

Lincoln University Digital Thesis

Copyright Statement

The digital copy of this thesis is protected by the Copyright Act 1994 (New Zealand).

This thesis may be consulted by you, provided you comply with the provisions of the Act and the following conditions of use:

- you will use the copy only for the purposes of research or private study
- you will recognise the author's right to be identified as the author of the thesis and due acknowledgement will be made to the author where appropriate
- you will obtain the author's permission before publishing any material from the thesis.

Perspectives on Antarctic conservation: An analysis of New Zealand Antarctic stakeholder views

A thesis
submitted in partial fulfilment
of the requirements for the Degree of
Master of Applied Science

at
Lincoln University
by
Gabriela Paz Gómez Fell

Lincoln University

2016

Abstract of a thesis submitted in partial fulfilment of the
requirements for the Degree of Master of Applied Science

Perspectives on Antarctic conservation: An analysis of New Zealand
Antarctic stakeholder views

by

Gabriela Paz Gómez Fell

The Antarctic, open to all and under no state ownership, is one of the world's global commons. This area is facing challenges that extend beyond its boundaries. Challenges stemming from global warming, economic utilisation of natural resources, increased human visitation and growing science-related activities in the area that are placing pressure on Antarctica's unique ecosystems and biodiversity.

In an effort to understand stakeholder perspectives from one of the states involved its governance, this study gathered the views of 124 New Zealand Antarctic stakeholders from four key stakeholder groups (government, science, commercial industry and conservationists) on Antarctic conservation. The study used a mixed methods approach, in the form of an online survey and interviews, to gather their views and utilised two opposing common-pool resource (CPR) management frameworks to analyse the data gathered. The study identified stakeholders in Antarctic conservation, challenges and issues facing Antarctic conservation as well as potential future scenarios for Antarctic conservation.

Antarctic stakeholders that were identified included governments, members of the science community, those affiliated with specific commercial industries, and conservationists. In addition, the public and Antarctica's wildlife were also seen as key stakeholders in Antarctic conservation. Issues raised by survey respondents and interviewees included direct and indirect human impacts on the Antarctic environment, particularly the present and future effects of climate change; as well as the potential for resource exploitation beyond harvesting of marine living resources. Although concerns over growing human presence in Antarctica through science, tourism and fishing were expressed, their impacts were deemed minor in contrast to effects from indirect human impacts. Uncertainty over the precise impacts of climate change on Antarctica created speculation towards the future conservation of the area.

The Antarctic Treaty System's (ATS) agreements were perceived as generally very positive and a number of strengths, as well as weaknesses of Antarctica's governance system were raised. Stakeholders offered solutions for the future conservation of Antarctica, including the need to address climate change, strengthen the ATS and to further implement some of its existing environmental protection mechanisms.

The analysis of data gathered in the context of the contrasting Common-pool resource (CPR) management frameworks revealed that the ATS governance structure has many attributes resembling strong CPR institutions, however, it also holds many operational challenges.

This stakeholder analysis confirms that the future of Antarctic conservation remains vulnerable. To avoid a commons 'tragedy' from unfolding, a combined effort and cooperation of all stakeholders is paramount.

Keywords: Resource management, Common-pool resource management frameworks, tragedy of the commons, collective action, Antarctic governance, Antarctic stakeholders, Antarctic stakeholder analysis, Antarctic conservation, New Zealand.

Acknowledgements

I feel ever so grateful for all the help and support I have received in order to complete this thesis.

I would like to acknowledge my supervisors Stephen Espiner and Emma Stewart. Stephen was part of the process before I even enrolled at Lincoln. He helped and encouraged me from the moment I told him I was interested in pursuing this. Stephen was the reason I came back to Lincoln University, he has been an inspiration and wonderful to work with.

Crossing paths Emma re-sparked my love for Antarctica and introduced me to the fascinating world of polar science. Thank you both for being ever so accommodating, understanding and supportive every step of the way.

To the lovely Antarctic community who welcomed me with open arms and trusted me with their knowledge and expertise. Without them this thesis would have not been possible. I hope I have not misinterpreted any of their comments. I apologise in advance if I have done so. I must also thank Daniela Liggett and the Gateway Antarctica team for supporting my research from its inception.

I am also indebted to Lincoln University and the scholarships they have granted me. The McCaskill and Lincoln University Masters scholarships who provided financial assistance during this research project.

I would also like to acknowledge all my lecturers and numerous staff at the University. Their knowledge and thoughtfulness never ceased to amaze me. Staff from ESD, student services, scholarship, graphic design division, the library, recreation centre, Lincoln hospitality, IT and teaching and learning; and specially the staff from student health and support and Lincoln University early childhood centre, they were ever so helpful, understanding and kind. I will always hold a special place in my heart for Lincoln.

Thank you to all the friends I made along the way. You are too many to mention and I don't want to leave anyone out, but I must mention Majo, Italo, Sonia, Kathy and Caroline. Just thinking of you all puts a smile on my face. Thank you for always making time to catch up and for the good laughs.

I must also acknowledge Jennifer and Kathy for coming in the last minute to help with some much-needed editing. You were both life-savers, thank you.

Finally, to my family. This thesis was no doubt a family effort and it started way back when my parents sowed the love of nature and conservation on me from an early age.

To my ever-supportive mum, who has helped, loved and supported me always. Your knowledge and academic pursuits have forever inspired me, your love for us and our family fills my heart with joy. I am eternally thankful for all you do for us.

To my brother for his academic and technical support and always being available to discuss polar matters. Who would have thought we would end up working in the same field!

To Andrew, none of this would have happened without your love, help and encouragement. Thank you for always believing in me and supporting me every step of the way; for your unconditional love, support and superhuman help. You are simply the best.

Last but certainly not least, to my boys – Sebi and Tommy - who have grown up with their mother studying and hearing about Antarctic conservation. Thank you for the hugs, kisses, smiles and for helping me to keep things in perspective. This is for you both. May there always be magical and wild places to be inspired by, and that you find yours as I found mine.

Table of contents

Abstract	ii
Acknowledgements	iv
Table of contents.....	vi
List of Tables	ix
List of Figures	x
 Acronyms and abbreviations.....	 xi
 1 Introduction.....	 1
1.1 Commons and common-pool resource management frameworks.....	1
1.2 Antarctica	2
1.2.1 The importance of Antarctica	2
1.2.2 Antarctic conservation challenges	4
1.3 New Zealand and Antarctica	6
1.4 New Zealand Antarctic stakeholders	6
1.5 Objectives of this study.....	7
1.6 Contribution of this study	7
1.7 Thesis structure.....	8
 2 Literature review	 9
2.1 Common-pool resources.....	9
2.2 Global commons and international commons	11
2.2.1 Managing the commons	12
2.3 Managing Antarctica.....	16
2.3.1 Antarctic Treaty.....	16
2.3.2 Protecting Antarctica	17
2.3.3 The Protocol on Environmental Protection to the Antarctic Treaty	18
2.3.4 Managing the Southern Ocean	19
2.3.5 Commentary on the Antarctic Treaty System.....	21
2.4 Antarctic stakeholders and stakeholder theory	22
2.5 Relevant studies and gaps in the literature	23
 3 Methods	 25
3.1 Approach.....	25
3.2 Quantitative methods.....	25
3.2.1 Online survey	26
3.2.2 Pilot study	26
3.2.3 Survey respondents	26
3.2.4 Data collection	29
3.3 Qualitative methods	30
3.3.1 Interview participant recruitment	30
3.3.2 Interview participants	31
3.3.3 Interviews.....	31
3.4 Data analysis	31

3.5	Ethical considerations	32
3.6	Limitations	33
3.7	Chapter summary	34
4	Results Part 1. Survey respondents' views on Antarctic conservation	35
4.1	Profile of respondents	35
4.2	Challenges and issues facing Antarctic conservation	37
4.2.1	The Ross Sea Region.....	40
4.3	Antarctic environmental futures.....	42
4.4	Antarctic governance	43
4.5	Perceived influence of Antarctic conservation stakeholders	45
4.6	Chapter summary	45
5	Results Part 2. Interviewees' perspectives on Antarctic conservation: Stakeholders, environmental condition and human impacts.....	47
5.1	Interviewees' profile	47
5.1.1	Interviewees' experience on Antarctic matters.....	50
5.2	Identified key stakeholders in Antarctic conservation	50
5.2.1	Governments.....	50
5.2.2	Scientists and researchers.....	51
5.2.3	Commerical industry	51
5.2.4	Conservationists.....	52
5.2.5	Other stakeholders	53
5.2.6	Perspectives on New Zealand-based stakeholders in Antarctic conservation	54
5.3	Perspectives on Antarctica's natural environment and barriers to conservation	55
5.4	Perspectives on direct human impacts affecting the Antarctic environment	58
5.4.1	Science and logistics.....	58
5.4.2	Tourism	62
5.4.3	Fishing	64
5.4.4	Introduced species	67
5.4.5	Resource exploration and exploitation.....	69
5.5	Perspectives on indirect human impacts.....	72
5.5.1	Climate change.....	72
5.6	Chapter summary	76
6	Results Part 3. Interviewees' perspectives on Antarctic conservation: Governance and the future.....	78
6.1	Perspectives on Antarctic governance.....	78
6.1.1	Antarctic Treaty System and the Antarctic Treaty.....	78
6.1.2	Protocol on Environmental Protection to the Antarctic Treaty.....	91
6.1.3	Commission and the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)	96
6.2	Perspectives on the future of Antarctic conservation	98
6.3	Chapter summary	101
7	Concluding discussion	102
7.1	New Zealand stakeholder perspectives on Antarctic conservation.....	102
7.2	Key findings and discussion	103

7.2.1	Key stakeholders in Antarctic conservation.....	103
7.2.2	Key challenges and issues facing Antarctic conservation	107
7.2.3	Antarctic futures	114
7.2.4	Contemporary common pool resource management frameworks.....	116
7.3	Conclusion.....	122
Appendices		125
Chapter 2 appendices		126
Appendix 2.1	Map of Antarctica illustrating territorial claims.....	126
Appendix 2.2	List of Consultative and Non-Consultative Parties to the Antarctic Treaty	127
Chapter 3 appendices		130
Appendix 3.1	Online survey	130
Appendix 3.2	Poster presented at 2014 SCAR OSC.....	141
Appendix 3.3	Card with invitation to online survey.....	142
Appendix 3.4	Interview schedule.....	143
Appendix 3.5	Lincoln University ethics committee approval.....	145
Appendix 3.6	Research information sheet.....	146
Appendix 3.7	Interviewees' consent form	148
Appendix 3.8	Information sheet for online or phone interviewees	149
Appendix 3.9	Online consent form	151
Appendix 3.10	Poster presented at 2015 Antarctic Science Conference	152
Chapter 4 appendices		153
Appendix 4.1	Survey respondents' demographics.....	153
Chapter 5 appendices		155
Appendix 5.1	Interviewees' connections with Antarctica.....	155
Chapter 6 appendices		157
Appendix 6.1	Strengths and weaknesses of the ATS as identified by interviewees.....	157
References		159

List of Tables

Table 2.1 Typology of goods (Compiled from Buck, 1998; Ostrom, 2005; Ostrom, Burger, Field, Norgaard, & Policansky, 1999; Ostrom & Ostrom, 1977; Ostrom & Ostrom, 1999; Poteete et al., 2010)	10
Table 2.2 Design principles for robust common-pool resource institutions (Ostrom, 1990, p. 90) ..	14
Table 3.1 Identified and contacted New Zealand Antarctic stakeholders classified by Polk's (1998) stakeholder categories	28
Table 3.2 Categorisation and coding of interviews	32
Table 4.1 Respondents' network of connections to Antarctica (n=92).....	36
Table 4.2 Respondents' rankings of the most important things to protect in Antarctica (n=79)	38
Table 4.3 Respondents' rankings of the most important conservation challenge facing Antarctica today (n=78)	39
Table 5.1 New Zealand stakeholders in Antarctic conservation as identified by interviewees.....	54
Table 5.2 New Zealand advocates for Antarctic conservation as identified by interviewees	55
Table 7.1 Societal segments with interests in Antarctica (Polk, 1998, pg. 1395)	103
Table 7.2 Stakeholders in Antarctic conservation with roles and interests as perceived by the New Zealand Antarctic stakeholders who participated in this research project.....	104
Table 7.3 Antarctic conservation challenges relating to direct human impacts on the Antarctic environment, and proposed solutions as perceived by survey participants and interviewees	108
Table 7.4 Antarctic conservation challenges relating to indirect human impacts on the Antarctic environment, and proposed solutions as perceived by survey participants and interviewees	112
Table 7.5 Interviewees' opinions on what is essential to securing the future conservation of the Antarctic.....	115

List of Figures

Figure 2.1 Design principles for robust CPR institutions (green boxes, left and right columns) and the governance requirements they help meet (yellow boxes, centre column). Each principle is relevant for meeting several requirements. Arrows indicate some of the most likely connections between principles and requirements. Principles in the right column may be particularly relevant for global and regional problems (Dietz et al., 2003, p. 1910).....	15
Figure 2.2 Typology of Antarctic stakeholders with some non-extensive stakeholder examples (Based on Grimble & Wellard, 1997; Polk, 1998)	23
Figure 4.1 Survey respondents' Antarctic interest groups.....	35
Figure 4.2 Word cloud illustrating relative frequencies of perceived challenges in Antarctica in 2048	40
Figure 4.3 Word cloud illustrating relative frequencies of perceived challenges in the Ross Sea Region in 2048	41
Figure 4.4 Perceived likelihood of occurrence of Antarctic environmental events for the year 2048 (n=74).....	43
Figure 4.5 Level of agreement on statements on Antarctic governance.....	44
Figure 4.6 Mean scores of Antarctic groups and their perceived level of influence in stimulating change that positively affects Antarctic conservation	45
Figure 5.1 Science stakeholder interviewees' Antarctic connections.....	49
Figure 5.2 Government stakeholder interviewees' Antarctic connections.....	49
Figure 7.1 Antarctic stakeholders and their roles in Antarctic conservation as perceived by research participants	106

Acronyms and abbreviations

ASMA - Antarctic Specially Managed Areas
ASOC – Antarctic and Southern Ocean Coalition
ASPA - Antarctic Specially Protected Areas
AT – Antarctic Treaty
ATCM – Antarctic Treaty Consultative Meeting
ATCP – Antarctic Treaty Consultative Parties
ATS – Antarctic Treaty System
CCAMLR – Convention of the Conservation of Antarctic Marine Living Resources¹
CCAS - Convention for the Conservation of Antarctic Seals
CEE – Comprehensive Environmental Evaluation
CEP – Committee for Environmental Protection
COLREGS - Convention on the International Regulations for Preventing Collisions at Sea
COMNAP – Council of Managers of National Antarctic Programmes
CPR – Common-Pool Resources
CRAMRA - Convention for the Regulation of Antarctic Mineral Resource Activities
EIA – Environmental Impact Assessment
IAATO – International Association of Antarctica Tour Operators
IGY - International Geophysical Year
IMO – International Maritime Organization
IUCN – International Union for the Conservation of Nature
IWC – International Whaling Commission
MARPOL - International Convention for the Prevention of Pollution from Ships
NAP – National Antarctic Programme
NGO – Non-Governmental Organisation
Protocol – Protocol on Environmental Protection to the Antarctic Treaty
SCAR – Scientific Committee on Antarctic Research
UN – United Nations
UNCLOS – United Nations Conference on the Law of the Sea
UNGA – United Nations General Assembly
WWF – World Wide Fund for Nature

¹ CCAMLR is also used in this document to refer to the Commission for the Conservation of Antarctic Marine Living Resources which was established by the Convention of the Conservation of Antarctic Marine Living Resources.

1 Introduction

‘The commons’ is at the core of many of the world's most pressing environmental issues, from climate change to biodiversity loss (Dietz, Dolšak, Ostrom, & Stern, 2002). Presently there is more interest in securing access to the global commons than ever before, particularly from a security, trade and critical resources perspective (United Nations System Task Team, 2013). This, together with growing awareness of global environmental change, makes the issue of global environmental management and governance an increasingly significant issue for international relations (Vogler, 2000).

With no state ownership or indigenous population, Antarctica is the southernmost place on Earth and one of the world’s global commons (Vogler, 2000). It is also the only place where states have agreed to comprehensive and rigorous rules to protect the environment of a whole continent through the Protocol on Environmental Protection to the Antarctic Treaty (Blay, 1992). Antarctica plays a fundamental role in the world’s climate and oceanic circulation patterns and is host to unique terrestrial and marine ecosystems and species (Rogers, Johnston, Murphy, & Clarke, 2012). However, Antarctica is facing challenges that both originate and expand beyond its boundaries. Among them, climate change and pressure from industry are likely to be important conservation issues facing Antarctica today and in the future.

Mindful of the potential for collective action as well as the potential for ‘tragedy’, this research explored the perspectives on Antarctic conservation as viewed by New Zealand Antarctic conservation stakeholders, and analysed them through a common-pool resource lens.

This introductory chapter starts by presenting the commons and the common-pool resource management frameworks which were chosen to analyse this study through. It then introduces the Antarctic and the connections between New Zealand and the Antarctic. Later, Antarctic stakeholders and the objectives of the study are presented, before elaborating on the structure of this thesis.

1.1 Commons and common-pool resource management frameworks

Commons are things that are accessible to everyone and can never be fully owned by individuals or governments (Buck, 1998). Global commons are very large resource domains which fall outside national jurisdiction including the oceans and seabed, outer space, the atmosphere and Antarctica (Vogler, 2000; World Commission on Environment and Development, 1987).

Garrett Hardin claimed in 1968 that resources treated as commons are destined to be over-used leading to an inevitable ‘tragedy of the commons’ if not privatized or placed under centralized government management. By contrast, Elinor Ostrom (1990) believed that under certain conditions individual users do restrict their use of resources and share the benefits of ‘the commons’ through collaborative action for everyone's long-term benefit. This study utilises these two contrasting common-pool resource management frameworks to analyse the data gathered.

1.2 Antarctica

Antarctica is the coldest, windiest, driest, highest and southernmost continent on Earth, isolated from the nearest landmass by one of the most tempestuous oceans (Trewby, 2002). Only a few and highly skilled (ocean) explorers have ventured into this area and it has only been since the late 1700s that the continent has been explored and people have ‘inhabited’ some of its coastal, and more recently, inland areas for short periods of time (Hansom & Gordon, 1998). It is a place with no indigenous people and where humans have had little direct impact on the environment in comparison to other places on Earth (Grant, Convey, Hughes, Phillips, & Trathan, 2012).

Antarctica is also the only continent on Earth that is not “owned” by any one country, although seven countries have territorial claims on segments of the continent². Antarctica is governed by the Antarctic Treaty System (ATS) which started with the adoption of The Antarctic Treaty (AT) of 1959, ratified in 1961 (Antarctic Treaty Secretariat, 2014). The ATS refers to the international legal framework that regulates activities in the Antarctic continent, its adjoining maritime areas and its resources (Saul & Stephen, 2015). The framework includes the AT, Convention for the Conservation of Antarctic Seals (CCAS), Convention of the Conservation of Antarctic Marine Living Resources (CCAMLR), Convention for the Regulation of Antarctic Mineral Resource Activities (CRAMRA) and the Protocol on Environmental Protection to the AT. The Protocol is of particular importance to this study as it designates Antarctica as a “natural reserve, devoted to peace and science” (Article 2) and provides mechanisms for protecting areas of value (Annex V).

1.2.1 The importance of Antarctica

The Antarctic continent comprises 14 million km² representing 9 percent of the planet’s continental surface (Trewby, 2002). This large area is covered almost completely (95 percent) by snow and ice year-round and the areas of the Weddell and Ross Sea contain another 3 million km² of sea ice, which expands to 18 million km² in winter months (Masson-Delmotte, 2013).

² See Appendix 2.1 for map illustrating territorial claims.

The formation of sea ice has a great impact on the exchange of water and heat between the atmosphere and the ocean. When sea ice forms, the surface of the ocean freezes creating a barrier between the ocean and the atmosphere, thus preventing an energy exchange. Conversely, as sea ice forms the density of the water increases as it becomes colder and saltier. This cold, salty and dense water expelled from the top layer of the ocean sinks deep into the Southern Ocean feeding the global ocean circulation system (Talley, Pickard, Emery, & Swift, 2011). Deep ocean water masses play a fundamental role in global carbon cycles as they transfer atmospheric carbon dioxide into the depths of ocean basins (Masson-Delmotte, 2013). Moreover, Antarctica's expansive ice surface also holds a high ice and snow albedo reflecting sun radiation into the atmosphere cooling the area, generating more ice and creating a positive feedback ensuring the area remains cold (Brandt, Warren, Worby, & Grenfell, 2005; Curry, Schramm, & Ebert, 1995). These processes contribute to maintaining Earth's temperate climate (Masson-Delmotte, 2013).

