extremely conservative
I am...	◯	◯	◯	◯	◯	◯	◯

Please rate how politically left-wing versus politically right-wing you see yourself as being:

	Extremely left-wing	.	..	...	....	.....	Extremely right-wing
I am...	◯	◯	◯	◯	◯	◯	◯

NZMVS

Please rate your knowledge of the following:

	Excellent	Good	Average	Poor	No knowledge	Don't know
General environmental issues	○	○	○	○	○	○
Marine environmental issues	○	○	○	○	○	○
Recreational fishing practices	○	○	○	○	○	○
Commercial fishing practices	○	○	○	○	○	○
Commercial aquaculture practices	○	○	○	○	○	○
Marine science	○	○	○	○	○	○
Fisheries science	○	○	○	○	○	○
Mātauranga Māori	○	○	○	○	○	○
The Treaty of Waitangi / Te Tiriti o Waitangi	○	○	○	○	○	○
NZ Quota Management System	○	○	○	○	○	○
Māori Fisheries Settlement	○	○	○	○	○	○
NZ marine/maritime acts and regulations	○	○	○	○	○	○

Please rate the condition of the following:

	Very good	Good	Adequate	Poor	Very poor	Don't know
Global natural environment	○	○	○	○	○	○
Global marine environment	○	○	○	○	○	○
Global marine fish stocks	○	○	○	○	○	○
NZ natural environment	○	○	○	○	○	○

	Very good	Good	Adequate	Poor	Very poor	Don't know
NZ marine environment	◯	◯	◯	◯	◯	◯
NZ marine fish stocks	◯	◯	◯	◯	◯	◯
NZ deep sea fish stocks	◯	◯	◯	◯	◯	◯
NZ inshore fish stocks	◯	◯	◯	◯	◯	◯
NZ marine mammal populations	◯	◯	◯	◯	◯	◯
NZ seabird populations	◯	◯	◯	◯	◯	◯
NZ coastlines	◯	◯	◯	◯	◯	◯
NZ freshwater environment (rivers, lakes, groundwater)	◯	◯	◯	◯	◯	◯

Please rate the threat of the following to New Zealand's marine environment/ecosystems:

	Insignificant	Minor	Moderate	Major	Catastrophic	Don't know
Climate change	◯	◯	◯	◯	◯	◯
Invasive species	◯	◯	◯	◯	◯	◯
Sedimentation	◯	◯	◯	◯	◯	◯
Nutrient/chemical run-off	◯	◯	◯	◯	◯	◯
Sewage	◯	◯	◯	◯	◯	◯
Plastics	◯	◯	◯	◯	◯	◯
Maritime vessel pollution	◯	◯	◯	◯	◯	◯
Recreational fishing	◯	◯	◯	◯	◯	◯
Commercial fishing	◯	◯	◯	◯	◯	◯
Commercial aquaculture	◯	◯	◯	◯	◯	◯
Māori customary fishing	◯	◯	◯	◯	◯	◯
Seabed mining & the oil & gas industry	◯	◯	◯	◯	◯	◯

Please indicate how strongly you agree or disagree with each statement:

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
Climate change is real.	◯	◯	◯	◯	◯	◯	◯
Climate change is caused by humans.	◯	◯	◯	◯	◯	◯	◯
I am deeply concerned about climate change.	◯	◯	◯	◯	◯	◯	◯
Climate change is a threat to the marine environment.	◯	◯	◯	◯	◯	◯	◯
Climate change is a threat to fisheries.	◯	◯	◯	◯	◯	◯	◯

Please indicate your trust in the following individuals:

	None	Weak	Moderate	Strong	Very strong	Don't know
The environmentalist	◯	◯	◯	◯	◯	◯
The commercial fisher	◯	◯	◯	◯	◯	◯
The recreational fisher	◯	◯	◯	◯	◯	◯
The public servant	◯	◯	◯	◯	◯	◯
The scientist	◯	◯	◯	◯	◯	◯
The academic	◯	◯	◯	◯	◯	◯

Please indicate your trust in the following groups:

	None	Weak	Moderate	Strong	Very strong	Don't know

	None	Weak	Moderate	Strong	Very strong	Don't know
Environmental NGOs	○	○	○	○	○	○
Commercial fishing companies	○	○	○	○	○	○
Recreational fishing organisations	○	○	○	○	○	○
Government departments	○	○	○	○	○	○
Research institutes	○	○	○	○	○	○
Universities	○	○	○	○	○	○