The Southern Ocean is one of the coldest, oldest and largest deep-water marine systems on Earth (Bargagli, 2005). Accounting for 10 per cent of the world's oceans, the Southern Ocean is home to one of the richest marine feeding grounds on the planet, with a total biomass greater than in that found in the tropics (Vogler, 1995). It is also host to rich marine life including many iconic species, such as whales, penguins, seals and albatrosses (Rodger, 2013). Its northern boundary is referred to as the Antarctic convergence, the natural border of the Antarctic marine ecosystem where warmer waters from the north meet the colder Antarctic waters (Johnston, 1999).

The Southern Ocean holds the "world's most distinctive marine biota" (Hoyt, 2011, p. 127) as many of the species found in the area have evolved in semi-closed systems, resulting in a high level of endemism in marine organisms as well as long lifespan, late reproduction, large body sizes and circumpolar distribution (Bargagli, 2005).

The Antarctic continent is also host to unique terrestrial ecosystems and species (Grant et al., 2012). Its terrestrial biodiversity is low in species richness in comparison to the Southern Ocean's rich marine biota (Rogers, 2012). Nonetheless, Antarctica's terrestrial biota has unique characteristics as it has evolved in isolation from predators, hunters and habitat modification (Woehler, Ainley, & Jabour, 2014). Its fauna is comprised of invertebrates and insect species and with flora composed of mosses, lichens and liverworts as well as two native flowering plants. Moreover, Antarctica is widely regarded for its intrinsic, wilderness and aesthetic values which are also afforded protection (Neufeld, O'Reilly, Summerson, & Tin, 2014).

Antarctica, and the ocean that surrounds it, play a critical role in maintaining the stability of the global biosphere (IUCN, 1991). They also play a fundamental role in scientific research as its ice sheets preserve the history of over a million years of environmental and climate changes (Masson-

Delmotte, 2013). All these facets make the Antarctic and the Southern Ocean region unique in its own right, and particularly important to humanity (Simon, 1999).

1.2.2 Antarctic conservation challenges

Despite its scientifically and ecologically acknowledged significance, Antarctica faces a number of challenges which could have substantial environmental consequences. The continent and surrounding ocean are facing pressures from growing interest in its resources, increasing human activity in the area as well as activities in other parts of the globe, and global environmental change (Chown et al., 2012).

Uncontrolled and unregulated extraction of Antarctic resources in the past led to an inevitable 'tragedy of the commons' with overexploitation of rich marine resources which has left lingering effects in terrestrial and marine ecosystems with most whale species, elephant seals, fur seals, king penguins and some fish species still in recovery (Ainley & Brooks, 2013; Grant, Hill, Trathan, & Murphy, 2013; Tin, Lamers, Liggett, Maher, & Hughes, 2014). Krill fisheries and fin fish fishing have continued to be active in the area creating mounting pressure on marine food webs (Antarctic Ocean Alliance, 2012). This is especially evident in the Antarctic waters where food webs are characteristically very short, with as few as three steps between phytoplankton and top predators (IUCN, 1991). The Southern Ocean is currently facing a number of threats and an uncertain future (Antarctic and Southern Ocean Coalition, 2012) as technology advancements and easily accessible resources elsewhere become scarce (Suter, 1991).

Increased human activity in Antarctica, from tourism, science programmes and associated transport logistics, creates great pressure on Antarctic ecosystems (Rogers et al., 2012; Tin et al., 2009; Woehler et al., 2014). Documented impacts arising from current and historic human activities on the Antarctic continent range from chemical contamination and sewage disposal to introduction of non-indigenous organisms and species to disturbances to flora and fauna through building, transport and visitation (Tin et al., 2009). This pressure is magnified in the small area without ice which attracts most of the human activities over the same time of the year (summer) that is when globally significant populations of marine mammals and seabirds come to moult and/or breed (Convey, Hughes, & Tin, 2012).

Tourism in Antarctica has grown exponentially since it started in the Antarctic Peninsula in 1950s with one vessel and a hundred tourists (Liggett, McIntosh, Thompson, Gilbert, & Storey, 2011). Tourism has diversified over the years and now offers a wide range of activities, transport modes and destinations, including cruises (expedition, large liner and yachts), over-flights, and land-based

tourism including private expeditions. While the majority of tourists visit the Antarctic Peninsula, others also visit the Ross Sea region, the Polar Plateau (including the South Pole), and the Sub Antarctic Islands (Lamers, Haase, & Amelung, 2008; Liggett et al., 2011). The International Association of Antarctica Tour Operators (IAATO) reports yearly on tourism activities in the Antarctic, including visitation statistics. In the 2015-2016 Antarctic tourism season 38,478 visitors with IAATO members were reported, a 4.6% increase from previous season (IAATO, 2016a). Tourism currently represents the largest movement of people within Antarctica (Tin et al., 2014). This growth and diversification raised the prospect of potential environmental implications and the increasing potential for accidents and incidents (Jabour, 2014; Liggett et al., 2011). In particular, there has been a number of high-profile tourism related incidents, most notably the sinking of the tourism cruise ship MS Explorer in the Antarctic Peninsula in 2007 (Stewart & Draper, 2008).

In terms of the number of people involved, scientific research is the second biggest human activity occurring on the continent; with approximately 190 research stations, camps and refuges located mainly close to coastal areas, providing accommodation and acting as logistic hubs to 5400 people during the austral summer, and 1100 in the winter months (Convey et al., 2012). Antarctic scientific research was first boosted in the International Geophysical Year (IGY) in 1957-58 and has continued to grow over the years. National Antarctic Programmes now concentrate their activities in two main areas, Ross Island in Victoria Land and South Shetland Islands/northern Antarctic Peninsula (Convey et al., 2012).

In addition to direct human impacts, Antarctica's environment and biota are threatened by larger, potentially more serious external pressure (Rodger, 2013). Climate change is already having effects on the continent and Southern Ocean, and further impact could have severe consequences for everyone on Earth (Rodger, 2013). An increase in greenhouse gas emissions into the atmosphere will increase the world's median temperature (Rodger, 2013). The increase in greenhouse gas emissions alters the polar ecosystem as variations in temperature affect the continent's ice shelves and sea ice, as well as increasing acidity levels in the Southern Ocean (Antarctic and Southern Ocean Coalition, 2012; Chown et al., 2012). The stability of the West Antarctic marine ice sheet (containing ice equivalent to over a 3 metre rise in global mean sea level if melted) provides another source of concern in terms of predictions of climate-change-related sea level rise (Joughin & Alley, 2011). This is of particular concern as the world-wide potential impacts of sea level rise are enormous, with millions of people living in low-lying areas likely to be severely displaced and negatively affected (Rodger, 2013). Rising sea levels due to melting ice sheets and glaciers, will have catastrophic impacts on low-lying areas globally (Rodger, 2013). Climate change can also create climatic instability (Joughin & Alley, 2011). Climatic instability can affect weather patterns globally making it hard to

predict seasonal changes, which will have an impact on food production around the world (Rosenzweig, Iglesias, Yang, Epstein, & Chivian, 2001). Furthermore, global warming and rising sea levels will also impact the ecological balance of the Antarctic continent (Rogers et al., 2012).

1.3 New Zealand and Antarctica

New Zealand has a long history of connections with Antarctica, from its involvement in the heroic era, its claim on the Ross Sea Dependency, its scientific presence in the area and participation in the ATS (Brady, 2013b; New Zealand Ministry of Foreign Affairs & Trade, 2014). New Zealand's strategic interests in the Antarctic include maintaining peace and security, actively engaging in Antarctic governance, biodiversity protection, conservation of Antarctica's intrinsic and wilderness values, supporting scientific research, as well as advocating and demonstrating best practice in environmental stewardship (New Zealand Ministry of Foreign Affairs & Trade, 2014)

Many government agencies are involved in securing New Zealand's interests in Antarctica. Of them, the Ministry of Foreign Affairs and Trade, is the one responsible for coordinating New Zealand's overall interests in Antarctica and the Southern Ocean (New Zealand Ministry of Foreign Affairs & Trade, 2014). Antarctica New Zealand is the Crown agency which manages New Zealand's base in the Ross Dependency area of Antarctica, represents the country in international Antarctic forums and facilitates scientific research (Antarctica New Zealand, 2014). Additionally, the Department of Conservation is responsible for promoting the conservation of historic and natural resources of Antarctica, the Sub-Antarctic Islands and the Ross Dependency (Department of Conservation, 2014). New Zealand's direct involvement in Antarctica's affairs is shown partly by its involvement in globally significant research as well as in policy implementation (Department of Conservation, 2014).

Other groups involved in Antarctic matters include private Antarctic commercial operators (mainly in the fishing and tourism industries) as well as Non-Governmental Organisations (NGOs), which have been actively involved in conservation matters in Antarctica since the late seventies (Hansom & Gordon, 1998). Non-Governmental Organisations such as the Antarctic and Southern Ocean Coalition (ASOC) have played important roles in securing the protection of the Antarctic environment through raising public awareness, facilitating public engagement and raising Antarctic environmental issues with Antarctic Treaty Consultative Parties (ATCPs) (Tin, 2013).

1.4 New Zealand Antarctic stakeholders

Stakeholders refers to "any group of people, organised or unorganised, who share a common interest or stake in a particular issue or system" (Grimble & Wellard, 1997, p. 175). Under this

definition, New Zealand, its government agencies working on Antarctic affairs, Antarctic fishing and tourism operators as well as NGOs, all classify as stakeholders in Antarctic conservation.

In natural resource management, as well as in national and international environmental policy, stakeholder opinions are increasingly being sought as decision-makers recognise the need to understand who is affected by the actions and decisions they make and, who has the power to influence their outcome (Prell, Hubacek, & Reed, 2009; Reed et al., 2009). Stakeholder analysis provides a method for understanding developmental and environmental interactions and problems of a system by analysing and comparing the perspectives and interests of stakeholders at various levels (Grimble & Wellard, 1997). Grimble and Wellard (1997, p. 173) note that stakeholder analysis is a “powerful tool for policy analysis and formulation” as well as a great approach for understanding a system as it changes, and for identifying key actors and assessing their interests in that system.

1.5 Objectives of this study

Aware of the challenges currently facing Antarctic conservation, the potential for collective action or ‘tragedy’, and the importance of understanding the views of stakeholders, this research project gathered the perspectives on Antarctic conservation from New Zealand Antarctic stakeholders. The project addressed four key objectives:

1. Identify key stakeholders in Antarctic conservation as perceived by key New Zealand Antarctic stakeholders as well as through document analysis and literature review.
2. Investigate key challenges and issues facing Antarctic conservation as observed by key New Zealand stakeholders and relevant literature.
3. Interpret the data gathered in the context of contemporary common pool resource management frameworks.
4. Examine stakeholder views on potential future scenarios for Antarctic conservation.

To address these objectives and gather a complete understanding of the topic, a mixed-methods approach, in the form of an online survey and in-depth interviewees, with New Zealand Antarctic conservation stakeholders was undertaken.

1.6 Contribution of this study

This study contributes to the literature and academic debates on Antarctic conservation and resource management and Antarctic stakeholder analysis. The contribution to literature is threefold. First, it documents and analyses New Zealand Antarctic stakeholders’ perspectives on present and future challenges facing Antarctic conservation. Second, it utilises common pool resource management frameworks to understand and aid desired outcomes for Antarctic conservation. Third, it revises the

existing literature on Antarctic stakeholder classification. Gathering stakeholder perspectives on Antarctic conservation is essential to fully understanding perceived conservation challenges facing Antarctica and governance systems, as well as New Zealand's Antarctic stakeholder position on these matters.

The significance of this research project also lies in its timeliness as the effects of climate change are being keenly observed, members of CCAMLR discuss designation of Marine Protected Areas (MPA) in the Southern Ocean, a potential review of the Protocol for Environmental Protection of the Antarctic Treaty and its decision making process looms in 2048, and changes to the ATS subscription raises issues of Antarctic conservation values.

1.7 Thesis structure

This thesis is organised into seven chapters. Chapter 2 presents the literature relevant to this study, including that of common-pool resources (CPR), CPR management frameworks and stakeholder analysis. This chapter also situates the study by presenting the area of interest, the Antarctic; and discusses the conservation-related challenges it currently faces as well as introducing Antarctica's governance system. The chapter also identifies relevant studies and gaps in the literature.

Chapter 3 explains the mixed methods approach utilised in this study and describes the data collection and analyses. The research project's ethical considerations and limitations are also defined.

Chapters 4, 5 and 6 present the research findings. Chapter 4 outlines survey respondents' profiles and their views on Antarctic conservation. Chapter 5 presents interviewees' perspectives on Antarctic stakeholders, environmental condition of the Antarctic and human impacts affecting the area. Chapter 6 presents and explores interviewees' perspectives on Antarctic governance and the future of Antarctic conservation.

Chapter 7 concludes by suggesting a new classification of stakeholders in Antarctic conservation, discussing key findings on challenges and issues facing Antarctic conservation in relation to the literature, as well as discussing factors that will affect the future of the Antarctic. An analysis of the data gathered in the context of Hardin (1968) and Ostrom's (1990) CPR management frameworks is also presented and suggestions on areas of future research on the matter of stakeholders' perspectives on Antarctic conservation are given.

2 Literature review

This chapter presents the literature related to CPR, commons, the Antarctic and stakeholders with the purpose of providing the literary background of this research study.

The chapter is divided in five sections. The first two sections explore the literature relevant to CPR, commons and CPR management frameworks. The third section presents Antarctica's governance system. The fourth section relates to stakeholders and the literature related to Antarctic stakeholders. The last section explores studies relevant to this research project and identifies gaps in the literature on stakeholder views on Antarctic matters.

2.1 Common-pool resources

The literature uses a number of terms to define the 'commons' which are worth clarifying, as it has been noted by various authors that there has been considerable confusion about language, meanings and concepts, when referring to the management of commons (See for example Araral, 2014; Dolšák & Ostrom, 2003; Ostrom, 1992; Poteete, Janssen, & Ostrom, 2010).

Ostrom (1992) noted that to understand the challenges facing governance of commons it is important to distinguish the types of resources they contain. Common-pool resources (CPRs) include both 'natural' and human-produced goods that possess two distinctive characteristics: non-excludability and high subtractability (Buck, 1998; Dolšák & Ostrom, 2003; Poteete et al., 2010). Excludability refers to the ability to exclude others from accessing the resource, which in case of CPRs is either technically or economically infeasible (Ostrom & Ostrom, 1999). High subtractability relates to the extraction, use or enjoyment of a good, which once used or taken is no longer available to another user. Ostrom (1992) further clarified the characteristic of subtractability and made reference to resource-units and resource systems. She used the term resource-units to define what individuals gather, use or produce from a resource system, such as fish harvested from a fishery. Resource systems are stock variables with the capacity of producing flow variables without harming the resource system of stock, such as fishing grounds and forests (Ostrom, 1990). Ostrom (1990) clarified that subtractability is a characteristic of the resource-unit appropriated from a CPR, whereas jointness of use is a characteristic of the resource system (e.g. many boats can harvest fish – a resource-unit - simultaneously on the same fishing ground – a resource system-). Ostrom (1992) also attributed the failure to make the distinction between jointness of use of a resource system and subtractability of resource-units to previous confusion about the attributes of CPRs.

The word ‘commons’ is used to refer to the resource domains where CPRs are found (Buck, 1998, p. 5). Vogler (2000) added that ‘commons’ are resources “to which no single decision-making unit holds exclusive title” (Vogler, 2000, p. 2). Commons are also referred to as *res commune*, a term which dates back to Roman property laws encompassing things that are accessible to all users and can never be fully acquired by individuals or governments (Araral, 2014; Buck, 1998). Araral (2014) noted that *res commune* particularly applies to resource systems, such as oceans and forestry ecosystems which are enjoyed and used by everyone, but not to resource units from the resource system, such as fish and wood which are rival in nature (Araral, 2014).

Various authors have used a table to clarify these characteristics and to differentiate CPRs from other goods (See for example Araral, 2014; Buck, 1998; Ostrom & Ostrom, 1977; Vogler, 2000). Though these tables effectively illustrate differences between goods, variance exists in the language used. Table 2.1 summarises the terms identified in the literature.

Table 2.1 Typology of goods (Compiled from Buck, 1998; Ostrom, 2005; Ostrom, Burger, Field, Norgaard, & Policansky, 1999; Ostrom & Ostrom, 1977; Ostrom & Ostrom, 1999; Poteete et al., 2010)

	Subtractability of use (Rivalry or jointness of use/consumption)	
	High (Rivalrous/Alternative use)	Low (Non-rivalrous/Joint use)
Exclusion – Difficulty of excluding potential beneficiaries		
Easy (Excludable)	Private goods (e.g. shoes, haircut)	Toll or club goods (e.g. theatres, telephone service)
Difficult (Non-excludable)	Common-pool resources (e.g. fish in the high seas, water from ground water basins, the world wide web)	Public goods (e.g. streets, peace and security of a community)

As well as differences in the language, definitions of CPRs have changed in the literature over time. Early definitions of CPRs referred to the size of the resource system as the key to excludability, mentioning that CPRs are resource systems large enough to make it costly, but not impossible to exclude others from benefiting from its use (Ostrom, 1990, p. 30). Later definitions also include institutional means as a characteristic that makes exclusion costly (Ostrom et al., 1999).

An interesting later addition to the definition of CPRs has been the reference to pollution (although Hardin (1968) acknowledged pollution as an issue of commons management). Dolšák and Ostrom (2003) noted that subtractability can also relate to how depositing into a resource system subtracts from the ability of others to so. Vogler (2000) also made reference to pollution and introduced the concept of the common sink (also referred to as global sink by Araral (2014)), which is described as a type of common resource that relates to the use of water bodies and atmosphere as systems for

waste disposal. In the case of common sinks the issues surround adding something (e.g. sewage, chemicals) into the resource and the regulations to control the use of resources for the purpose of disposal (Vogler, 2000).

Vogler (2000) pointed out that often it is not the characteristics of the goods that matter but the property rules or regimes that are applied to it. Contrary to Ostrom et al. (1999), who had argued that CPRs refer to resource systems regardless of the property rights involved, Buck (1998) acknowledged property regimes in the definition of CPRs and stated their management role in controlling access to CPRs. The set of rules that define property rights, such as treaties, regulations, laws and customs are called property regimes (Buck, 1998, p. 5). These rules are human institutions that can affect the property of mobile goods (e.g. fish) depending on their location (e.g. high seas, inshore fishing grounds) and the governing instrument (e.g. Exclusive Economic Zones, Law of the Sea) of the place they happen to be (Vogler, 2000).

It is of fundamental importance to clearly understand the characteristics of CPRs as they are at the core of CPR issues (Araral, 2014; Dolšák & Ostrom, 2003; Ostrom et al., 1999). Subtractability impairs others from harvesting or depositing into a resource, which can lead to congestion, overuse or even destruction of CPRs (Dolšák & Ostrom, 2003); while the issue of excludability and the cost of excluding others from accessing the resource can lead to problems relating to free-riding by potential beneficiaries (Dolšák & Ostrom, 2003). Resource users need effective rules defining duties and rights and limiting access in order to avoid substantial free-riding, which can occur in the form of overuse without considering the potential negative effects on other users and lack of resource contribution towards maintaining and improving the CPR (Ostrom et al., 1999). Subtractability and non-exclusivity make CPRs vulnerable to overuse and destruction, which can lead to the so called, 'tragedy of the commons' (Araral, 2014; Hardin, 1968). In relation to this study, it is important to note that Antarctica's resources can be classified as common pool resources, as they are non-excludable and subtractable (Lamers, Liggett, & Amelung, 2012).

2.2 Global commons and international commons

Commons can vary in size, from very small to very large (Buck, 1998). Global commons are very large resource domains which fall outside national jurisdiction (Buck, 1998; Vogler, 2000). Under this definition, global commons include the oceans and seabed, outer space, the atmosphere and Antarctica (Vogler, 2000; World Commission on Environment and Development, 1987). Although this definition and categories of global commons are generally agreed upon, Buck (1998) made the case for including a slightly different category, the 'international commons'. She noted international commons as resource domains shared by a number of countries, whereas global commons are accessible to all states. Under this category the Mediterranean Sea and Antarctica would form part of

international commons, as they are governed by regimes that include a small number of states. Buck (1998) does, however, acknowledge that recent United Nations (UN) environmental agreements have affected Antarctica's regime and it now possesses some of the characteristics of a global commons. She also noted that Antarctica has no formally recognised territorial claims.

A different perspective on Antarctica is presented by Vogler (2000) which places Antarctica's wilderness in its own category (although includes it in his study of global commons). He regarded Antarctica's uncongested wilderness as a common property resource which is non-rival and excludable, with an area so large that is unlikely that users will be faced in a situation of rival consumption, and with the Antarctic Treaty (AT) regulating its access. Haase, Lamers, and Amelung (2009) disagreed with this categorisation as they see Antarctica's pristine wilderness as a commons with subtractable and nonexclusive attributes and note that Antarctica is now facing issues relating to congestion with rising numbers of people visiting the area for tourism and scientific purposes. Although there are some discrepancies towards the inclusion of Antarctica as a global commons, in the present study, the more widely recognised definition of Antarctica as a global commons is used.

As the global commons and their shared ecosystems fall outside individual country jurisdictions, it is only through international cooperation and the creation of regimes that they can be secured for the benefit of all (Falk, 2000; World Commission on Environment and Development, 1987). Nevertheless, the protection of global commons has proven to be among the most challenging, intellectually interesting and demanding resource management problems in the world today (Jawadekar, 2008; Ostrom et al., 1999).

Though consensus on the management of the commons has not been easy to attain, numerous agreements have been developed and agreed on over time (Vogler, 2000). Vogler (2000) listed nineteen conventions, treaties and agreements, dating from 1946 to 1997, that regulate the management of the oceans, Antarctica, outer space and the atmosphere. However, there are still commons needing adequate management policies and existing policies requiring updates to incorporate modern-day conservation principles as well as regulation of current resource use technology (United Nations System Task Team, 2013). Vogler (2000) also noted that even though some of these commons are closely interconnected in terms of physical processes and their ability to act as research centres for global environmental change, their institutional and political frameworks remain "hopelessly fragmented" (Vogler, 2000, p. 2).

2.2.1 Managing the commons

The way that commons are managed has been the focus of many studies and much academic debate (see for example Hardin, 1968; Olson, 1965; Ostrom, 1990). Araral (2014) identified three

generations of theorising on the management of the commons. The first generation was led by Garret Hardin who in 1968 proposed that commons should either be privatised or be under state-enforced rules in order to prevent resource degradation (Hardin, 1968). Hardin (1968) contended that groups of individuals could not secure a sustainable management of commons, as individuals would always want to increase their own use and benefits of the resource, which over time would lead to an overexploitation of resources. He presented his theory by illustrating a grazing pasture open to all where all herdsman keep as many heads of cattle as possible. This arrangement is satisfactory while poaching, tribal wars and disease keep numbers of stock and population within the physical capacity of the land to provide. Problems arise when society overcomes these difficulties and social stability becomes a reality. Following the same logic as before, each herdsman, seeking to maximize his gain, adds one more animal to his herd as it will bring each individual herdsman the proceeds from the sale of the animal. There is, however, a negative component to this as the addition of every head of cattle contributes to overgrazing of the shared commons. The negative effects of overgrazing are shared among all herdsman and only affects the decision-making herdsman fractionally. As the individual gain to the herdsman of adding one more head of cattle is greater than his share of the negative impact, the herdsman continues to add to his herd, but this decision is reached by every rational herdsman sharing the commons. This eventually ends up in what Hardin termed the 'tragedy', as the herdsman are locked into a system that encourages them to expand their herd without limit in a world which has limits (Hardin, 1968). This 'tragedy of the commons' is a widely recognised theory and is still used today in the literature and study of commons management situations (See for example Araral, 2014; Dietz et al., 2002; Haase et al., 2009; Ostrom, 1990; Stern, 2011; Vogler, 2000).

In 1990, Elinor Ostrom presented a different, more optimistic alternative to the management of commons (Araral, 2014). Ostrom (1990) believed that under the right conditions groups of individuals could behave altruistically and cooperate to manage commons for the benefit of the community not just the individual. Ostrom (1990) analysed the example of four small-scale, locally governed CPRs which had survived over long periods of time: communal tenure in high mountain meadows and forests in Törbel, Switzerland; Japanese mountain meadows in Hirano, Nagaike and Yamanoka villages; *Huerta* irrigation institutions in Valencia, Alicante, Murcia and Orihuela, Spain; and Zanjera irrigation communities in the Philippines. The longest of these has been sustained for over 1,000 years and the shortest more than 100 years (Ostrom, 1990, p. 58). Through analysing these long-enduring self-governed CPRs, Ostrom was able to identify eight 'design principles' which they all possessed (See Table 2.2).

Table 2.2 Design principles for robust common-pool resource institutions (Ostrom, 1990, p. 90)

1	Clearly defined boundaries of resources and user groups
2	Congruence between appropriation and provision rules and local conditions – devising rules that are congruent with ecological conditions
3	Collective-choice arrangements – involving interested parties in discussions of rules
4	Monitoring – devising accountability mechanisms for monitors
5	Graduated sanctions – assess users who violate rules and grant sanctions depending on the context and seriousness of the offence
6	Conflict-resolution mechanisms – establish low-cost mechanisms for conflict resolution
7	Minimal recognition of rights to organise - users need to be able to devise their own institutions and not be challenged by external governmental authorities
8	Nested enterprises (for CPRs that are parts of larger systems) – appropriation, provision, monitoring, enforcement, conflict resolution and governance are organised in multiple layers of nested enterprises

These principles together with Ostrom’s new solution out of the ‘tragedy of the commons’ sparked a second generation of empirical work which resulted in more than twenty-five years of empirical research (Araral, 2014). Though a significant amount of research has been performed over the last twenty-five years, Araral (2014) noted that this work has been done mainly on smaller commons and the study of global commons has not gained much scholarly attention.

In 2003, Dietz, Ostrom and Stern acknowledged the fact that management of larger commons face different problems than local commons and proposed five strategies for managing them. These are providing necessary information, dealing with conflict, inducing rule compliance, providing physical, technical, and institutional infrastructure and encouraging adaptation and change. In presenting these sets of strategies Dietz et al. (2003) did not discard the applicability of Ostrom’s original principles for robust CPR regimes to global commons, but they show how Ostrom’s principles can be applied at a larger scale (see Figure 2.1). Dietz et al. (2003) also added that three of Ostrom’s principles are most relevant for large CPR areas, these being: analytic deliberation, nesting and institutional variety.

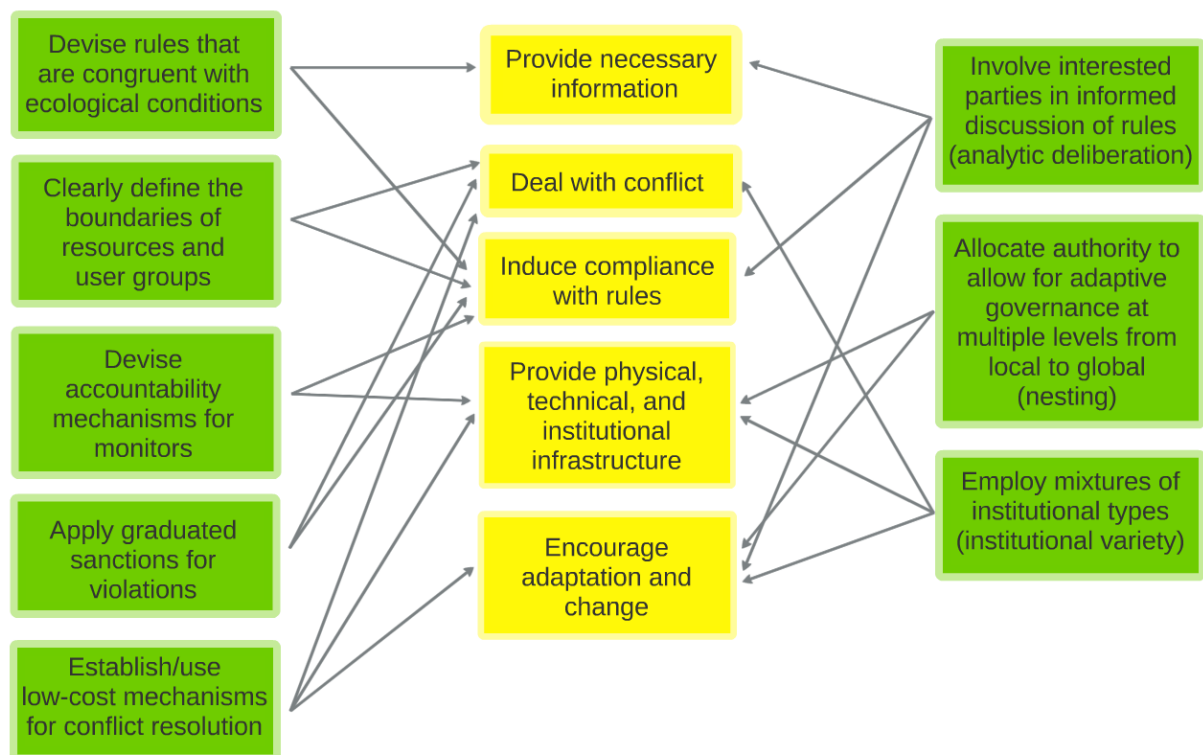


Figure 2.1 Design principles for robust CPR institutions (green boxes, left and right columns) and the governance requirements they help meet (yellow boxes, centre column). Each principle is relevant for meeting several requirements. Arrows indicate some of the most likely connections between principles and requirements. Principles in the right column may be particularly relevant for global and regional problems (Dietz et al., 2003, p. 1910)

During this second area of research Araral (2014) reassessed twelve of Ostrom's early case studies on CPR institutions which led him to the conclusion that small scale, locally governed commons can succeed and sustain their resources over long periods of time. Though he found that these resources were wrongly classed as CPRs and they were in fact privately owned resource systems by definition, as excludability to the resource was easily attainable. He also found that larger, more complex commons (which were correctly classed and studied as CPRs) resulted in institutional and resource failure, highlighting the fact that Hardin's theory could be more applicable to national, regional, international and global commons (Araral, 2014). In his case for supporting Hardin's pessimism over the success of global commons, Araral (2014) provided examples of 'tragedies' of global commons. He gave the example of the collapse of the Aral Sea and the degradation of the marine ecosystem in the South China Sea, among others. These resource domains, however, fit the definition of international commons better as their resources are only accessible to a number of countries and not to all (see Chapter 2.2). It has also been demonstrated that large-scale resources can be successfully managed through international governance regimes; notable examples include the International Convention for the Protection of the Rhine river ecosystem (1999) and the Montreal Protocol on substances (chlorofluorocarbons [CFCs]) that deplete the ozone layer (1987) (Dietz et al., 2003).

Araral (2014) and others (See for example Agrawal, 2014; Stern, Dietz, Dolšák, Ostrom, & Stonich, 2002) called for a third generation of common pool resource management research. Seeking to build on Ostrom's legacy, a new set of research questions needs to be addressed: Is Ostrom's way out of the 'tragedy of the commons' only valid for small-scale, locally governed commons? Could there be examples of large commons which do not end in 'tragedy' if not privatised or under state ruling? (Araral, 2014, p. 22). Could Antarctica be an example to the contrary?

2.3 Managing Antarctica

Activities in the Antarctic continent and Southern Ocean are primarily governed through the ATS and its related agreements, though other international agreements have jurisdiction over the area (Saul & Stephen, 2015). The following section will outline these agreements.

2.3.1 Antarctic Treaty

The AT was in great part an outcome of the International Geophysical Year (IGY) 1957-1958 (Jawadekar, 2008). The AT defines Antarctica as a place to be used only for peaceful purposes, banning all military activity (Article I). It promotes freedom of scientific investigation and international cooperation (Article II). The Treaty defines Antarctica as the land and ice shelves south of 60 degrees south of latitude (Article VI). Moreover, Article IV of the AT addresses the issue of sovereignty by acknowledging (but not settling) countries claims and 'basis for claim' at the time, and agreeing to set these claims aside while the AT is in force.

The AT was signed originally by 12 countries, including New Zealand, which became the first Consultative Parties (Antarctic Treaty Secretariat, 2016). The Treaty has now been acceded to by 41 more countries, though not all have consultative status (Antarctic Treaty Secretariat, 2016). Any country is open to join the Treaty so long as it accepts all Treaty provisions (Article XIII), but only the states with significant research interests may qualify for ATP status (Article IX). The ATPs meet annually and decisions made during those meetings must be agreed on by consensus, which adds strength to any policy enacted (Rolston III, 2002).

There are other states that are involved and support the Treaty but do not have voting powers. These are acceding states and Non-Consultative Parties (Rolston III, 2002). Currently there are 53 signatory states to the Treaty, 29 ATPs and 24 Non-Consultative Parties³ (Antarctic Treaty Secretariat, 2016). In 2013 the number of states who had agreed to the AT represented over 65% of the world's population (Walton, 2013).

³ See Appendix 2.2 for full list of AT Consultative and Non-Consultative Parties and their status with regards to all ATS agreements.

2.3.2 Protecting Antarctica

Even though the AT provided an essential political and legal framework for Antarctic matters, it did not directly address conservation or environmental management issues (Blay, 1992). After agreeing to the AT, the ATCPs soon realised the lack of environmental provisions in the document and started working on a number of different protection measures for the Antarctic environment (French, 1999).

After the AT came into force, a number of annexes and conventions were agreed throughout the years that enhanced the protection of living species in the area. The Agreed Measures for the Conservation of Antarctic Fauna and Flora were agreed in 1964; the Convention for the Conservation of Antarctic Seals (CCAS) in 1972 and the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) in 1980 (Hansom & Gordon, 1998). During this period the International Whaling Commission (IWC) introduced a worldwide moratorium on all commercial whale catching and in 1994 banned all whaling below 40 degrees south through designating Antarctica as the Southern Ocean Whale Sanctuary (Rolston III, 2002). All these measures and conventions addressed conservation issues, primarily dealing with Antarctic species, but no general environmental protection measures had been set in place, although the Agreed Measures for the Conservation of Antarctic Fauna and Flora allowed for the establishment of Specially Protected Areas (SPAs). These are areas of outstanding value and “unique ecological systems” where rigorous planning and environmental impact assessment are needed to be completed prior to entry (Hansom & Gordon, 1998, p. 270).

In 1988 there was an attempt to address issues relating to the environmental management of the continent by introducing the Convention for the Regulation of Antarctic Mineral Resource Activities (CRAMRA) (Blay, 1992). The CRAMRA was set to establish a framework for mineral exploration, prospecting and development activities (Hansom & Gordon, 1998) and introduced strict environmental safeguards for the continent (Blay, 1992). This convention failed to be ratified but set the grounds for a much wider encompassing protocol, which unlike the CRAMRA does not allow mining (Rolston III, 2002).

After a number of different drafts since the CRAMRA in 1988, the ATCPs agreed to and signed the Protocol on Environmental Protection to the AT⁴ (Protocol) in Madrid in 1991, which came into force seven years later after its ratification by all ATCPs (Hansom & Gordon, 1998).

⁴ Also referred to as the Environmental Protocol or the Madrid Protocol.

2.3.3 The Protocol on Environmental Protection to the Antarctic Treaty

The Protocol on Environmental Protection to the AT has had a significant influence on the environmental and biodiversity sustainability of Antarctica by determining strict environmental regulations which are compulsory and legally binding by all signatory parties (Hansom & Gordon, 1998). Although the Protocol can be modified or amended at any time, Article 25.2 stipulates that if consultative parties choose to they can request that the Protocol be reviewed fifty years after coming to force, this being the year 2048 (Protocol on Environmental Protection to the Antarctic Treaty, 1991). At this point modifications or amendments will require a simple majority, rather than consensus, including three-quarters of the states that held consultative status at the time of adoption of the Protocol (Article 25.3).

The Protocol designates Antarctica as a “natural reserve, devoted to peace and science” (Article 2). It also commits all signing parties to the “comprehensive protection of the Antarctic environment and dependent and associated ecosystems” (Article 2). In addition, it sets out to protect Antarctica’s intrinsic wilderness and aesthetic values, as well as valuing the continent as a place for conducting research of global relevance (Article 3).

The Protocol ensures an all-inclusive and consistent protection of Antarctica by setting out environmental principles (Article 3) and regulations for environmental management and protection (Protocol on Environmental Protection to the Antarctic Treaty, 1991). It stipulates that any human activity takes place with as little adverse impact on the environment as possible (Article 3). It also requires that all activities set to take place in Antarctica undergo prior assessments on the effects they may have on the environment, and as such it establishes a structured Environmental Impact Assessment (EIA) procedure (Article 8). If any activity is likely to have more than a moderate or transitory impact it is subject to a Comprehensive Environmental Evaluation (CEE) (Annex I, Article 3). Moreover, if an activity is going through a CEE, the state party needs to allow for the ATCPs to comment on it before they can permit the activity, so long as this process does not exceed 15 months (Annex I, Article 3.5). Another environmental protection mechanism provided under the Protocol is the designation of Antarctic Specially Managed Areas (ASMA) and Antarctic Specially Protected Areas (ASPA) (Annex V). Antarctic Specially Managed Areas and ASPAs allow for areas to be protected for a number of values, including historic, aesthetic, environmental, and scientific and or wilderness (Annex V). The Protocol’s principles and regulations clearly set out strong environmental management measures, raising the standard of Antarctic environmental care through the ATS (Hansom & Gordon, 1998; Hemmings & Kriwoken, 2010; Rogers et al., 2012).

To facilitate exchange of information between states about environmental issues impacting the continent and to give expert advice to the annual Antarctic Treaty Consultative Meetings (ATCM), the Protocol also established a Committee for Environmental Protection (CEP) (Articles 11 & 12). Finally, the Protocol dealt with the issue of mineral resources use by banning all non-scientific mineral resource exploration and extraction (Article 7). This clause and what its future may hold has been at the centre of much speculation as the time for revision of the Protocol nears its potential review date and escalating global demand for resources together with advancing technology could make Antarctic resource extraction feasible (Chown et al., 2012).

2.3.4 Managing the Southern Ocean

Although several international agreements have implications for the management of activities in Antarctic waters, the Southern Ocean and its maritime area is regulated by two normative systems: the 1982 United Nations Convention on the Law of the Sea (UNCLOS), and the ATS (Vidas, 1996).

The UNCLOS provides a universal legal framework for controlling pollution and management of marine natural resources, including mineral resources and fish stocks (Jawadekar, 2008). The ATS's 1980 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) is the agreement which relates specifically to the Southern Ocean and the management of its resources (CCAMLR, 2014). The Convention established a Commission as well as a Scientific Committee to work towards the sustainable management of marine living resources in the Antarctic Ocean (Jawadekar, 2008). It was the Parties to the AT that called for the Convention upon concerns over an increase on the Antarctic krill harvesting and the potential impact on the marine ecosystems of the Southern Ocean from unregulated krill fisheries (Hansom & Gordon, 1998).

The Commission on the Conservation of Antarctic Marine Living Resources sets the core principles for conservation to be followed when harvesting marine living resources and applies to the "Antarctic marine living resources of the area south of 60 degrees South latitude and to the Antarctic marine living resources of the area between that latitude and the Antarctic Convergence which form part of the Antarctic marine ecosystem" (Article I.1.). Although CCAMLR relates to all Antarctic marine living resources, it excludes the management of seals and whales as these are regulated by the Convention for the Conservation of Antarctic Seals and the International Convention for the Regulation of Whaling, respectively (Article VI).

The Convention's main aim is to conserve marine life (Article II.1.) and allows for harvesting of marine living resources so long as the harvesting is performed in a rational manner (Article II.2.).

The CCAMLR calls for an Ecosystem Based Management (EBM) approach to manage the use of Antarctic marine living resources (Article II.1.3); an innovative EBM approach which had never been adopted by another international resource management regime at the time (Rose & Milligan, 2010). The Convention recognises the importance of protecting the environment as well as the integrity of the Antarctic marine ecosystem and so, the Commission follows a precautionary approach to the management of resources and bases its decisions on the best available scientific information (CCAMLR, 2014).

Decisions relating to “matters of substance” can only be taken by consensus (Article XII.1.) unlike decisions over other matters, which only call for a simple majority of representatives present and voting (Article XII.2.). This consensus approach to decision making proved challenging for the creation of Antarctic Marine Protected Areas (MPA), such as the Ross Sea MPA, which in 2013 was stalled by two CCAMLR member states (Brooks, 2013) and took five years since it was first proposed to be approved (CCAMLR, 2016).

As under the AT, Antarctica is not owned by any one country and the AT binds states with territorial claims to “freeze” their claims as long as the AT is operational, the states with territorial claims on the continent cannot declare coastal jurisdiction through the UNCLOS over the Southern Ocean (Oxman, 1986). Therefore Antarctic claimant states do not possess Exclusive Economic Zone (EEZ) rights of exploring and exploiting the Antarctic waters and seabed. This results in the Southern Ocean falling under the category of the UNCLOS “high seas” (Article 87) and its ocean floor and resources as “Common Heritage of Mankind” (Article 136).