Please indicate your trust in the following organisations:

	None	Weak	Moderate	Strong	Very strong
NIWA (National Institute of Water and Atmospheric Research)	○	○	○	○	○
Met Service (Meteorological Service of New Zealand)	○	○	○	○	○
Plant & Food Research	○	○	○	○	○
Cawthron Institute	○	○	○	○	○
Callaghan Innovation	○	○	○	○	○
Marine Stewardship Council (MSC)	○	○	○	○	○

Please indicate your trust in the following organisations:

	None	Weak	Moderate	Strong	Very strong
Ministry for Business, Innovation, and Employment (MBIE)	○	○	○	○	○

	None	Weak	Moderate	Strong	Very strong
Department of Conservation (DoC)	◯	◯	◯	◯	◯
Ministry for the Environment (MfE)	◯	◯	◯	◯	◯
Ministry for Primary Industries (MPI)	◯	◯	◯	◯	◯
Fisheries New Zealand (FNZ)	◯	◯	◯	◯	◯
Maritime NZ	◯	◯	◯	◯	◯

Please indicate your trust in the following organisations:

	None	Weak	Moderate	Strong	Very strong
Your local fishing club/s	◯	◯	◯	◯	◯
NZ Sports Fishing Council	◯	◯	◯	◯	◯
LegaSea	◯	◯	◯	◯	◯
Fish & Game	◯	◯	◯	◯	◯
Coastguard	◯	◯	◯	◯	◯
Your local iwi	◯	◯	◯	◯	◯

Please indicate your trust in the following organisations:

	None	Weak	Moderate	Strong	Very strong	Don't know	Haven't heard of them
Sanford	◯	◯	◯	◯	◯	◯	◯
Sealord	◯	◯	◯	◯	◯	◯	◯
Talley's	◯	◯	◯	◯	◯	◯	◯
Moana	◯	◯	◯	◯	◯	◯	◯
Lee Fish / Leigh Fisheries	◯	◯	◯	◯	◯	◯	◯

	None	Weak	Moderate	Strong	Very strong	Don't know	Haven't heard of them
Fonterra	○	○	○	○	○	○	○

Please indicate your trust in the following organisations:

	None	Weak	Moderate	Strong	Very strong	
Sea Shepherd	○	○	○	○	○	
Greenpeace	○	○	○	○	○	
Forest & Bird	○	○	○	○	○	
World Wildlife Fund (WWF)	○	○	○	○	○	
The Nature Conservancy	○	○	○	○	○	
Sustainable Coastlines	○	○	○	○	○	

Approximately how often do you participate in the following activities:

	Every day	Once or more per week	Once or more per month	Once or more per year	Less than once per year	Never
Collecting seafood from the coast (e.g. gathering shellfish)	○	○	○	○	○	○
Diving for seafood, with or without tanks (e.g. spear fishing)	○	○	○	○	○	○
Fishing from beach/coast (e.g. surf-casting)	○	○	○	○	○	○
Marine fishing from a non-powered craft (e.g. kayak)	○	○	○	○	○	○

	Every day	Once or more per week	Once or more per month	Once or more per year	Less than once per year	Never
Marine fishing from a powered craft (e.g. motor boat)	○	○	○	○	○	○

Approximately how often do you participate in the following MARINE activities (excluding participation in activities listed above):

	Every day	Once or more a week	Once or more a month	Once or more a year	Less than once a year	Never
Spending time at the beach/coast (for any reason other than those listed previously)	○	○	○	○	○	○
Swimming or water-sports (e.g. surfing)	○	○	○	○	○	○
SCUBA diving / snorkelling (non-fishing)	○	○	○	○	○	○
Recreational boating, either non-powered or powered craft (non-fishing)	○	○	○	○	○	○
Use marine transport (e.g. catch the ferry)	○	○	○	○	○	○

Approximately how often do you participate in the following activities:

	Every day	Once or more a week	Once or more a month	Once or more a year	Less than once a year	Never
Eat seafood	○	○	○	○	○	○
Purchase seafood	○	○	○	○	○	○
Visit a marine reserve	○	○	○	○	○	○

	Every day	Once or more a week	Once or more a month	Once or more a year	Less than once a year	Never
Volunteering as part of a group working in the marine environment	○	○	○	○	○	○
Volunteering as an individual working in the marine environment	○	○	○	○	○	○

Disclaimer

The following section asks you to indicate how well various statements describe you. These statements use gendered language based on your response to the earlier question: "What is your gender?"