As noted by Joyner (1998), there are other external treaties affecting international activities in Antarctica. These are: the 1973 International Convention for the Prevention of Pollution from Ships (MARPOL), which in 1983 (MARPOL 73/78) declared Antarctica as a special area; the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (the London Dumping Convention); the 1972 Convention on the International Regulations for Preventing Collisions at Sea (COLREGS); the 1992 UN Framework Convention on Climate Change (Rio Conference); the 1992 Convention on Biological Diversity; the 1985 Convention for the Protection of the Ozone Layer and the 1987 Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol); and the 1989 Convention in the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention). Another, more currently relevant international agreement, is the International Code for Ships Operating in Polar Waters (Polar Code) under the IMO which is expected to enter in to force in 2017 (IMO, 2016).

2.3.5 Commentary on the Antarctic Treaty System

While heralded by some authors as “one of the most successful environmental regimes to date” (Ali, 2007, p. 169), other scholars have scrutinised the ATS’s legitimacy and effectiveness (See for example Dodds, 2010; Joyner, 1998; Stokke & Vidas, 1996). The ATS has also been criticised by the United Nations (UN) and non-signatory parties have expressed their aspiration to have a more inclusive regime that includes a wider number of countries in its management (World Commission on Environment and Development, 1987). In 1982 Malaysia asked the UN General Assembly (UNGA) to place the “question of Antarctica” on the agenda (Beck, 1984). Malaysia⁵, acting in representation of several developing states, wanted the UN to lead discussions on the creation of a more equitable and transparent regime to govern Antarctica (Hamzah, 2010) and advocated for considering Antarctica as common heritage of mankind, and to share the continent’s resources equitably between all states (Hansom & Gordon, 1998). These discussions started not long after growing speculations about the potential mineral wealth Antarctica and interest in regulating minerals activities in the area; perhaps not coincidentally, this time also saw an increase in states acceding to the AT (Hansom & Gordon, 1998).

Since the “question of Antarctica” was first officially placed on the UNGA’s agenda in 1983, the UN has produced a number of reports outlining developments relating to Antarctica and the ATS to guide UN sessions informing the wider international community on Antarctica’s current affairs, the global relevance of Antarctic research as well as the merits of the ATS as a governing mechanism (Beck, 2006; United Nations Environmental Programme, 2005). After over twenty years of the “question of Antarctica” the UN seized the topic and, though no new governing regime for Antarctica emerged out of it, the process led to stronger accountability by the ATCP and improved relations between countries (Beck, 2006).

The “question of Antarctica” has not been the first time the management of the area has been scrutinised. Alternative forms of management have been suggested over the years. The most prominent one being declaring Antarctica as a world park (Hansom & Gordon, 1998). The first time it was suggested that Antarctica be declared as a world park was in 1972 at the Second World Conference on National Parks in Yellowstone Park, USA. Where it was recommended that Antarctica and its surrounding ocean become the first world park under the auspices of the UN (Joyner, 1998). This idea was presented by New Zealand at the 1975 ATCM, where it was received with little enthusiasm (Brewster & Friends of the Earth, 1982). Non-Governmental Organisations (NGOs) embraced the idea of declaring Antarctica as a world park and through their media profile and

⁵ Malaysia later became a Non-Consultative Party to the ATS in October 2011 (See Appendix 2.2).

growing political influence with Treaty states contributed to the development of the Protocol (Hansom & Gordon, 1998) where many of the world park principles became embedded (Joyner, 1998).

The conservation and management of the Antarctic and its ecosystems has improved significantly since the inception of the ATS, and has evolved into a system which provides some of the most comprehensive protection for the environment, ecosystems and species in the world (Rogers et al., 2012). This governance system has been identified by some as saving Antarctica from the 'tragedy of the commons' (Ainley & Brooks, 2013). Notwithstanding these successes, it is becoming increasingly apparent that the protective measures under the ATS may be insufficient to protect the Antarctic environment and to address the challenges resulting from a more intensively visited and warmer Antarctica (Liggett, Lamers, Tin, & Maher, 2014; Rogers et al., 2012).

2.4 Antarctic stakeholders and stakeholder theory

Stakeholders are at the core of Antarctica's governance system. Reed et al. (2009) and Mitchell, Agle, and Wood (1997) pointed out that definitions of stakeholders are varied, though all agree that stakeholders must have a 'legitimate stake' in the issue or system. Stakeholders were previously defined in this study as a group of people who share a stake or common interest in an issue or system (Grimble & Wellard, 1997). Mitchell et al. (1997) clarified the definition and added that many entities can be a stakeholder, from organisations and institutions through to societies and the natural environment. This view was also noted by Reed et al. (2009) who added that stakeholders can include living as well as non-living entities. According to Grimble and Wellard (1997) stakeholders also exist at various institutional and geographic scales, including global and international, to national, regional and local.

Contemporary literature on Antarctic conservation stakeholders is lean. An early study by Friedheim and Akaha (1989) proposed that everyone on Earth is a stakeholder in Antarctica, as Antarctica affects the Earth's ecosystems and is recipient of environmental impacts from activities in the rest of the world. In 1998 Polk analysed Antarctic stakeholders and identified four groups: governments, scientists and researchers, commercial industry, and conservationists. Polk (1998) proposed that these groups have specific interests in their involvement in the Antarctic, and only identified conservationists as Antarctic stakeholders with an interest in Antarctic conservation. Polk (1998) perceived governments as interested in sovereignty; scientists and researchers as interested in utilising the Antarctic as place of study; and commercial industry as interested in the commercial value of the area, which he noted ranges from "minerals and fishery exploitation to the commercial tourist trade" (Polk, 1998, pp. 1395, 1396).

Figure 2.2 was compiled in an effort to apply Grimble and Wellard's (1997) stakeholder scale to the Antarctic setting and to reflect some of Polk's (1998) Antarctic stakeholder groups. Figure 2.2 uses New Zealand as an example of an Antarctic stakeholder nation and provides examples of Antarctic stakeholders under each institutional level.

Stakeholders and their perspectives are at the heart of stakeholder analysis (Grimble & Wellard, 1997; Mitchell et al., 1997). Grimble and Chan (1995) described stakeholder analysis as an approach to understanding a system by identifying the stakeholders or actors in the system, and evaluating their interests in that system. They emphasised that stakeholder analysis can identify the basis of natural resource issues and understand the conflicts of interests that may undermine the success of a project or policy. Due to its ability to understand systems and their changes, stakeholder analysis is seen a powerful tool for analysing policy (Grimble & Wellard, 1997).

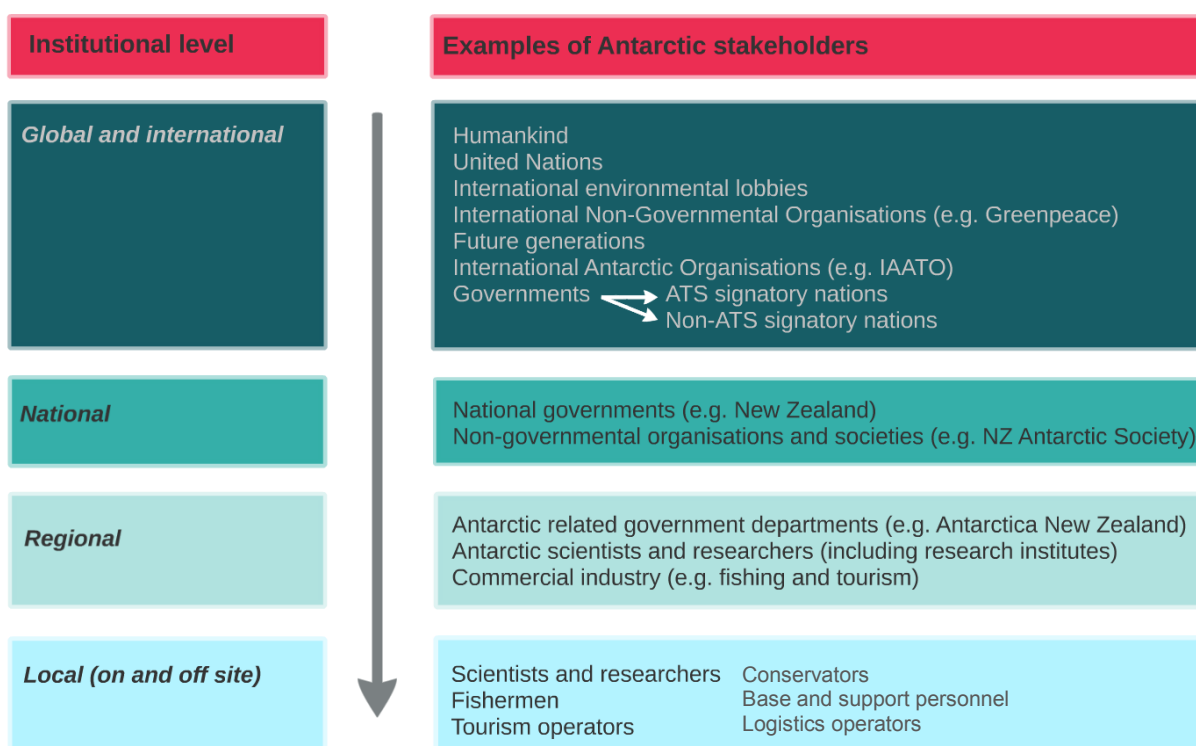


Figure 2.2 Typology of Antarctic stakeholders with some non-extensive stakeholder examples (Based on Grimble & Wellard, 1997; Polk, 1998)

2.5 Relevant studies and gaps in the literature

In the field of Antarctic studies, only a handful of scholars have looked at Antarctic stakeholders as subjects of study (See for example Friedheim & Akaha, 1989; Haase et al., 2009; Haase, Storey, McIntosh, Carr, & Gilbert, 2007; Parnell, 2007; Sovacool, 2008). One of the earlier studies included that of Friedheim and Akaha (1989) who analysed Japan's involvement in the development of the ATS. More recently, Haase et al. (2007) interviewed key Antarctic tourism stakeholders to gather

their perspectives on current and future aspects of tourism regulation in Antarctica. Another study by Haase et al. (2009) used Ostrom's design principles for robust management of CPRs to analyse the institutional robustness of the self-regulated IAATO. They achieved this through reviewing academic literature on Antarctic tourism, analysing ATS documents and interviewing Antarctic tourism stakeholders. Other than these studies on Antarctic stakeholder perspectives, no other studies were found that analysed the governance of Antarctica through a CPR lens.

Other studies of relevance include that of Liggett et al. (2014), who provided a framework to view potential future scenarios for Antarctic conservation as identified by polar researchers and called for further research into the values Antarctic stakeholders place in the Antarctic; Araral (2014) also called for additional research into global commons in the context of CPR management frameworks.

Lastly, the Scientific Committee on Antarctic Research (SCAR) released in 2014 the top six priorities for Antarctic science over the next 20 years, as decided by leading Antarctic scientists and policy-makers at SCAR's first Antarctic and Southern Ocean Science Horizon Scan, and noted the need for research into recognizing and mitigating human influences on the Antarctic region (Kennicutt, Chown, Cassano, Liggett, Massom, et al., 2014). They also called for further protection of the Antarctic as well as greater international collaboration engaging diverse stakeholders.

To address a gap in the literature on global commons governance and CPR management frameworks, as well as on human impacts on the Antarctic environment and on stakeholder values on Antarctic conservation and governance, this research project gathered New Zealand Antarctic stakeholder perspectives on Antarctic conservation, and analysed them through a CPR lens.

3 Methods

The purpose of this chapter is to describe the methodological approach used to investigate New Zealand Antarctic stakeholders' perspectives on Antarctic conservation.

This chapter is comprised of seven sections. The first section provides a broad overview of mixed method research approaches. The second and third sections explain, in more detail, the quantitative and qualitative approaches used, and the fourth section describes how the data were analysed. The fifth section examines the ethical considerations of the research, before the limitations of the research are acknowledged and the chapter is summarised.

3.1 Approach

In order to best meet the study's research objectives, a mixed methods approach was used, combining both quantitative and qualitative techniques. Mixed methods are often used when the research outcome can be improved by the use of more than a single method as the research questions are complex and cannot be answered using only one research method (Morse & Niehaus, 2009). Mixed methods can be particularly relevant when the researcher aims to simultaneously explore associations and understand systems at both a macro and micro level (Morse & Niehaus, 2009). Through combining quantitative and qualitative approaches, there is also potential for a more detailed understanding of topics under study than is likely using either method on its own (see for example Babbie, 2004; Creswell & Clark, 2011; Morse & Niehaus, 2009). In this study, quantitative methods provide an understanding of the current thinking on Antarctic conservation from a broad range of New Zealand Antarctic stakeholders, while qualitative methods allow for a more in depth examination of the topic with a smaller group of participants. Both research methods were used to address all four of the research's objectives.

The data gathering process took place between August 2014 and January 2015. In that period, emails with a link to the *Qualtrics* hosted online survey were sent to 420 identified New Zealand Antarctic stakeholders, and interviews with 22 stakeholders took place. The survey had a 22 per cent response rate, which was closely in line with online survey response rates as identified in the literature (Sheehan, 2001).

3.2 Quantitative methods

Surveys are regarded as excellent tools for collecting data from populations too large to be directly observed and have the ability to measure perceptions and attitudes within a large group (Babbie, 2004). The survey used in this study was designed to capture perspectives on Antarctic conservation from a range of New Zealand Antarctic stakeholders and address all research objectives.

3.2.1 Online survey

Following a review of academic literature relating to the challenges and issues facing Antarctica and the Southern Ocean, ATS policy documents, as well as stakeholder and common pool resource literature, a questionnaire was designed (see Appendix 3.1) to survey New Zealand Antarctic stakeholders about their views on Antarctic conservation. Qualitative data gathered from a pilot study was also used to shape some of the quantitative questions in the survey. The survey was hosted online via *Qualtrics* online survey software. Online surveys are an increasingly popular way to conduct survey research as they hold a number of advantages such as accessibility, low cost, efficiency and anonymity (Van Selm & Jankowski, 2006). The online survey was also used as a way to recruit interview participants for the qualitative component of the study.

The survey used in this study was organised into five distinct thematic sections: conservation challenges and issues in the Ross Sea Region; challenges and issues facing Antarctic conservation; Antarctic governance; future scenarios for Antarctic conservation; and Antarctic conservation stakeholders. The survey had a total of nineteen questions, plus seven questions regarding participants' personal backgrounds.

3.2.2 Pilot study

A trial of the survey took place between April and May 2014 as part of the researcher's course work requirements for her postgraduate programme. The trial survey was distributed to the University of Canterbury's Postgraduate Alumni from Gateway Antarctica through the University of Canterbury's online database (N=208). Permission to access this database was approved by Dr. Daniela Liggett a lecturer at Gateway Antarctica, University of Canterbury. The trial resulted in 39 suitable surveys for analysis, a response rate of 19 per cent. The survey responses were analysed using Excel, Qualtrics and SPSS statistical software⁶.

Having the survey completed by a smaller stakeholder group and fully analysing the results, allowed the researcher to refine questions to make the survey more user friendly before sending it to a wider group. The final survey included fewer quantitative questions and a separate section on matters relating to the Ross Sea Region.

3.2.3 Survey respondents

The target population for the final survey was New Zealand Antarctic stakeholders. New Zealand Antarctic stakeholders were identified by using stakeholder analysis methods including an analysis of

⁶ The information was presented as a poster at the Scientific Committee on Antarctic Research Open Science Conference (SCAR OSC) in Auckland in August 2014. See Appendix 3.2 to see the poster.

Antarctic conservation and policy literature, web searches, expert opinion as well as snow-ball sampling (Reed et al., 2009).

Polk's (1998) four tier classification of Antarctic stakeholders (Government, Science, Commercial Industry and Conservationists) was used to categorise all stakeholders identified and to ensure all known stakeholder groups were represented. Table 3.1 shows the New Zealand Antarctic stakeholders identified in their respective stakeholder categories. The number of individuals contacted per stakeholder group is also included in Table 3.1. This exercise provided a purpose judgement non-probability sample, an appropriate group given that specialist knowledge of Antarctic matters was essential to this study (Babbie, 2004).

Table 3.1 Identified and contacted New Zealand Antarctic stakeholders classified by Polk's (1998) stakeholder categories

Polk (1998) stakeholder category and number of individuals contacted per group	New Zealand Antarctic stakeholders
Government (N=12)	Antarctica New Zealand
	Department of Conservation
	New Zealand Ministry for Primary Industries
	New Zealand Ministry of Foreign Affairs and Trade
Scientists (N=248)	Auckland University of Technology
	Bodeker scientific (New Zealand based atmospheric research company)
	Constantia Consulting (New Zealand based environmental solutions consultancy firm)
	GNS Science - New Zealand Crown Research Institute
	Land information New Zealand
	Landcare Research - New Zealand Crown Research Institute
	Lincoln University
	Massey University
	National Institute of Water and Atmospheric Research
	New Zealand Antarctic Research Institute (NZARI)
	New Zealand Ministry of Business, Innovation, and Employment
	SCAR 2014 Open Science Conference (SCAR OSC) New Zealand based attendees
	University of Auckland
	University of Canterbury
	University of Canterbury - Gateway Antarctica
	University of Otago
	Victoria University
	Victoria University - Antarctic Research Centre
	Waikato University
Commercial industry (N=21)	Tourism. Heritage Expeditions
	Fishing. NZ Longline Ltd.
	Fishing. Sanford Ltd.
	Fishing scientists.
Conservationists (N=139)	Antarctica New Zealand Artists to Antarctica Programme and the Invited Artists Programme Alumni
	Antarctic Heritage Trust
	Independent artists and film makers
	International Antarctic Centre (Christchurch based Antarctic attraction)
	Media representatives
	New Zealand Antarctic Society
	New Zealand IceFest (Christchurch based Antarctic festival) presenters
	NGO. ECO NZ
	NGO. Forest and Bird
	NGO. WWF
	Science communicators

3.2.4 Data collection

Once identified, New Zealand Antarctic conservation stakeholders were contacted and invited to participate in the online survey. Upon completing the survey, respondents were invited to participate in a 45-minute interview at a later time and place through clicking on a link which guided them to a separate survey to provide their contact details.

Between August 2014 and January 2015, an email with the link to the *Qualtrics* online survey was distributed to 420 individuals representing the four stakeholder groups (see Table 3.1). One hundred and eight people responded to the invitation by accessing the online survey. The survey resulted in 92 useable surveys⁷, a response rate of 22 per cent.

All known New Zealand government departments with a management or policy role in Antarctic affairs were contacted via details readily available online. 'Gatekeepers' from each department distributed an email with an invitation to participate in the online survey to all relevant members of their departments. In total, there were 12 respondents from the government stakeholder group. In the science stakeholder group, all known universities, science-supporting government agencies, crown institutes and consultancy firms with an Antarctic affiliation were contacted through details readily available online. As with the previous group, 'gatekeepers' distributed the email to relevant staff or forwarded the email to databases already in existence (e.g. University of Otago's Polar Environment Research Theme network). All New Zealand based attendees to the SCAR OSC were also included and contacted directly by the researcher as their contact details were made available to all conference participants. Two hundred and forty eight people were contacted in the science group, making this the largest group.

The commercial industry group was contacted using approaches similar to those used with the previous groups. A total of 21 people, mainly from the fishing industry, were invited to participate in the survey. In addition, 139 people were reached in the conservationist stakeholder group through various methods including posts in the Facebook page of an Antarctic Society, direct contact from the researcher to various polar advocates, through contacts readily available online. Once again, 'gatekeepers' were important in their help forwarding invitations to participate in the survey to relevant staff and polar conservationists. Arts fellow alumni from Antarctica New Zealand's Artists to Antarctica Programme and the Invited Artists Programme were part of this group as well. They were identified through Antarctica New Zealand's website and their contact details searched online

⁷ There were 16 unusable responses, of these, 7 respondents gave consent but provided no further information and 9 provided solely their personal background information.

creating a database of 29 artists. Speakers in the 2014 Christchurch based Antarctic festival “IceFest” were also invited to participate in the survey through a Christchurch City Council ‘gatekeeper’. The researcher took the opportunity to personally invite a number of potential survey participants from all stakeholder groups at various Antarctic-related conferences and events⁸, and provided them with a card (see Appendix 3.3) with a link to the survey.

Aware of the online survey response rate decline in recent years - due in part to a rise in distribution of web surveys, an increase in email traffic and the ability of potential respondents to ignore emailed survey requests (Tourangeau, Conrad, & Couper, 2013) - techniques to boost response rates were implemented. Close attention went into the survey design, the invitation to participate and to contact the participants up to three times with reminders, all these in an effort to enhance the response rate (Tourangeau et al., 2013; Van Selm & Jankowski, 2006). The researcher sent reminders to databases accessible to her and where possible, gatekeepers were used to email reminders to their databases, though some were not able to do this. Considering these limitations and efforts to overcome them, the response rate of 22 per cent was deemed appropriate.

Care was taken to avoid cross-posting invitations to participate in the survey and double-counting people in each group sample size. However, due to the use of ‘gatekeepers’ as portals to access greater networks and the inability of the researcher to see each email address, it is possible that some people might have been approached through different networks which would have resulted in double-counting of participants.