PVQ57-RR (Female)

Please indicate how well the following statements describe you:

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to form her views independently.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her that her country is secure and stable.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to have a good time.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to avoid upsetting other people.	○	○	○	○	○	○
It is important to her that the weak and vulnerable in society be protected.	○	○	○	○	○	○
It is important to her that people do whatever she says they should.	○	○	○	○	○	○
It is important to her never to think she deserves more than other people.	○	○	○	○	○	○
It is important to her to care for nature.	○	○	○	○	○	○
It is important to her that no one should ever shame her.	○	○	○	○	○	○
It is important to her always to look for different things to do.	○	○	○	○	○	○
It is important to her to take care of people she is close to.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to have the power that money can bring.	○	○	○	○	○	○
It is very important to her to avoid disease and protect her health.	○	○	○	○	○	○
It is important to her to be tolerant toward all kinds of people and groups.	○	○	○	○	○	○
It is important to her never to violate rules or regulations.	○	○	○	○	○	○
It is important to her to make her own decisions about her life.	○	○	○	○	○	○
It is important to her to have ambitions in life.	○	○	○	○	○	○
It is important to her to maintain traditional values and ways of thinking.	○	○	○	○	○	○
It is important to her that people she knows have full confidence in her.	○	○	○	○	○	○
It is important to her to be wealthy.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to take part in activities to defend nature.	◯	◯	◯	◯	◯	◯
It is important to her never to annoy anyone.	◯	◯	◯	◯	◯	◯
It is important to her to develop her own opinions.	◯	◯	◯	◯	◯	◯
It is important to her to protect her public image.	◯	◯	◯	◯	◯	◯
It is very important to her to help the people dear to her.	◯	◯	◯	◯	◯	◯
It is important to her to be personally safe and secure.	◯	◯	◯	◯	◯	◯
It is important to her to be a dependable and trustworthy friend.	◯	◯	◯	◯	◯	◯
It is important to her to take risks that make life exciting.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to have the power to make people do what she wants.	○	○	○	○	○	○
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to plan her activities independently.	○	○	○	○	○	○
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to follow rules even when no-one is watching.	○	○	○	○	○	○
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to be very successful.	○	○	○	○	○	○
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to follow her family's customs or the customs of a religion.	○	○	○	○	○	○
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to listen to and understand people who are different from her.	○	○	○	○	○	○
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her that the state is strong and can defend its citizens.	○	○	○	○	○	○
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to enjoy life's pleasures.	○	○	○	○	○	○
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her that every person in the world has equal opportunities in life.	○	○	○	○	○	○
It is important to her to be humble.	○	○	○	○	○	○
It is important to her to figure things out herself.	○	○	○	○	○	○
It is important to her to honour the traditional practices of her culture.	○	○	○	○	○	○
It is important to her to be the one who tells others what to do.	○	○	○	○	○	○
It is important to her to obey all the laws.	○	○	○	○	○	○
It is important to her to have all sorts of new experiences.	○	○	○	○	○	○
It is important to her to own expensive things that show her wealth.	○	○	○	○	○	○
It is important to her to protect the natural environment from destruction or pollution.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to take advantage of every opportunity to have fun.	○	○	○	○	○	○
It is important to her to concern herself with every need of her dear ones.	○	○	○	○	○	○
It is important to her that people recognise what she achieves.	○	○	○	○	○	○
It is important to her never to be humiliated.	○	○	○	○	○	○
It is important to her that her country protect itself against all threats.	○	○	○	○	○	○
It is important to her never to make other people angry.	○	○	○	○	○	○
It is important to her that everyone be treated justly, even people she doesn't know.	○	○	○	○	○	○
It is important to her to avoid anything dangerous.	○	○	○	○	○	○

Not like me at all | Not like me | A little like me | Moderately like me | Like Me | Very Much Like Me

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to be satisfied with what she has and not ask for more.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her that all her friends and family can rely on her completely.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to be free to choose by herself what she does.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to her to accept people even when she disagrees with them.	○	○	○	○	○	○

PVQ57-RR (Male)

Please indicate how well the following statements describe you:

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to form his views independently.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him that his country is secure and stable.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to have a good time.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to avoid upsetting other people.	○	○	○	○	○	○
It is important to him that the weak and vulnerable in society be protected.	○	○	○	○	○	○
It is important to him that people do whatever he says they should.	○	○	○	○	○	○
It is important to him never to think he deserves more than other people.	○	○	○	○	○	○
It is important to him to care for nature.	○	○	○	○	○	○
It is important to him that no one should ever shame him.	○	○	○	○	○	○
It is important to him always to look for different things to do.	○	○	○	○	○	○
It is important to him to take care of people he is close to.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to have the power that money can bring.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is very important to him to avoid disease and protect his health.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to be tolerant toward all kinds of people and groups.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him never to violate rules or regulations.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to make his own decisions about his life.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to have ambitions in life.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to maintain traditional values and ways of thinking.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him that people he knows have full confidence in him.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to be wealthy.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to take part in activities to defend nature.	○	○	○	○	○	○
It is important to him never to annoy anyone.	○	○	○	○	○	○
It is important to him to develop his own opinions.	○	○	○	○	○	○
It is important to him to protect his public image.	○	○	○	○	○	○
It is very important to him to help the people dear to him.	○	○	○	○	○	○
It is important to him to be personally safe and secure.	○	○	○	○	○	○
It is important to him to be a dependable and trustworthy friend.	○	○	○	○	○	○
It is important to him to take risks that make life exciting.	○	○	○	○	○	○
It is important to him to have the power to make people do what he wants.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to plan his activities independently.	◯	◯	◯	◯	◯	◯
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to follow rules even when no-one is watching.	◯	◯	◯	◯	◯	◯
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to be very successful.	◯	◯	◯	◯	◯	◯
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to follow his family's customs or the customs of a religion.	◯	◯	◯	◯	◯	◯
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to listen to and understand people who are different from him.	◯	◯	◯	◯	◯	◯
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him that the state is strong and can defend its citizens.	◯	◯	◯	◯	◯	◯
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to enjoy life's pleasures.	◯	◯	◯	◯	◯	◯
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him that every person in the world have equal opportunities in life.	◯	◯	◯	◯	◯	◯
	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to be humble.	○	○	○	○	○	○
It is important to him to figure things out himself.	○	○	○	○	○	○
It is important to him to honour the traditional practices of his culture.	○	○	○	○	○	○
It is important to him to be the one who tells others what to do.	○	○	○	○	○	○
It is important to him to obey all the laws.	○	○	○	○	○	○
It is important to him to have all sorts of new experiences.	○	○	○	○	○	○
It is important to him to own expensive things that show his wealth.	○	○	○	○	○	○
It is important to him to protect the natural environment from destruction or pollution.	○	○	○	○	○	○
It is important to him to take advantage of every opportunity to have fun.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to concern himself with every need of his dear ones.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him that people recognise what he achieves.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him never to be humiliated.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him that his country protect itself against all threats.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him never to make other people angry.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him that everyone be treated justly, even people he doesn't know.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to avoid anything dangerous.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to be satisfied with what he has and not ask for more.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him that all his friends and family can rely on him completely.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to be free to choose by himself what he does.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to him to accept people even when he disagrees with them.	○	○	○	○	○	○

PVQ57-RR (Diverse / Prefer not to say)

Please indicate how well the following statements describe you:

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them to form their views independently.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them that their country is secure and stable.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them to have a good time.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them to avoid upsetting other people.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them that the weak and vulnerable in society be protected.	○	○	○	○	○	○
It is important to them that people do whatever they says they should.	○	○	○	○	○	○
It is important to them never to think they deserves more than other people.	○	○	○	○	○	○
It is important to them to care for nature.	○	○	○	○	○	○
It is important to them that no one should ever shame them.	○	○	○	○	○	○
It is important to them always to look for different things to do.	○	○	○	○	○	○
It is important to them to take care of people they is close to.	○	○	○	○	○	○
It is important to them to have the power that money can bring.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is very important to them to avoid disease and protect their health.	◯	◯	◯	◯	◯	◯
It is important to them to be tolerant toward all kinds of people and groups.	◯	◯	◯	◯	◯	◯
It is important to them never to violate rules or regulations.	◯	◯	◯	◯	◯	◯
It is important to them to make their own decisions about their life.	◯	◯	◯	◯	◯	◯
It is important to them to have ambitions in life.	◯	◯	◯	◯	◯	◯
It is important to them to maintain traditional values and ways of thinking.	◯	◯	◯	◯	◯	◯
It is important to them that people they knows have full confidence in them.	◯	◯	◯	◯	◯	◯
It is important to them to be wealthy.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them to take part in activities to defend nature.	○	○	○	○	○	○
It is important to them never to annoy anyone.	○	○	○	○	○	○
It is important to them to develop their own opinions.	○	○	○	○	○	○
It is important to them to protect their public image.	○	○	○	○	○	○
It is very important to them to help the people dear to them.	○	○	○	○	○	○
It is important to them to be personally safe and secure.	○	○	○	○	○	○
It is important to them to be a dependable and trustworthy friend.	○	○	○	○	○	○
It is important to them to take risks that make life exciting.	○	○	○	○	○	○
It is important to them to have the power to make people do what they wants.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them to plan their activities independently.	◯	◯	◯	◯	◯	◯
It is important to them to follow rules even when no-one is watching.	◯	◯	◯	◯	◯	◯
It is important to them to be very successful.	◯	◯	◯	◯	◯	◯
It is important to them to follow their family's customs or the customs of a religion.	◯	◯	◯	◯	◯	◯
It is important to them to listen to and understand people who are different from them.	◯	◯	◯	◯	◯	◯
It is important to them that the state is strong and can defend its citizens.	◯	◯	◯	◯	◯	◯
It is important to them to enjoy life's pleasures.	◯	◯	◯	◯	◯	◯
It is important to them that every person in the world have equal opportunities in life.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them to be humble.	○	○	○	○	○	○
It is important to them to figure things out themself.	○	○	○	○	○	○
It is important to them to honour the traditional practices of their culture.	○	○	○	○	○	○
It is important to them to be the one who tells others what to do.	○	○	○	○	○	○
It is important to them to obey all the laws.	○	○	○	○	○	○
It is important to them to have all sorts of new experiences.	○	○	○	○	○	○
It is important to them to own expensive things that show their wealth.	○	○	○	○	○	○
It is important to them to protect the natural environment from destruction or pollution.	○	○	○	○	○	○

Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them to take advantage of every opportunity to have fun.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them to concern themself with every need of their dear ones.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them that people recognise what they achieves.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them never to be humiliated.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them that their country protect itself against all threats.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them never to make other people angry.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them that everyone be treated justly, even people they doesn't know.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them to avoid anything dangerous.	○	○	○	○	○	○

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them to be satisfied with what they has and not ask for more.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them that all their friends and family can rely on them completely.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them to be free to choose by themself what they does.	◯	◯	◯	◯	◯	◯

	Not like me at all	Not like me	A little like me	Moderately like me	Like Me	Very Much Like Me
It is important to them to accept people even when they disagrees with them.	◯	◯	◯	◯	◯	◯

NEP15

NEP15 Listed below are statements about the relationship between humans and the environment. For each one, please indicate whether you strongly agree, mildly agree, are unsure, mildly disagree, or strongly disagree with it.

	Strongly agree	Mildly agree	Unsure	Mildly disagree	Strongly disagree
We are approaching the limit of the number of people the Earth can support.	◯	◯	◯	◯	◯
Humans have the right to modify the natural environment to suit their needs.	◯	◯	◯	◯	◯
When humans interfere with nature it often produces disastrous consequences.	◯	◯	◯	◯	◯

	Strongly agree	Mildly agree	Unsure	Mildly disagree	Strongly disagree
Human ingenuity will insure that we do not make the Earth unlivable.	○	○	○	○	○
Humans are seriously abusing the environment.	○	○	○	○	○

	Strongly agree	Mildly agree	Unsure	Mildly disagree	Strongly disagree
The Earth has plenty of natural resources if we just learn how to develop them.	○	○	○	○	○
Plants and animals have as much right as humans to exist.	○	○	○	○	○
The balance of nature is strong enough to cope with the impacts of modern industrial nations.	○	○	○	○	○
Despite our special abilities, humans are still subject to the laws of nature.	○	○	○	○	○
The so-called "ecological crisis" facing humankind has been greatly exaggerated.	○	○	○	○	○

	Strongly agree	Mildly agree	Unsure	Mildly disagree	Strongly disagree
The Earth is like a spaceship with very limited room and resources.	○	○	○	○	○
Humans were meant to rule over the rest of nature.	○	○	○	○	○
The balance of nature is very delicate and easily upset.	○	○	○	○	○
Humans will eventually learn enough about how nature works to be able to control it.	○	○	○	○	○
If things continue on their present course, we will soon experience a major ecological catastrophe.	○	○	○	○	○

Comments

Is there anything you would like to say about this survey, New Zealanders values, or the marine environment?

[text box]