3.3 Qualitative methods

Qualitative interviews have the potential to capture rich and detailed information about a person’s views and opinions on particular topics (Lofland, Snow, Anderson, & Lofland, 2006). It is for this reason that semi-structured interviews were deemed essential to this study. Data from the interviewee process helped address all research’s questions, providing valuable insights into stakeholder perspectives in Antarctic conservation.

3.3.1 Interview participant recruitment

Two methods were used to recruit interviewees: the online survey and direct requests from the researcher. Of the 22 individuals who participated in the semi-structured interviews, six volunteered

⁸ XXXIII SCAR Biennial Meetings and Open Science Conference which took place at the SkyCity Convention Centre in Auckland, in August 2014; International Polar Tourism Research Network (IPTRN) conference held at University of Canterbury in Christchurch in September 2014; New Zealand IceFest, Antarctic festival in Christchurch between September and October 2014.

after completing the online survey. The remainder of interviewees were recruited directly as their expertise was determined as especially relevant to the research topic.

Two additional people volunteered to participate in the interview process after completing the online survey but were not interviewed. This was due to their stakeholder groups (science and conservation) already being well represented at the time and capacity to hold additional interviews had been reached.

3.3.2 Interview participants

New Zealand members of each stakeholder group were part of the interview process and included people involved in polar affairs through logistics, environmental management, operations management, environmental policy, tourism management, fishing, humanities and social science as well as natural science research, science communication, advocacy, outreach and education. Two prominent international Antarctic stakeholders were also part of the interview process. The inclusion of international stakeholders helped validate some of the views from New Zealand stakeholders and provided an international perspective to New Zealand's involvement in Antarctica.

3.3.3 Interviews

Semi-structured interviews were guided by an interview schedule (see Appendix 3.4) which was created to reflect the study's research objectives. Key themes included Antarctic conservation challenges and issues, Antarctic governance, stakeholders in Antarctic conservation, potential future scenarios for Antarctic conservation as well as conservation and management issues in the Ross Sea Region. In order to provide context to the interview, the interviewees' professional connection with the Antarctic was also part of the interview schedule. Twenty-two semi-structured face-to-face, phone and Skype interviews were conducted by the researcher between August and December 2014 in Christchurch, Auckland and Invercargill. Interviews took place in a mutually convenient location, mainly in public spaces or in the work spaces of interviewees. A small number of interviews were held at SCAR 2014 OSC and Ice Fest. Interviews lasted between half an hour to one and half hours in length, though the average interview length was one hour. All interviews were recorded using a hand-held DSS recorder and written notes were taken by the researcher.

3.4 Data analysis

Quantitative data was analysed using SPSS software for statistical analysis, *Qualtrics* research software and Excel⁹. To allow for some statistical analyses to be performed and to simplify data interpretation in the text, numerical scales were often collapsed to represent broad categories. For

⁹ Upon analysis the information was presented as a poster at the 2015 Antarctic Science Conference at University of Canterbury between 29 June and 2 July. See Appendix 3.10 to see the poster.

instance, agreement statement scales (0-100) were reduced to disagree (0-33), neutral (34-66) and agree (67-100). Bivariate descriptive statistical analyses were carried out on most survey questions, and their noteworthy results reported in Chapter 4. However, low frequencies meant it was not possible to prove statistically significant differences between Antarctic interest group affiliations or other dimensions of respondent profiles in terms of their views on Antarctic conservation.

For the analysis of qualitative data, all interview audio files were fully transcribed into Word. Word documents were later imported to *NVivo* software for coding. A coding tree was developed from themes arising from the interviews and categorised according to the 4 key objectives of the study (see Chapter 1). All interviews were categorised and coded (See Table 3.2) to ensure interviewee confidentiality. Table 3.2 shows the number of completed interviews, the code assigned to each, the stakeholder group they belonged to, as well as the date the interview took place.

Table 3.2 Categorisation and coding of interviews

Interview #	Code	Stakeholder group	Date
1	G1	Government	12/10/2014
2	G2	Government	14/10/2014
3	G3	Government	22/10/2014
4	G4	Government	22/10/2014
5	G5	Government	24/11/2014
6	S1	Science	27/08/2014
7	S2	Science	25/09/2014
8	S3	Science	22/10/2014
9	S4	Science	4/11/2014
10	S5	Science	18/11/2014
11	S6	Science	18/11/2014
12	I1	Industry	3/10/2014
13	I2	Industry	23/11/2014
14	C1	Conservation	10/10/2014
15	C2	Conservation	29/10/2014
16	C3	Conservation	11/11/2014
17	C4	Conservation	11/11/2014
18	C5	Conservation	19/11/2014
19	C6	Conservation	28/11/2014
20	C7	Conservation	9/12/2014
21	E1	International	9/12/2014
22	E2	International	15/12/2014

3.5 Ethical considerations

This research project was fully approved by the Lincoln University Human Ethics Committee on 15th of August 2014 (see Appendix 3.5). Confidentiality, anonymity and privacy were the main ethical

considerations in this research project. In the survey, anonymity and confidentiality was guaranteed to all participants and consent was obtained prior to their participation. Respondents were also made aware that they could cease their participation in the survey at any time by exiting the web browser. Contact details of the researcher and her supervisors were provided on the survey and cover email, in case of any questions or concerns. Anonymity was guaranteed since respondent details were not collected in the survey and responses only reported in aggregate. Confidentiality was also guaranteed since only the researcher and her supervisors had access to the raw data.

For the interviews, confidentiality was assured since identities of participants were never made public or made known to any person other than the researcher and her supervisors. Real names and contact details were never used as a part of data dissemination and descriptors, such as “Antarctic scientist” were used instead of proper names in written documents. Upon commencement of each interview, a research information sheet (see Appendix 3.6) was given to the interviewee. This explained the study and described the commitment participants were making and outlined confidentiality provisions. Written consent (see Appendix 3.7) to participate in the research and for the interviews to be recorded was obtained from all interviewees. The signed consent forms were stored separately to the transcript of the interview. A separate information sheet (see Appendix 3.8) was emailed to participants interviewed over Skype or telephone. This information sheet had details on how to provide consent by accessing a *Qualtrics* hosted online consent form (see Appendix 3.9), which each participant completed prior to the interview. With the permission of the participants, all interviews were digitally recorded and transcribed onto Word documents, which the participants had access to upon request. All participants were made aware that they reserved the right to withdraw from the interview at any time during the interview and up to a month after the interview took place.

Above all, participants were treated with utmost respect and their participation was voluntary. No harmful effects to the participants were foreseen or reported.

3.6 Limitations

It is important to acknowledge the limitations of this research. First, the data collected for this study is limited to New Zealand Antarctic stakeholders representing Polk’s (1998) four tier classification of Antarctic stakeholders. A wider study might have added the general public, as this group has been identified in the literature as having a stake in Antarctic matters (Friedheim & Akaha, 1989), this however was deemed beyond the scope of this research.

Second, in order to identify members of each stakeholder group an identification scoping exercise was carried out using multiple stakeholder analysis methods. Despite the extensive nature of this identification process, it is inevitable that some stakeholders will have been missed.

Third, the distribution of the survey relied heavily upon the good-will of 'gatekeepers', and it was assumed that all gatekeepers who agreed to distribute the survey did so, though this was never proven.

Fourth, some stakeholders were identified but were unable to be approached as their contact details could not be found or potential 'gatekeepers' were unable to help in the distribution of the survey. Furthermore, due to the nature of the survey, only people with access to the internet were able to be contacted, potentially excluding some participants. The nature of the survey instrument with mainly quantitative questions could have also limited the types of responses to some questions by survey respondents.

No significant limitations were identified for the qualitative part of the study, and the researcher was satisfied with the depth of information gathered. Many recurrent themes appeared across all interviewees representing each stakeholder group and by the end of the interviewing phase themes were typically consistent and recurrent. This was interpreted by the researcher as an indication that data saturation point had been reached (Guest, Bunce, & Johnson, 2006).

3.7 Chapter summary

This chapter has described the methodological approach taken to study New Zealand Antarctic stakeholders' perspectives on Antarctic conservation underpinned by a framework outlined by Polk (1998) and discussed in Chapter 1.

A mixed methods approach was used to maximise understanding of the topic (Babbie, 2004; Creswell & Clark, 2011; Morse & Niehaus, 2009). An online survey and semi-structured interviews were developed to reflect the objectives of the study. The data collection occurred between August 2014 and January 2015, with 108 Antarctic stakeholders participating in the survey and 22 in the interview process.

The following chapters regard the results of the research project. Chapter 4 presents the results of the online survey and chapter 5 and 6, the data gathered in the interview process. Results from both research methods are being presented separately providing initially a broad overview of stakeholder perspectives in Antarctic conservation, and later a more detailed view.

4 Results Part 1. Survey respondents' views on Antarctic conservation

The data collection period for the quantitative component of this study was between 21st of August 2014 and 6th of January 2015. Within this period, 420 New Zealand Antarctic stakeholders were identified and invited to participate in a *Qualtrics*-hosted online survey aimed at exploring New Zealand Antarctic stakeholders' perspectives on Antarctic conservation. The survey component of this research project aimed at addressing all four research objectives.

This chapter presents the findings of the survey and is organised as follows. The chapter first describes survey respondent profiles, before perceived conservation challenges for Antarctica and the Ross Sea Region are presented. Respondents' views on future scenarios for the Antarctic environment and issues relating to Antarctic governance are then outlined. Finally, the respondents' perceptions of the influence of Antarctic conservation stakeholders are presented and the chapter is then briefly summarised.

4.1 Profile of respondents

Respondents' connections with Antarctic matters span science, government, fishing, tourism, NGOs, policy, education, the arts, media, history, heritage and 'other(s)' such as ships masters and ice pilots (see Figure 4.1). The interest group that was most represented by survey participants was science, with 60 respondents noting an affiliation with this group.

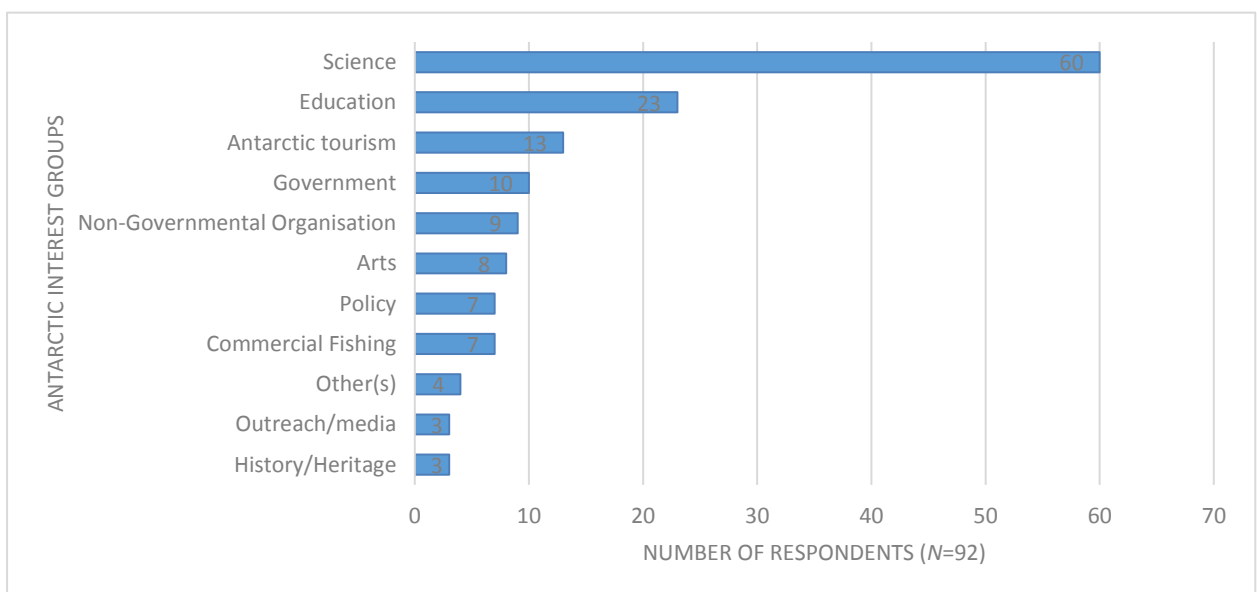


Figure 4.1 Survey respondents' Antarctic interest groups

The dominance of science stakeholders in the sample is not surprising considering the science stakeholder group equated to 59 per cent of the target population (see Chapter 3). Education was the second most represented interest group with 23 respondents having a connection to this group. It is important to emphasise that, although the majority (59%) were part of a single Antarctic interest group, survey participants could select multiple interest groups in the survey, and a significant proportion (40%) noted affiliations to more than one interest group (see Table 4.1). This underscores the interrelationships between Antarctic interest group sectors. The most common overlap of selected interest groups were science and education ($n=14$). Although it was valuable to observe a large interrelationship between Antarctic interest groups, respondents' ability to select multiple Antarctic interest groups in the survey meant the researcher was not able to gather individual stakeholder group response rates or perform statistical analyses of results based on Polk's (1998) Antarctic stakeholder classification. The researcher did, however, carry out analyses of results based on respondents' identified interest groups.

Table 4.1 Respondents' network of connections to Antarctica ($n=92$)

Number of connections	Number of respondents
Single connection	54
Double connection	22
Triple connection	11
Quadruple connection	5

Respondents reported between one and 55 years' working on Antarctic matters in their various roles. The average length of association (14 years) and the 1254 years of collective experience suggests a long-term commitment, focus and considerable depth of Antarctic knowledge among stakeholder respondents.

Males (60%) outnumbered females (40%) among survey respondents. This overrepresentation of men could be attributed to the fact that Antarctic matters have historically been male dominated (Dodds, 2009). Survey respondents' were also asked to select their age range, which showed that the most populous age group was 41 to 50 years ($n=17$) (see Appendix 4.1 for further information on respondents' demographics). The educational attainment levels reported by respondents' was high, with most (87%) having completed tertiary education studies and over half (55%) of those with tertiary qualifications holding a doctoral degree. Nine respondents held a high school diploma and three had technical qualifications.

Most respondents lived in New Zealand (91%) and held New Zealand citizenship (71%). Other respondents' origins were from European states ($n=11$), North America ($n=10$) and Australia ($n=4$). One respondent identified as Antarctic¹⁰. Four interviewees declared multiple nationalities.

Survey respondents' characteristics reported here depict a mature median cohort of individuals with considerable experience in Antarctic matters, high academic achievement and with New Zealand residence. This suggests the data gathered in the survey was provided mainly by individuals knowledgeable in Antarctic matters and familiar with the nature of data gathering processes. The next section presents the analysis of the data provided by survey respondents revealing respondents' perspectives on Antarctic conservation and addressing the research's four objectives.

4.2 Challenges and issues facing Antarctic conservation

Survey respondents were asked to consider a range of challenges and issues facing Antarctic conservation today and into the future. Responses were recurrently sought using rating scales, as described below.

The current condition of Antarctica's natural environment was rated by respondents as being above average. Antarctica's 'ocean', 'air', 'land', 'cultural heritage' and 'wildlife' were all elements rated at or above a mean of 66 on a relative scale of 0 to 100 (0 being poor and 100 excellent). Additionally, on a relative scale of 0 to 100 (where the current condition of Antarctica's environment was compared to its condition in 1998 on a scale where 0 = 'substantially worse than in 1998' and 100 = 'substantially better than in 1998'), respondents perceived the general condition of Antarctica's environment now as 'neither better nor worse' ($M=54.39$, $SD=17.03$, $n=66$) in comparison to its condition in 1998 when the Protocol came into force.

In terms of survey respondents' perceptions about what needs protecting in Antarctica, the majority of respondents ranked 'ecological ecosystems' as the most important, followed by 'wildlife', 'landscapes' and 'historic sites and artefacts' (see Table 4.2).

¹⁰ Although not all respondents live in New Zealand, their answers were included in the analysis as their country of residence does not affect their capacity to work in Antarctic matters through New Zealand.

Table 4.2 Respondents' rankings of the most important things to protect in Antarctica ($n=79$)

#	Things to protect in Antarctica	Ranking				
		1	2	3	4	5
1	Ecological systems	55	21	3	0	0
2	Wildlife	16	50	12	1	0
3	Landscapes	4	8	54	11	2
4	Historic sites and artefacts	1	0	8	66	4
5	Other	3	0	2	1	73

Frequencies

Under the category of 'other' (see Table 4.2), respondents mentioned elements of Antarctica, such as wilderness ($n=2$), the value of peace and science ($n=1$) and the ATS itself ($n=1$) as worthy of protection.

In other analysis, Antarctica's environment and dependent and associated ecosystems were perceived by most respondents ($n=79$) as being either, well protected (49%) or very well protected (39%) through the Protocol; only a small minority (11%) observed the protection of Antarctica's environment to be poor. Bivariate descriptive statistical analyses were carried out finding no significant differences between Antarctic interest groups, years of experience on Antarctic matters, age range or gender of respondents' profiles in terms of their perception of how well Antarctica is currently protected through the Protocol. However it is noteworthy that no government affiliated respondent ($n=9$) reported Antarctica as being poorly protected and that all respondents affiliated to the fishing industry rated Antarctica's environment to be very well protected ($n=6$).

Although the stakeholders surveyed perceived Antarctica as having a good level of protection, the significance of a range of conservation challenges facing the Southern Ocean and Antarctic continent were also recognised. Climate change, ocean acidification and fishing were ranked by most respondents as the top three conservation challenges facing Antarctica today (see Table 4.3).

Table 4.3 Respondents' rankings of the most important conservation challenge facing Antarctica today ($n=78$)

#	Antarctic conservation challenges	Ranking									
		1	2	3	4	5	6	7	8	9	10
1	Climate change	42	19	5	4	1	1	2	2	2	0
2	Ocean acidification	8	23	9	8	14	4	4	4	4	0
3	Fishing	11	8	26	15	6	10	1	1	0	0
4	Invasive alien species	5	11	11	14	12	8	9	3	3	2
5	Whaling	0	4	6	8	15	14	14	10	6	1
6	Pollution	0	3	8	9	10	19	16	9	3	1
7	Government support	4	5	6	5	4	5	16	19	14	0
8	Tourism	3	0	2	10	11	10	12	16	14	0
9	Impacts from science and logistics	3	4	4	5	5	7	4	13	32	1
10	Other(s)	2	1	1	0	0	0	0	1	0	73

Frequencies

When asked whether Antarctica's current conservation challenges will remain the same in 2048 when the Protocol may be reviewed, just over half (51%) of respondents ($n=83$) believed the challenges will change by then. Further analyses using cross-tabulations revealed an even split of opinions on the topic within respondents' Antarctic interest group affiliations, gender, age and years of experience in Antarctic matters. No clear correlation was apparent within these dimensions of respondents' profiles and respondents' views on Antarctic conservation challenges remaining unchanged by the year 2048.

Although climate change and its auxiliary effects were noted as a continuing challenge in Antarctica's future, respondents also demonstrated concern over the impact on the environment from increasing human presence in Antarctica and the potential increase in pressure to extract natural resources including minerals, oil, water and fauna. As a visual illustration of respondents' views on the perceived Antarctic conservation challenges for the future, a word cloud was generated (see Figure 4.1). The cloud was created in a word cloud generating website¹¹ using the frequencies associated with respondents' answers to their opinions expressed on an open-ended question in the survey about Antarctica's conservation challenges for the year 2048. The size of the words displayed is relative to their in-text frequency; hence words respondents used numerous times, such as 'exploitation' are highlighted and displayed in larger font size than those mentioned fewer times in

¹¹ Tagxedo.com

($M=50.15$, $SD=20.96$). However when asked about their expectations on the future condition of the Ross Sea Region's natural environment most respondents ($n=75$) expect it to either remain unchanged (51%) or to decline (47%) by the time the Protocol could be reviewed in 2048. Only a small minority (2%) expect it to improve. A cross tabulation analysis, revealed that perceptions about the future condition of the Ross Sea Region's natural environment might be related to respondents' age. Most (75%) respondents aged between 31 and 40 years were negative about the expected future condition of the Ross Sea Region's natural environment. By contrast, most respondents aged above 41 (54% in the 41-60 year old range and 56% in the 60+ age group) expected the Region's environment to remain unchanged. The only respondents' ($n=2$) who expect the Ross Sea Region's environment to be better in the year 2048, were respondents in the 41 to 60 years of age range. Though these patterns are worth noting, the results did not allow proof of a statistical significance due to the small sample sizes. Following respondents' neutral views towards the future condition of Ross Sea natural environment, respondents ($n=82$) reported similar findings about the future conservation of the region. Forty-six percent of respondents felt neither optimistic nor pessimistic about the future conservation of the Ross Sea Region.

4.3 Antarctic environmental futures

With regard to the future of Antarctica's natural environment, the majority (54%) of respondents expect it to remain similar to its current condition, although a large minority (36%) expected the condition of Antarctica's natural environment to deteriorate. Only a small proportion (9.4%) of respondents believed Antarctica's environment will be substantially better than what it is today by 2048 when the Protocol could be reviewed. Contrary to respondents' views on the future state of the Ross Sea Region's natural environment, respondents in the 31 to 40 year old age band felt more positively about Antarctica's future environment. Most respondents in this age group (78%) expect the condition of Antarctica's natural environment to remain unchanged by the year 2048. The views from the older age groups are similar to those expressed about the future condition of the Ross Sea Region.

The level of optimism towards the overall future conservation of Antarctica's was divided between respondents. Forty-two per cent of respondents showed neither optimism nor pessimism about Antarctica's future conservation, and equal proportions of respondents felt optimistic and pessimistic (29% each) about Antarctica's future conservation. These views echo those expressed about the future conservation of the Ross Sea Region mentioned in the earlier in this chapter.

When presented with hypothetical future Antarctic environmental events by 2048, respondents had a negative outlook (see Figure 4.4) toward most events resulting in negative effects to Antarctica's

natural environment. For example, most respondents ($n=61$) believed an increase human activity in places not currently frequented on the continent is likely (see Figure 4.4 S6) as well as an increase in marine oil spills (see Figure 4.4 S10) and the establishment of non-native species in continental Antarctica (see Figure 4.4 S4). In contrast, respondents felt somewhat positive about the creation of marine reserves in the Southern Ocean by the year 2048 (see Figure 4.4 S2).

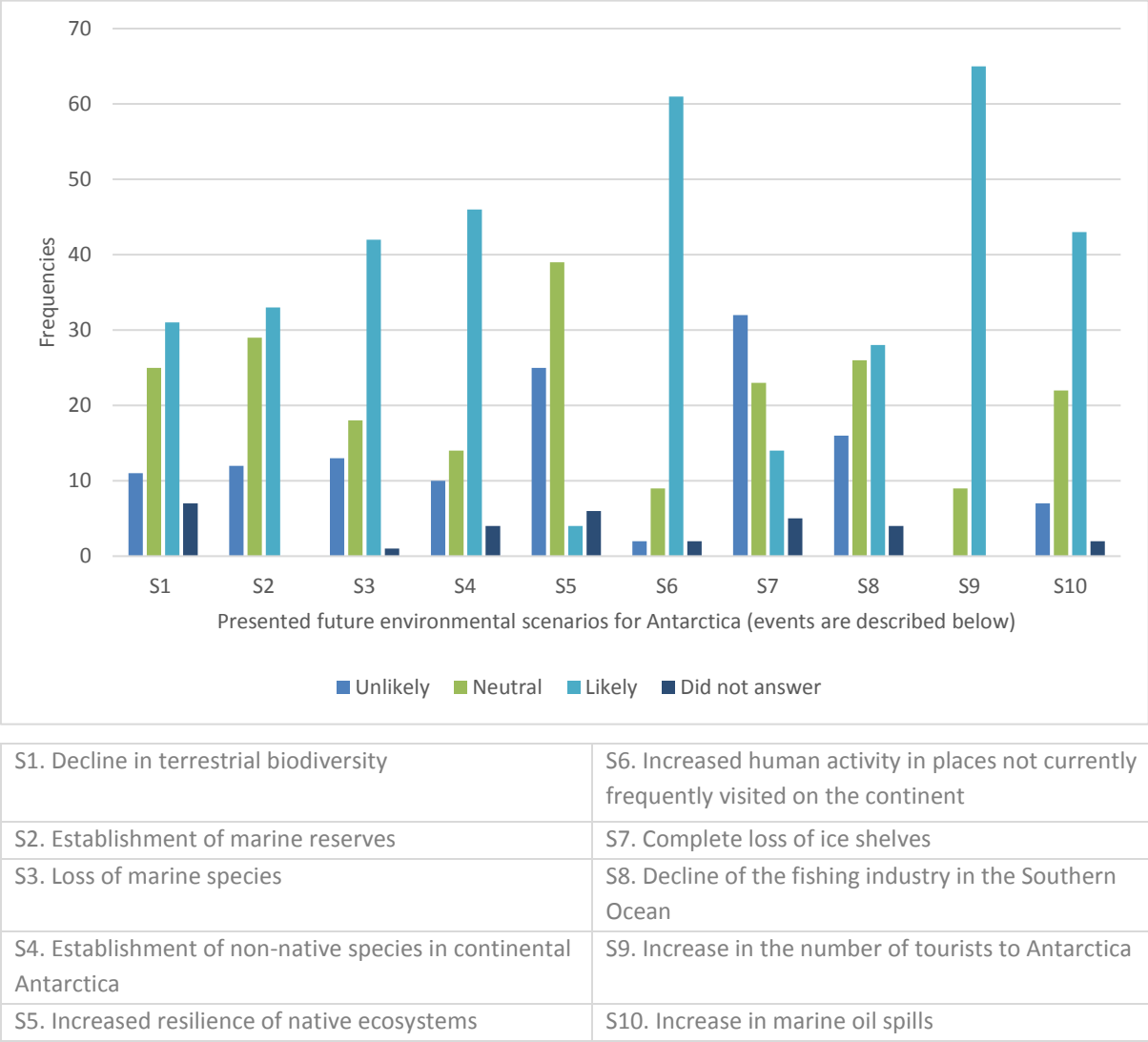


Figure 4.4 Perceived likelihood of occurrence of Antarctic environmental events for the year 2048 ($n=74$)

4.4 Antarctic governance

To explore the respondents’ views on the robustness¹³ of the ATS as a common pool resource (CPR) institution, statements based on Ostrom (1990) principles for successful CPR regimes (see Chapter 2) were presented to respondents seeking an indication of their level of agreement or disagreement on

¹³ Robustness is referred by Ostrom as institutional success of institutions who govern commons, by this she meant “institutions that enable individuals to achieve productive outcomes in situations where temptations to free ride and shirk are ever present” (Ostrom, 1990, p. 15).

a relative scale from 0 to 100 (where 0= ‘completely disagree’ and 100 = ‘completely agree’) (see Figure 4.5). Overall, the response trend was toward the middle range, indicating a relatively neutral view on the ATS’s governance performance. The highest rated statement related to Antarctica’s physical boundaries being clearly defined (Figure 4.5 S2) which, according to Ostrom (1990), is essential to managing natural resources. By contrast, the lowest rated statement related to enforcement of sanctions for violations to Antarctica’s environmental regulations (Figure 4.5 S4); implying a perception among stakeholders that there is room for improvement in that aspect of Antarctic governance, echoing some of the literature which criticises the lack of enforcement on AT Parties on environmental damages (See for example Convey et al., 2012; Hughes, 2010; Liggett et al., 2014).

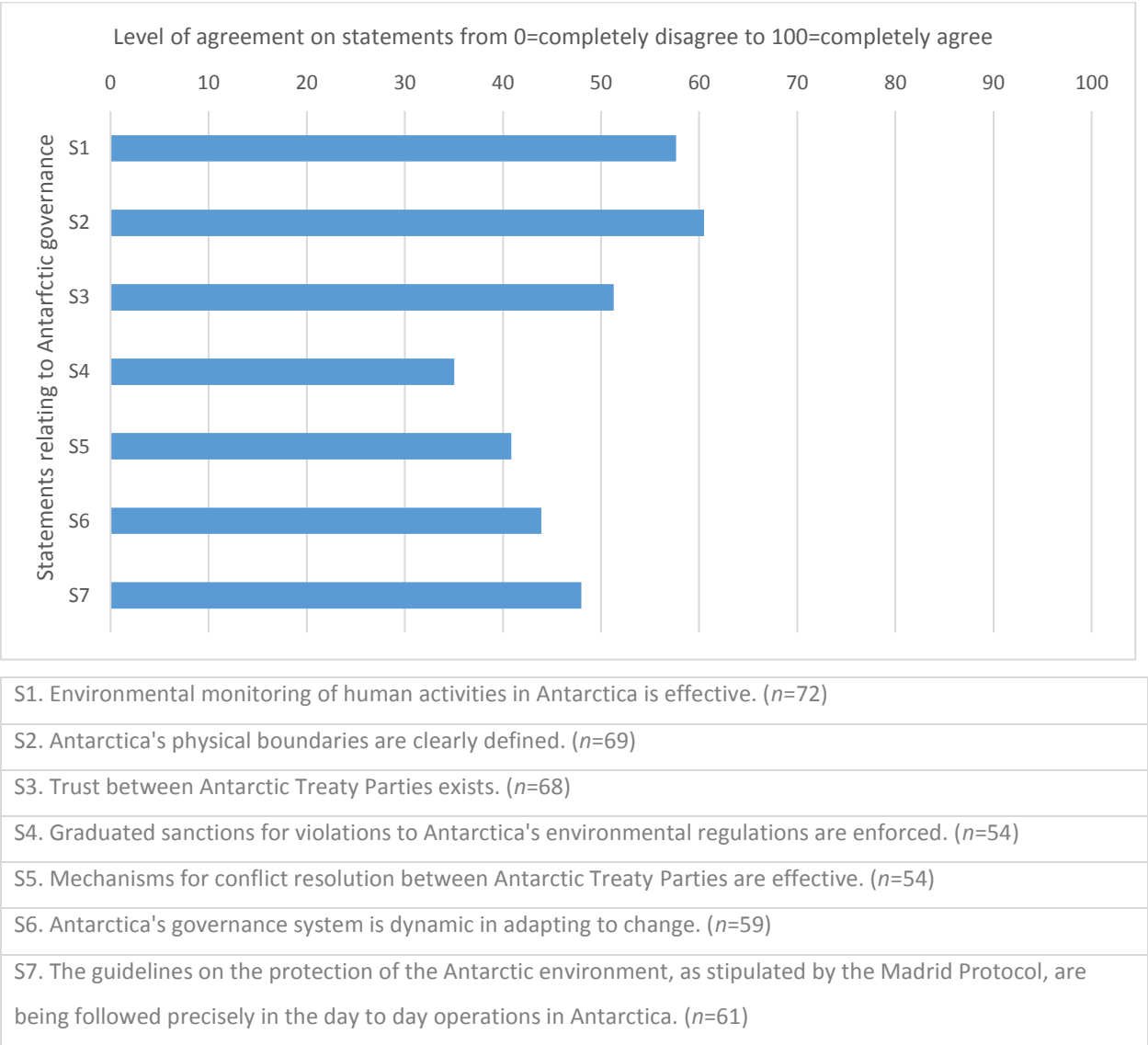


Figure 4.5 Level of agreement on statements on Antarctic governance

4.5 Perceived influence of Antarctic conservation stakeholders

Using a relative scale of influence (where 0 = 'not at all influential' and 100 = 'extremely influential'), respondents were asked to indicate how influential different groups are in terms of their capacity to stimulate change that positively affects Antarctic conservation. Governments (see Figure 4.6) were seen as having the greatest potential to influence ($M=72.38$, $SD=22.42$). Interestingly, the media ($M=65.1$, $SD=25.37$) was seen as having the second highest level of influence, followed by natural scientists ($M=64.88$, $SD=21.18$). International organisations ($M=60.31$, $SD=20.35$) and lobby groups ($M=58.22$, $SD=21.63$) were also perceived as having an above medium level of influence. Following reclassification of the scale data into nominal groupings (0-33=not influential, 34-66=somewhat influential, 67-100=very influential), cross-tabulation analyses revealed no significant differences in the views held by respondents from different Antarctic interest group affiliations.

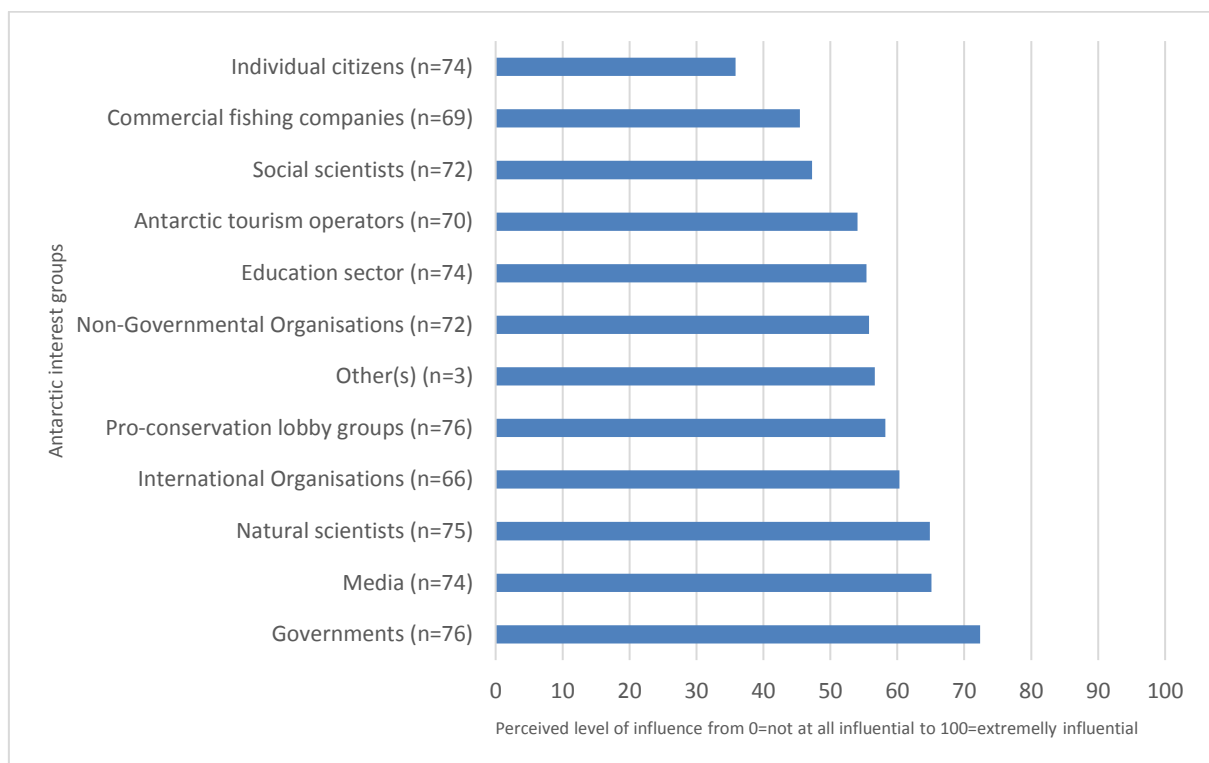


Figure 4.6 Mean scores of Antarctic groups and their perceived level of influence in stimulating change that positively affects Antarctic conservation

4.6 Chapter summary

This chapter has presented the findings and survey respondents' profile of the online survey conducted to explore New Zealand Antarctic stakeholders' perspectives on Antarctic conservation.

Survey respondents reported affiliations to a number of different Antarctic interest groups with science being the most represented Antarctic interest group. The results suggest that respondents

view Antarctica as having a good level of environmental protection, and its relative environmental condition is perceived by stakeholders as above average status. Current challenges identified for both Antarctica and the Ross Sea Region include climate change, ocean acidification and fishing. These challenges are expected to remain into the year 2048, alongside increasing pressure to extract natural resources. While governments, media and natural scientists were seen as having the greatest capacity to effect positive change in Antarctic conservation, securing the future conservation of Antarctica is likely to depend upon collaboration between all stakeholder groups.

The results of the survey address aspects of all research objectives for this study. This was achieved by analysing stakeholder views on Antarctic conservation challenges and issues; presenting future scenarios for Antarctic conservation; and exploring stakeholders' views on Antarctica's governance system as well as Antarctic conservation stakeholders.

The next chapter presents the findings of the qualitative stage of this research project which focused on gathering more in-depth information about stakeholder perspectives on Antarctic conservation.

5 Results Part 2. Interviewees' perspectives on Antarctic conservation: Stakeholders, environmental condition and human impacts

In order to complement the quantitative data collection, and more thoroughly comprehend perspectives offered, 22 qualitative semi-structured interviews with Antarctic stakeholders were undertaken and these form the basis of the following two chapters further examining stakeholder perspectives on Antarctic conservation. The first of these two chapters presents interviewees' perspectives on Antarctic stakeholders, the environmental condition of the Antarctic as well as human impacts on the area. This data contributes directly to the study's aims of identifying key Antarctic stakeholders in Antarctic conservation, challenges and issues, as well as future scenarios for Antarctic conservation. The next chapter will address challenges and issues facing Antarctic conservation in relation to Antarctica's governance system as well as further potential future scenarios for Antarctic conservation.

This chapter is organised in six sections starting with the interviewees' profile. The sections that follow include identified key stakeholders in Antarctic conservation, the perceived condition of Antarctica's natural environment and barriers to conservation, and stakeholder perspectives on direct and indirect human impacts on the Antarctic environment. The chapter concludes with a brief summary.

5.1 Interviewees' profile

Twenty-two people participated in the interview process and unlike the survey, which was completed predominantly by science stakeholders, an effort was made to broaden representation of all stakeholder groups. Five interviewees were affiliated to the government group as they were involved in government agencies dealing with Antarctic management, logistics and policy¹⁴. Six interviewees were science stakeholders and were from universities, an environmental management consultancy firm and a crown agency. The tourism and fishing industries were represented by a tourism operator and a commercial fisheries and fisheries research consultancy firm. Seven interviewees were conservationist stakeholders, including people affiliated to NGOs, the media, an Antarctic interest institution, as well as an Antarctic themed educational facility and an Antarctic public event. In an effort to corroborate some of the views provided by New Zealand Antarctic

¹⁴ It is important to note that the opinions expressed by the participants from the government stakeholder group do not represent the Government of New Zealand's official stance on Antarctic issues. The government's view was sought but never obtained.

stakeholders and to provide an international perspective to New Zealand's involvement in Antarctic conservation, two interviews were carried out with prominent international Antarctic stakeholders: an international polar science advisor; and an international nature film maker with a chemistry science background.

Interviewees were classified using Polk's (1998) four stakeholder groups based on the interviewees' main affiliation in relation to Antarctica; although as was the case with survey respondents, interviewees' connections with Antarctica were often multiple and could have represented more than one stakeholder group. The following figures illustrate the variety and complexity of interviewees' Antarctic connections and show the web of Antarctic knowledge behind each interviewee. The rectangles at the right side of the figures illustrate relative importance and magnitude of each Antarctic connection per stakeholder group as each rectangle is scaled according to the number of interviewees from each stakeholder group to have mentioned an affiliation to that group. For example in Figure 5.1, representing the government stakeholder group, all interviewees had connections with Antarctic aspects of government and conservation (unsurprisingly), four had connections to the sciences, three to the policy realm and three individuals had connections to either Antarctic tourism, education and outreach and media. In this stakeholder group there were no interviewees who identified themselves with the arts or commercial fishing¹⁵. It can be observed in Figure 5.2 that no interviewees in the science stakeholder group had connections to the arts and that most had connections with the conservation and education realms¹⁶. The figures clearly illustrate that interviewees from all stakeholder groups were mainly linked to Antarctic conservation and science. The interviewees' multiple connections with the polar world denote a cohort of people with many polar interests and breadth of knowledge in Antarctic matters which was essential for gathering rich qualitative data.

¹⁵ Groups with no connections are included in grey at the bottom of each figure.

¹⁶ For Figures on conservation, industry and international interviewees' connections with Antarctica see Appendix 5.1.

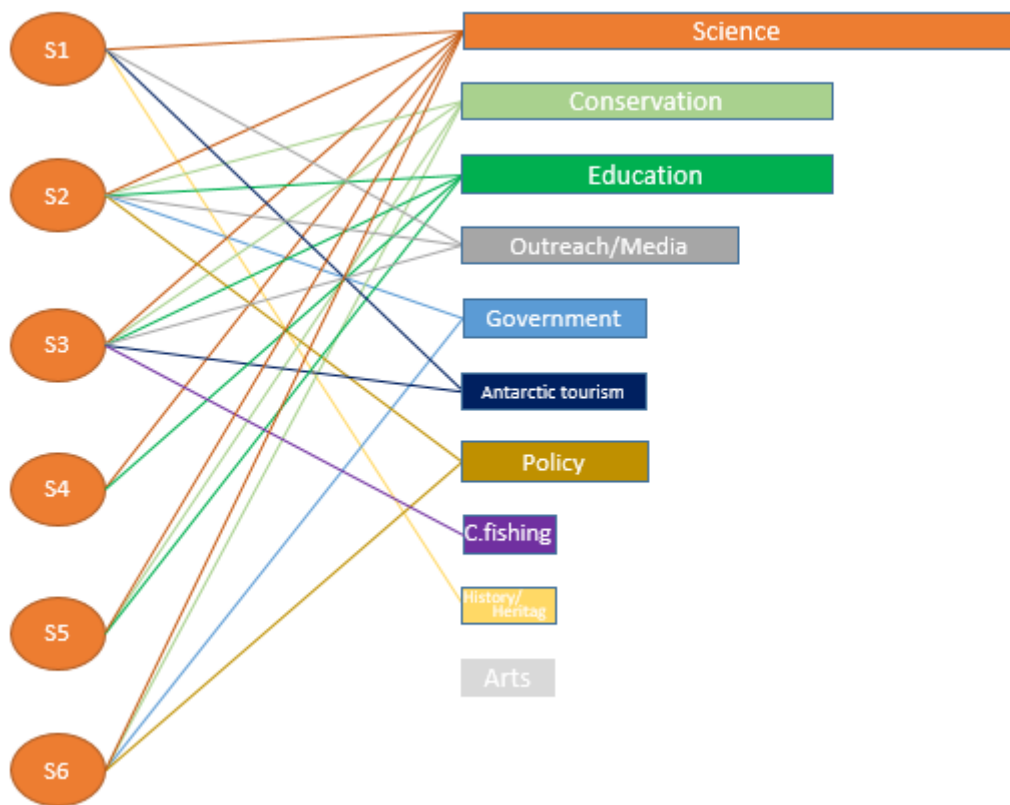


Figure 5.1 Science stakeholder interviewees' Antarctic connections

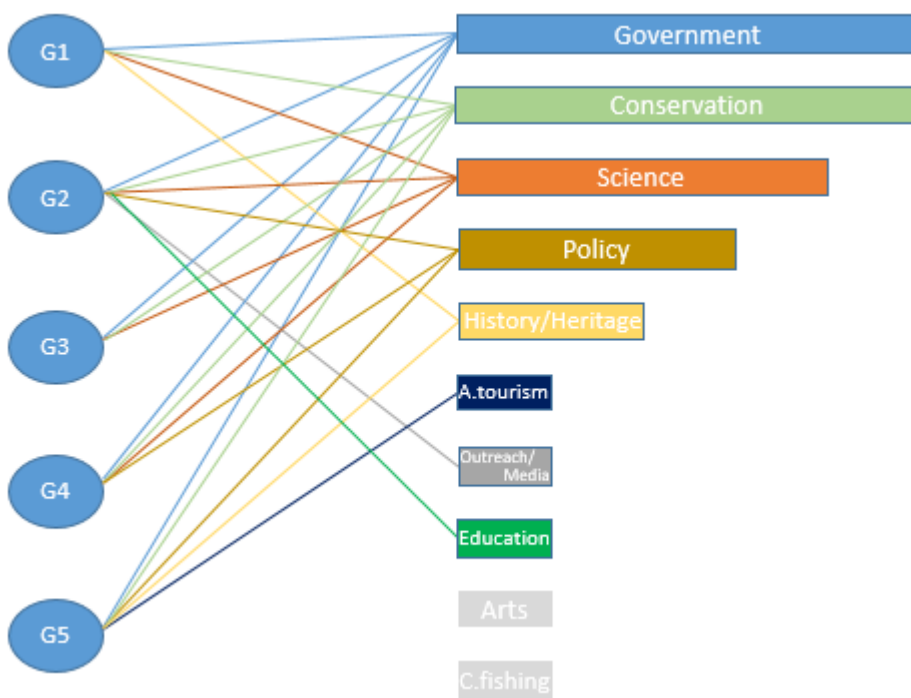


Figure 5.2 Government stakeholder interviewees' Antarctic connections

5.1.1 Interviewees' experience on Antarctic matters

All interviewees were active in their role with Antarctica and had been working or been affiliated to Antarctic matters through work and or personal interest. The person with the least amount of polar experience had been involved in Antarctic matters for 3 years, and the person with the most amount of experience had dedicated his entire career to polar matters, equating to 42 years of involvement in the polar sphere. On average, interviewees had 20 years of experience on Antarctic affairs, 6 more than those of survey respondents.

All interviewees but two had visited Antarctica's Ross Sea Region and 15 had visited or worked in other places in Antarctica, such as the Antarctic Peninsula, Sub-Antarctic Islands, Balleny Islands, South Orkney Islands, South Pole, Commonwealth Bay and the Southern Ocean. Of the interviewees who had not visited Antarctica, one had a planned trip to the Ross Sea Region. The other had not visited Antarctica as he did not want to add his environmental footprint, and it was not necessary for him to go there to work on Antarctic matters. All interviewees who had visited Antarctica had been more than once and 11 had lived in scientific bases or camps in different parts of Antarctica or in the Southern Ocean working on tourist or fishing vessels for more than one season.

Eight interviewees had participated in ATCMs, CEP meetings, or the CCAMLR meetings. The degree of attendance and involvement in these meetings varied between interviewees, from an interviewee who had attended one meeting for a day as part of a delegation, to an interviewee who had attended 18 ATCMs and all CEP meetings since its establishment in 1998. At least two interviewees were also involved in other Antarctic governance forums such as the IAATO and the SCAR meetings. First-hand experience with the ATS was particularly beneficial to gaining informed views and opinions on the governance of Antarctica.

5.2 Identified key stakeholders in Antarctic conservation

The Interviewees' identification of stakeholders in Antarctic conservation was heavily aligned with Polk's (1998) classification of polar stakeholders as they saw governments, scientists, commercial industry and conservationist as key stakeholders, although other stakeholders were also mentioned.

5.2.1 Governments

Interviewees representing all stakeholder groups noted governments (G4, I1, S2, S3, S4¹⁷) and countries (C4) as being key stakeholders in Antarctic conservation. Other interviewees were more specific and referred to "members of the ATS and the people from those nations" (S1), ATS states

¹⁷ Please refer to Chapter 3 for reference of the coding used in the chapter.

(S5), “countries that participate in Antarctica and do science in Antarctica” (G3), “all countries in the world, especially those with coastal areas” (C4), “people who operate down there” (G5); as well as “government institutions” (I1) and “diplomats” (S1) as key stakeholders in Antarctic conservation. An interviewee from the science stakeholder group noted that it is governments who “exercise most of the control and power of what happens in that part of the world”, so their participation as key stakeholders in Antarctic conservation is vital (S5). Other mentioned stakeholders with a connection with governments were National Antarctic Programmes (G1, S4) and “management” of Antarctic operations (I1). Only one interviewee mentioned the ATS itself and the CEP as key stakeholders in Antarctic conservation (C1).

5.2.2 Scientists and researchers

Scientists (C5, C7, G3, G4, S3, S4) and researchers (C4), as well as the “science community” (C4, G4, I1) and “science institutes” (S2) were also identified as key stakeholders in Antarctic conservation. An interviewee noted that the Antarctic continent has been set “aside for scientific purposes” and that scientists were “key stakeholders” (G4). Another interviewee noted that the science and research community “has a stakeholder interest in Antarctica” as “Antarctica [was] a great platform for conducting research, research that both inform[ed] us about planetary change, polar systems research, but also research that helps us understand manage Antarctica itself” (S2).

Some people mentioned scientists (C7, S3) as well as SCAR (C4, S2) as “flying the flag” for Antarctic conservation. An interviewee noted that “at times the science community is probably missing in the Antarctic conservation” (C4) sphere. Another added that SCAR “has shown itself to be a bit more proactive than it has been in terms of its priorities for research and conservation” as of late (C4).

5.2.3 Commercial industry

As with Polk’s (1998) analysis, interviewees from all groups included the commercial industry sector as key stakeholders in Antarctica. Interviewees mentioned two main groups when referring to commercial industry stakeholders in Antarctic conservation: tourism (C4, C5, E1, G4, I1, S2); and the fishing industry (C3, C4, C5, I1, S1, S2). Tour operators (C7, S1, S4), IAATO (S4) and more generically, “industry groups” (S3) were also mentioned.

An interviewee noted that stakeholders “run along the lines of where the pressures are coming” and gave the example of “commercial ventures like tourism” who “are a stakeholder” as “if there wasn’t an Antarctica they wouldn’t have a business in Antarctica” (E1). Another interviewee believed “stakeholders are sometimes people from economic environments” as “they want something out of it” which could be “tourism or mining or water” (C5). She added that some industries, such as

tourism, become involved in conservation as “people want to sell the Antarctic” and if “there is not a whale showing up any more, then it doesn’t make any sense to make a cruise to the Antarctic to see whales or penguins or seals or whatever, when they are all gone” (C5).

The fishing industry was also noted as a stakeholder in Antarctic conservation. An interviewee noting that they must be involved in conservation as “if you are going to be doing fishing down there long term you will need to be sustainable and sustainability and conservation kind of go together as well” (S1). Another interviewee spoke of the commercial industry as stakeholders in Antarctica:

“From a commercial perspective, clearly fishing industry and the tourism industry are stakeholders too. We have to recognise that; they are players in the system, they have legitimacy in the system, and their influence on the system is varying. I think we are seeing an increasing influence from the tourism sector in particular. And that means that their voice has to be heard more, and it will become more influential over time... and... we have to accommodate for that.” (S2)

The fishing (S3) and tourism (I1, S4) industries were also mentioned as advocates for Antarctic conservation. One interviewee expressed his belief that “the travel industry is doing an awful lot in terms of engaging with communities and getting the messages out, sharing a passion for Antarctica”, he added that “the travel industry is doing a lot” in terms of Antarctic advocacy (I1).

5.2.4 Conservationists

Other identified key stakeholders in Antarctic conservation were the environmental protection community (C4) and more specifically NGOs (C3, C7, E1, G3, G4, G5, S3). An interviewee noted that “the environment community [and], environment groups have basically helped drive Antarctic conservation over the last 25 or 30 years” (C4). He explained how the conservation community has been a key stakeholder and campaigner for Antarctic conservation over the years:

“When it comes to... driving the agenda and moving things on in terms of Antarctic conservation, it’s been the conservation groups that have really driven that conservation focus. Whether it be the... ban on mining or the Antarctic Protocol or the provisions that come out of the Antarctic Protocol... and if you look at the fisheries too; a lot of the discussion about getting better tools and management measures, a lot of that thinking and debate globally has been driven by the conservation groups.” (C4)

Non-Governmental Organisations (C4, C7, S3, S5, S6) were also mentioned as advocates for Antarctic conservation. International NGOs mentioned were ASOC (C3, C6, E1, G4, I2, S1, S3, S6), Greenpeace (C3, C6, E2, G1, G5, I2, S2, S5), PEW (C3), World Wide fund for Nature (WWF) (I2) and Sea Shepherd Conservation Society (E2). Interviewees noted that NGOs are the ones who are most vocal on conservation matters (E1, S6). In addition to these NGOs, two interviewees spoke of the International Union for the Conservation of Nature (IUCN) as an international organisation that is “leader” in conservation that they would like to see more actively involved in Antarctic conservation (G4, S2) as

involvement of international conservation organisations in Antarctica is declining. One of the interviewees elaborated:

“It worries me that there isn’t enough international conservation attention on Antarctica... I think this perception from some of the global conservation bodies that Antarctica is dealt with and under control needs to change... There is a long list of invited experts that have traditionally turned up to AT meetings in the past which are doing so less and less, we are now down to a very small group.” (S2)

Other than NGOs, the media was also mentioned as a key stakeholder in Antarctic conservation (C6, C7). An interviewee mentioned the media as having played “a great role” and as a “wonderful ally of conservation in Antarctica” in the past (C6). However, the interviewee believed media has changed and has deteriorated as journalists no longer hold the “ability to research things in a serious way” (C6). An interviewee involved in the media added that the “media landscape is changing rapidly”, allowing not only space for “awareness raising and informing the public” but for “advocacy, even activism” (C7).

5.2.5 Other stakeholders

As well as the previously mentioned stakeholder groups, interviewees identified other key stakeholders in Antarctic conservation. Interviewees mentioned the public (C3, C4, G4, S2, S3), “the global community” (G2, G4), “the global population” (S5), “the entire world” (S4); everybody (E1, G2) and everyone (E1, G5), as well as younger generations (C5), children (C7, G3) and “our children and our children’s children” (G3) as key stakeholders in Antarctic conservation.

Some interviewees believed that although the public are key stakeholders in Antarctic conservation, they may not recognise it (E1, G2, S1, S4). One interviewee mentioned that the world has “a huge investment in keeping that place stable or as stable as possible” (S4). Another interviewee concurred, mentioning that “everyone has a stake” in Antarctica as effects of climate change impact Antarctica’s ice sheets “dissolving [them] and turning [them] into water, [which] it’s going to impact on everyone, whether they like it or not, so they have a stake in it as its going to affect their lives” (G5). An interviewee from the government stakeholder group added that although the “global community... may not understand why” they “are the ones who get the benefit or the harm if we get Antarctic conservation wrong, so humanity will be rewarded or not” (G2).

An interviewee from the science stakeholder group believed there is a downside to the public not realising they are key stakeholders in Antarctic conservation and not being aware of Antarctic conservation matters, as “if you are not aware of the issues you can’t tell those people who are representing you, you can’t tell your MPs, you can’t tell the particular committee of what your thoughts are” (S1). Another interviewee agreed and added that “the [AT] system doesn’t work without government buy in and support. But governments are only going to be committed to Antarctic issues if the public is on side and understanding it and being aware of what’s happening

there” (S2). A third interviewee expressed his belief that it is the NGOs role to “push information to the public” who will then “push policy” (G5).

Other identified stakeholders mentioned were tourists (C7, S4), “people that are aware of the problems of the Antarctic and what it means to the rest of the world” (C5), artists (C5) and educators (C7). Only one interviewee noted Antarctica’s “local birds and wildlife” (S5) as key stakeholders in Antarctic conservation, adding that they have a primary stake in Antarctica and need it “to continue much as it is” (S5).

5.2.6 Perspectives on New Zealand-based stakeholders in Antarctic conservation

Similarly to Grimble and Wellard’s (1997) views on classifying stakeholders at varied geographical and institutional levels, some interviewees focused on Antarctic conservation stakeholders from a national and local perspective. Table 5.1 was compiled to summarise interviewees’ records of New Zealand stakeholders in Antarctic conservation.

Table 5.1 New Zealand stakeholders in Antarctic conservation as identified by interviewees

New Zealand stakeholders in Antarctic conservation					
National level	Government	Science	Conservationists	Industry	Other stakeholders
	MFAT (G2, G3, G4) New Zealand Government (G3, S1) Ministry of Fisheries (C3)	Antarctica New Zealand (C2, G1, G2, G3, G4) NZARI (C3, G4) Antarctic science community (G4, S1) NIWA (C2, C3)	DOC (S1) Antarctic Heritage Trust (G3)	New Zealand Fishing industry (C3)	Public (S2) New Zealand Antarctic Society (C2, S4)
Local level	Government	Science	Conservationists	Industry	Other stakeholders
	Christchurch city council (S2, S4)	Canterbury University (C3, S2) Gateway Antarctica (C3) Otago University (C3) Victoria University (C3) All Universities (C2)		Antarctic centre (C1, I1, S2) “Commercial companies in Christchurch who benefit from Antarctic activities” (S2)	

Table 5.1 sorts the identified New Zealand stakeholders into Polk’s classification of Antarctic stakeholders, as well as adding a column for stakeholders who do not fit into those categories. The table separates the stakeholders into a national and local level. For example, it can be observed in this table that at a national level the Ministry of Foreign Affairs and Trade (MFAT) and Antarctica New Zealand were the most mentioned stakeholders in Antarctic conservation in the government and science stakeholder classifications respectively. At a local level many Canterbury based organisations and institutions were mentioned as stakeholders in Antarctic conservation. The Christchurch City Council, Canterbury University and the International Antarctic Centre were the

most mentioned. It is noteworthy that no local conservation entities were mentioned by interviewees as key stakeholders in Antarctic conservation.

Some interviewees also identified advocates for Antarctic conservation in New Zealand. Table 5.2 compiles the mentioned New Zealand advocates, also using Polk's (1998) Antarctic stakeholder classifications.

Table 5.2 New Zealand advocates for Antarctic conservation as identified by interviewees

New Zealand advocates for Antarctic conservation		
Government	Science	Conservationists
MFAT (G3, S2, S5) New Zealand Government (S3)	Antarctica NZ (C1, C4, G3, G4, G5, S2, S4, S5) Scientists (C7, G3, S3) Gateway Antarctica (G1) Terrestrial biologists (S3) Marine biologists (S3) Climate change scientists (S3) "some" (G1) and "few" (G5) Universities	DOC (C4, G1, S6) ECO (C3, C4, S2) Forest and Bird (G5, S2) WWF NZ (C3, S2) Last Ocean (S3) Greenpeace NZ (G5, S2) "Some of the NGOs" (C3, G3, S2, S3) "Environment groups" (C4) The Antarctic Heritage Trust (S1)

It can be observed that Antarctica New Zealand was the most identified advocate for Antarctic conservation of all stakeholder groups. It was also noted as doing "an awful lot more to publicise our Antarctic interests than perhaps central government does" (S2) and that they are "the most hands on organisation in the place, that's implementing all of this [environmental] stuff and knows it better than anybody else and manages it better than anybody else" (S5). A number of New Zealand based NGOs were also identified as advocates for Antarctic conservation. It can be observed in Table 5.2 that no stakeholders at the industry level were identified as advocates for Antarctic conservation. Although scientists were identified as advocates for Antarctic conservation, an interviewee added that most scientists involved in Antarctic conservation advocacy were "marine biologists... climate change scientists, and terrestrial biologists" (S3). An interviewee from the science stakeholder group added that New Zealand scientists tend not to be vocal on conservation issues "because they do so at a risk to their own funding" and "the fact that the government tends to not look at those activities kindly" (S3). Other interviewees added that the New Zealand science community is "a bit quiet" (C4) and passive (S2) "when it comes to Antarctic conservation advocacy" (C4). Another interviewee from the science stakeholder group concurred and added that "scientists are just now starting to send the message out about it" as they have "all been so wrapped up studying Antarctica that we've just forgotten to tell anybody else in New Zealand that they should be worried about it" (S4).

5.3 Perspectives on Antarctica's natural environment and barriers to conservation

As well as identifying key stakeholders in Antarctic conservation in order to fulfil one of the study's

objectives, interviewees discussed their views on the challenges and issues facing Antarctic conservation.

Interviewees were asked if Antarctica needs protecting and they unanimously agreed that it does. The reasons why it needs protecting varied but all highlighted the global importance of Antarctica. The reasons for Antarctic protection and the importance of Antarctica were summarised eloquently by an interviewee from the government stakeholder group:

“It’s such an important part of the global climate system we need to understand it, the less we muck it up, the easier it will be to understand. And it’s one of these places that I look at and say *‘that 14 Articles, tiny Treaty... look what we can do as humanity in a place like Antarctica’*. It’s almost like this little beacon of hope at the bottom of the planet.... That... we can play nice with each other and we can do things for the benefit of the planet.” (G3)

Though Antarctica was seen as a place worthy of protection, two interviewees involved in governance (G2, G5) noted that it is only because of anthropocentric reasons that we manage Antarctica differently to the rest of the world. As one of them pointed out:

“I’d like to say we are protecting Antarctica for Antarctica but that is just silly... you have to tie it back to humanity. Because we are taking the actions that are affecting it and we are going to get the benefit from it [from protecting Antarctica]. It [Antarctica] will be there regardless of what we do in one form or another. It is not a living being, it doesn’t bother it if the ice melts, but it b****r our life a little bit.” (G5)

The question of who Antarctica needs protecting for was also discussed and all but two interviewees gave a non-anthropocentric answer. One interviewee stating that Antarctica needs protecting “for its own sake, for the creatures that live there” (S5) and the other interviewee noting that Antarctica needs to be protected for the “globe” as “[Antarctica] belongs to everybody and it belongs to no one so...[it needs protecting for] the globe” (G4). Most interviewees presented anthropocentric views with regards to who Antarctica needs protecting for. The common answers being [it needs protecting for]: “future generations” (C2, G3, G5, I1), “everyone” (C2, G2), “the people of the planet” (C1, C4) and “mankind” (G1).

Protecting Antarctica was also linked to the concept of identity. The importance of protecting identity was highlighted in a humorous manner by a government agency representative:

“If we lose the things that are unique to NZ, we lose our national identity, what makes NZ special? ... It’s the very things we are trying to protect, so the same sort of thing happens in Antarctica but on a world stage, you know. If we b****r the place up so that all those Adélie penguins disappear, then, how will Bluebird advertise their chips?!” (G5)

Although interviewees were aware of the impacts of humans in the Antarctic continent and Southern Ocean, many perceived Antarctica’s natural environment to be in a “pristine” (C6, G1, S4, S6) “excellent” (S5), “good” (G5) or relatively “untouched” condition (C7, G4) particularly when

compared to other places in the world. Some interviewees pointed out that although Antarctica is “more pristine than other places” (S4) it is not unaffected by human impacts and that it is becoming fragile (C1, C7, S1). It was also mentioned that the condition of Antarctica’s environment differed from place to place (C1, C2, I2, S1). Remote areas were perceived as less impacted by human activity in comparison to places where bases are located (C1, C2, I2, S1).

Interviewees who had visited places other than the Ross Sea Region had a slightly more negative view of the condition of Antarctica’s environment and emphasised a difference in environmental conditions between certain areas of Antarctica (C1, S1, S3). The Ross Sea Region was mentioned by a number of interviewees with experience in various parts of Antarctica as exhibiting better environmental conditions than other inhabited places (C1, E1, S1, S3). As one interviewee noted: “I think that... in the Ross Sea other than the effects of human and living around the major bases; I think it’s in pretty good shape” (I2).

Although it was clear that Antarctica was valued as a place to be protected, interviewees felt it was harder to protect now and into the future as mounting pressure in the world was felt in Antarctica. “Pressure” was a key theme expressed by many respondents and it was explained eloquently by a scientist with seventeen years of experience in polar matters:

“One common theme I think its pressure. And so when there is increasing pressure on the world’s populations and nations, which there is, particularly around resources or land use or population pressure, then all of those... [Are] a barrier to leaving Antarctica as it is. Because that pressure will lead to a rise in temperature or some of the other climate change effects, or whether it’s to do with food and the pressure for food and to move into raiding the seas of underutilised spaces, or whether it is the pressure for minerals ... [Antarctica] is one place that needs to be left untouched, not everyone’s sit on that space, so you’ve got the cultural pressure as well.” (S3)

It was also pointed out that Antarctica has been able to protect itself due to its remoteness and bareness but with technological advancements these barriers were becoming weakened (E1, S5). Further mentioned obstacles to protecting Antarctica into the future included current lack of global attention towards Antarctic conservation (C4, G1, G2, S1) and lack of common understanding of Antarctica as a vital part of a global system that impacts everyone on Earth (G2, G3, S1, S3). Other issues identified as impacting Antarctic conservation were lack of resources, including governmental funding for science programmes (C7, G1, I1, S5) and environmental management for some national Antarctic programmes (G1, G2, G3); as well as human capacity to bridge gaps in science (I1) and for advocacy and management of Antarctic conservation in NAPs (G1, G2).

5.4 Perspectives on direct human impacts affecting the Antarctic environment

The perceived direct damaging influence of humans on Antarctica's environment mentioned by interviewees was related to the direct impact of bases, seafloor pollution from vessels and former rubbish disposal methods, whaling and fishing. Moreover, the indirect impact of human activity through air and sea currents and the atmosphere, as well as through the effects of climate change were noted. Although these impacts were mentioned, when compared to indirect threats to the environment, direct human impacts were often perceived as minor. Antarctica's vastness and geographic location were commented on as barriers to having a large environmental direct impact on the continent. An interviewee from the conservation stakeholder group expressed this view:

"We're never going to have that amount of impact because it's cold, it's covered in ice, it's inhospitable, we're just never going to.... make a massive direct impact. We might completely destroy Ross Island or the Peninsula... but [Antarctica] is a bloody big place." (C2)

An interviewee from the conservation stakeholder group also highlighted the fact that although the impacts of direct human activity are not large in comparison to external impacts, the amount of energy and fuel required to sustain humans on the ice is significant and does carry an environmental impact (C2). Another interviewee noted that with human activity increasing there will be more direct pressure placed in the Antarctic environment (E1).

Stakeholders elaborated extensively on their views on direct human impacts on Antarctica. These related to science and logistic operations, tourism and fishing industries, as well as from potential resource exploration operations and consequently, exploitation; these views will be explored in the succeeding section.

5.4.1 Science and logistics

National Antarctic Programmes and their bases were seen by interviewees as one of the main contributors to direct environmental impacts on the Antarctic continent. Large bases and summer-only bases were mentioned as significantly contributing to Antarctic pollution; a commercial Antarctic industry participant elaborated:

"I think the bigger impact is from a lot of pollution that is caused around the bigger bases... human activity will always bring some form of load in terms of environmental degradation and the more people you have the harder it is to actually mitigate against it" (I2).

Concern was also expressed over the proliferation of scientific bases and as the scientific efforts in Antarctica increase activities (C3, C4, G3, G4, G5, S2). An interviewee from the science stakeholder group noted that: "there is that sense of more people more ships, more planes, more researchers, more equipment, which does have some conservation implications for sure" (S2). Considering

budgets for continuing science and upkeep of bases and equipment has not always remained, an increase in structures in Antarctica was noted as a concern (C4, G3). Dwindling budgets have historically led to “massive legacy issues; fuel spills, planes and machinery and helicopters just sitting there and rusting and blown to bits, stations that aren’t well secured and leaking into the environment” (G3). Other apprehensions over the proliferation of bases related to the ulterior motives for their establishment and bring to the fore issues concerning the effectiveness of the Protocol and the ATS in managing this increase. An interviewee from the conservation stakeholder elaborated:

“When you see what’s happening in terms of the proliferation of Antarctic bases around the continent you really have to wonder what the objectives for that are, is this really for research? Or is this a way of actually claiming a stake of Antarctica? ... That whole proliferation of research bases I think is not being well managed. The assessment of activities which is required under the Madrid Protocol tends to be rather superficial There’s an interesting and quite challenging paper... which compared the number of research bases compared to the quality of research produced, and this showed that there was little relationship between the number of bases [and the quality of the science produced].” (C3)

In terms of environmental management of stations it was noted by interviewees that bases in the Ross Sea Region are significantly better managed today than in the past, particularly McMurdo Station (C2, C4, C6, C7, E1, G1, G4, I1, I2, S2, S4, S5). A scientist with 25 years of experience in the Ross Sea Region explained previous rubbish disposal methods: “they just used to put stuff on the sea ice and let it drop into the ocean, that was the way they disposed of their rubbish” (S5). Now she noted “the US and the Kiwis cleaned up their act and started to take that whole conservation very seriously.” (S5) Two interviewees from the conservation stakeholder group mentioned there has been “a lot of work to cleaning up the historic contamination” (C4) and that most countries are “more considerate of environmental impacts than they used to be” (C6). It was also noted that there was a shift towards building more sustainable bases with Belgium highlighted as a leader in that regard (C4, G2). Changes in environmental attitudes, rules and regulations for scientists in the field, as well as for oil storage were mentioned as positive changes in Antarctic logistics over the years.

One scientist noted this attitudinal change:

“There was a huge, huge change in attitude and the rules around everything you did in the field like for instance when I first went down there, there was no rules about toilet facility....although they’d just started using poo buckets, but there was no pee barrels... Whereas now absolutely everything gets brought out and the poo buckets were brand new in about 1990... so there’s been this really big change in how the environment is viewed and the effort to minimise impacts on the environment... All of those things, the precautionary stuff has kicked in in a huge way.” (S5)

An interviewee from the science stakeholder group suggested that changes in people’s attitudes towards the environment, particularly in the Ross Sea Region, were multifaceted. In her view, attitudes started to change when the era of heroic exploration ended, the military stopped running

McMurdo Station and Greenpeace brought to light the issue of environmental degradation in the area (S5). A conservation stakeholder group interviewee also noted the signing and coming to force of the Protocol in the 1990s as a contributor to changing attitudes towards the environment and it led to many facility changes and practices (C7). Another noted reason for changing environmental practices in Antarctic operations and bases is that they are often more economic (G3, S4). An interviewee from the science stakeholder group explained:

“It turns out a pro-environmental station is also a cheaper station to run, initial investment is a little bit higher but the overall running costs are better provided everything works.” (S4)

Although there is a shift towards more sustainable practices around bases, some interviewees pointed out, this shift has not occurred in all parts of Antarctica (C1, G2, S1, S3). The Antarctic Peninsula was particularly mentioned as a place where scientific bases are continuing to have a large environmental impact.

Although the stations in the Ross Sea Region were perceived as better managed and their field practices improved over the years, a couple of interviewees were disappointed at some practices carried out by the New Zealand NAP - Antarctica New Zealand (C1, C2). An interviewee from the conservation stakeholder group explained that different rules applied to water conservation depending on your length of stay at Scott Base and that fresh food was not always eaten first leading to fresh produce being disposed of. These small actions made her question the mentality of staff; she explained: “these could be little things but you start doubting... how far does this go along the chain? You think about the mentality. Is this how we work?” (C1). Another interviewee from the conservation stakeholder group with experience in Scott Base’s operations mentioned other issues encountered while working in the field:

“The quantity of stuff that we flew in that seemed unnecessary, like scientists on our group flying in his favourite cereal that’s not even made in NZ... it’s flown in from who knows where?! All the way to the Dry Valleys and then we talked about making sure that we step on exactly the same spots and that we don’t have too much impact on climate change... I had my moments where I was a little bit like... Yeah, so, ‘you’re a climate change scientist but you fly your cereal from the States to Antarctica?!’ ” (C2)

When talking about environmental measures being implemented at Scott Base and in field operations, an interviewee from the government stakeholder group mentioned that Antarctica New Zealand is working to minimise the footprint they have in Antarctica and that equipment that is carried out in the field is now questioned and scrutinised before granting approval (G3). Another interviewee from the government stakeholder group pointed out that conservation and wise use of resources is not the first thing in the scientists’ minds and that therefore it is the responsibility of NAPs to make sure the environment is looked after (G1).

Another interviewee from the government stakeholder group added that NAPs have developed best practice guidelines based on internationally agreed legal documents from the ATS through their national governments to ensure agreed upon measures, including environmental ones, are “implemented in a meaningful way” (G2). She also highlighted the importance of NAPs in policy implementation and adds that they “have a really key role to play, not only in delivering their Antarctic science, so not only in operations and logistics, but in implementing government and international policies” (G2). Though NAPs have developed best practice guidelines, she adds that not all NAPs have been able to implement these guidelines and best practice as effectively and that “some NAPs need assistance to fully implement the good practices... as some of them [NAPs] aren’t doing as well as they could be” (G2).

Two mechanisms mentioned with the potential to reduce the impact of science related human activity in Antarctica were: collaboration and technology. Collaboration, partnerships and international cooperation have been the “hallmark” of Antarctic science from the beginning (E1). In more recent years budget constraints of some NAPs and pressure towards states with larger budgets and resources equipment to share their assets have led to great collaboration (E1, G2). An interviewee expressed his belief that “the biggest pressure on Antarctica is to get more bang for their dollar” and that “the most obvious way” to achieve it is through “international collaboration” (E1). One interviewee noted that some countries have increased their investment in Antarctic science operations, sometimes exceeding capacity, and that they will be pressured to collaborate with other countries to produce good science (E1).

Collaboration between NAPs noted by interviewees spanned not only delivering science programmes but on matters such as providing guidance on how to implement environmental regulations (G1, G3). Though collaboration and cooperation efforts in Antarctica and Antarctic science were repeatedly highlighted by interviewees, the need for more collaboration was also stressed (C1, C3, E1). Issues such as duplication of scientific work (C1) and lack of joint efforts in building joint facilities such as runways and research bases (C3) were mentioned as matters where collaboration could be improved; particularly at a time when there is a call for increased Antarctic science and reduced footprints (E1).

New technology and re-thinking of Antarctic operations were also mentioned as a way forward to produce the science needed whilst minimising the impact of scientific operations on Antarctica (E1). An interviewee from the science stakeholder group mentioned that “modern remote sensing” and the improved quality of images from satellites has already allowed some Antarctic science to be carried out remotely, minimising the direct impact of some of research projects (S6). Although the

use of new technology is desirable and can reduce direct environmental impacts from science, the downside is that there are only certain aspects of science that can be done remotely. The use of Geographic Information Systems (GIS) and Global Positioning Systems (GPS) was mentioned as modern tools to be used in an effort to minimise direct environmental impacts from scientific programmes.

5.4.2 Tourism

Tourism was identified by interviewees from all stakeholder groups as a contributor to direct environmental impacts on the Antarctic. Tourism was viewed as having the potential to become a serious threat due to the increase in visitation (C2, C3, E1, E2, I2, S1, S2, S3, S4, S5, S6), a concern that was shared by survey respondents. The potential for maritime accidents, and the effects of such accidents on the natural environment and wildlife as more ships go south, was of particular concern for some interviewees (I2, S3, S4). An interviewee from the commercial industry stakeholder group, with experience in nautical matters, was specifically concerned about large vessels navigating in areas where nautical charts are not up to date (I2).

The increase in tourism was predicted to affect the Peninsula area more than other parts of Antarctica (C4, E2, G4, G5, I1, I2). A consequence of this would be a rise in visitor numbers to ice-free areas that provide habitat for much Antarctic wildlife. This was of particular concern to a couple of interviewees from the science stakeholder group (S3, S5). One of them elaborated:

“[The Peninsula] is easier to access, there’s more people, there’s way more tourists and so.... I think you have to tolerate some impacts to allow people access... but it’s the place where you could impact the environment the most strongly... The coast or the marine environment that’s the most sensitive because that’s where the food chain is, it’s where the wildlife is, it’s where there’s potential for things like a big oil spill if a ship runs aground or that sort of thing, so that’s the most potentially vulnerable area.” (S5)

Various solutions to the problem of direct impacts on the environment from tourism were suggested by interviewees. A number of interviewees suggested increasing binding controls over tourism (C1, C3, S5, S6). A couple of interviewees recommended having better protected area management systems (S1), such as Antarctic Specially Protected Areas (ASPA) and Antarctic Specially Managed Areas (ASMA) (C3). Others called for placing “a cap” (C7) or a “quota”(I2) on tourist numbers, and another to have stronger guidelines through the CEP and ATCM (S6) including adding more designated landing areas for tourists (S6).

A further issue relating to the increase of tourism in Antarctica was mentioned by an interviewee with many years of experience in Antarctic affairs. His concern related to the industry becoming more influential as it grows and for the potential change in mentality from the world towards

Antarctica from a place for “peace and science” to a more “commercial” one (S2). An additional challenge to Antarctic conservation relating to the tourism industry involved the changing nature of tourism in Antarctica as it evolves from “the expedition ship that goes down and people step out and have their cameras and take photos” (G5) to include activities such as music concerts, 4WD expeditions, skydiving, and adventure tourism (C3, C5, G5). An interviewee from the conservation stakeholder group believed control over diversification of tourism activities and protection of Antarctica’s wilderness will be a challenge for the AT. He commented:

“We’re starting to see an increase in what might be called adventure tourism, so instead of people going to areas like Deception Island... you’re starting to get people now going and deliberately searching out wilderness and so the whole management of wilderness in Antarctica is not particularly well addressed... the question that I’ve got is how well placed is the AT to actually manage increasing pressures over the coming decades? And that’s a question I would have to leave open.” (C3)

A different concern over the diversification of tourism activities in Antarctica was expressed by an interviewee from the government stakeholder group. His concern related to the acceptance by IAATO of tour operators from activities such as 4WD tours which pose impacts on the environment that are “impossible to completely eliminate” (G5). He saw IAATO’s acceptance of these operators as lowering IAATO’s standards and believed that if those activities were directly regulated through the ATS or a government they would not be allowed (G5). He further argued that having a self-regulating industry increases the likelihood of compromise to allow environmentally degrading activities, as opposed “to the independence of a third party of an independent party” (G5).

An interviewee from the conservation stakeholder group also expressed her concern over the way IAATO has changed its bylaws and is “changing their principles in order to satisfy the needs of their members” (C1) highlighting again issues relating to having a self-regulating industry.

Although some concerns were expressed over IAATO, further concerns were presented towards “freedom tourists” (S6) who travel independently, hence they were seen as harder to control than cruise ships and operators who are members of IAATO (C5, S6).

Though there were some discrepancies regarding the effectiveness of IAATO in managing the impacts of tourism in Antarctica, most interviewees who commented on IAATO expressed their belief in its effectiveness in managing tourism in Antarctica (C6, C7, S1, S2, S4, S6). A couple of interviewees noted that it was in IAATO’s best interests to “preserve Antarctica with minimal impact” (C6) and that “they need it to be as pristine a baseline as they can possibly get” (S4). Praise given to IAATO focused on the fact that they “took the lead right from the beginning and no government had any involvement and I think people were clever enough to realise that if they were going to go down there they’ll need squeaky clean credentials”(C6). Another interviewee noted that IAATO “takes conservation quite seriously” and that “is not in the ATS, it is just the way that they’ve decided they

should be doing it”, although “they very much rely on the guidelines of the Treaty” (S1). She also notes that IAATO shows an “alternative” to management of resources that can be “used in the industry” (S1). One interviewee believes that IAATO is “very good” at holding all of their members to account, sometimes better than Treaty Parties who “don’t necessarily hold all of the national programmes to account” (S2). The same interviewee expressed his belief that IAATO is “proactive” and is “very good and very quick introducing new mechanisms once all agree and they just get on and do it” (S2).

Although interviewees made positive remarks about IAATO, a couple of interviewees pointed out that one of its biggest downfalls is that their guidelines are not binding (C7) and that they operate “under a voluntary code of practice [which] it means that they can or cannot do what they wish to do and they can or cannot do when it suits them” (I2).

Another interviewee added that the tourism industry is also regulated at the national level “like the other parts of the [Antarctic] Treaty” and that “about half of the tourist operators come out of the US and they are regulated by the US EPA (United States Environmental Protection Agency) who looks at their environmental impact” (E1). He also adds that further issues could arise if tourism operators were to operate from non-ATP states who have not agreed to the AT and have no national policies regarding environmental management in Antarctica (E1).

5.4.3 Fishing

Other than tourism, fishing was the other current economic activity with direct impacts on the Antarctic environment that concerned interviewees. Most interviewees, representing all stakeholder groups, expressed their diverse opinions over marine resource extraction in the Southern Ocean and the direct impact it has on the Antarctic environment. Overall most interviewees expressed concerns over the increase in fishing in the Southern Ocean and believe the industry will continue to bring challenges into the future (C4, C7, E1, E2, I1, S2, S3).

One interviewee thought that “we’ve only seen the tip of an iceberg with the fishing industry” and that krill fisheries will greatly expand into the future as “the value of having krill in your diet... is being promoted on all sorts of health things.” (I1). Another interviewee with experience in fishing matters pointed out that fishing will inevitably increase in the Southern Ocean as “85 per cent of [the] world fisheries are either fully utilised or over fished” (C3). Adding to this, is the concern that “generally, [we] seem to be pretty poor at managing marine resources and particularly so in Antarctica” (G5). Antarctica’s only advantage was noted as “its distance away” (G5).

Another issue relating to growing fishing pressures was brought to attention by an interviewee from the conservation stakeholder group who works on fishing matters. His concern related to the increasing number of vessels interested in fishing in the Southern Ocean and the risks associated with a potential increase in low cost fishing vessels in the area. He referred to current happenings in Ross Sea to portray the issue:

“At the moment while we have got catch limits being limited, in the Ross Sea it’s about 3500 tonnes of toothfish. If you’ve got ten boats, they can catch 350 tonnes each, which is plenty. 20 boats it’s 175 tonnes. If you get 30 boats we’re getting down to about 100 tonnes and so it becomes less economic, so you get less.....you get the low cost fishing boats which tend not to be as good in terms of their safety systems. Cheap boats, inexperienced crew, they get into trouble, they cheat, they don’t report and we get more resistance to marine protection and there will be pressures to push the catch limits up. CCAMLR has not to date been able to limit fishing capacity.” (C3)

Interviewees also noted the implications that the heavy historical extraction of marine living resources has had on the marine environment (C6, E1, I1, I2). Where “whales were harvested to almost extinction, certain seal species were harvested to almost extinction and in the 1970s the krill were very heavily harvested” (E1). One interviewee notes that some biologists “would say the Southern Ocean is one of the most altered ecosystems on the planet” as “key species” have been taken out over time (E1).

Pollution from previous rubbish disposal methods and fishing practices were also highlighted as unseen impacts that are still remaining. An interviewee with experience in maritime matters in Antarctica explained:

“Degradation is very subtle and a lot is probably underwater... krill fishing, fishing the toothfish in the Ross Sea... those sort of things are... not things that you can see... I was on a NZ government ship, and I’ve done 5 or 6 voyages with them, and they have cameras on the bottom, [I was]... looking at bottles and rubbish and old long lines on the bottom [of the sea].” (C6)

A couple of interviewees from the conservation stakeholder group highlighted issues relating to the international nature of the fishing industry which brings its own challenges (C3, C6). Fishing fleets from Russian (C3, C6), Chinese (C3, C6), Spanish (C6) and Korean (C6) business were mentioned as not following fishing regulations and “who really could not care less [about Antarctica]” (C6). Reasons behind Russian based fishing efforts in the Southern Ocean were mentioned to be for economic as well as strategic reasons (C3, C6) whilst Chinese related to the need to satisfy the demands of its growing middle class (C3). Conversely, Great Britain’s and New Zealand’s fishing fleets were mentioned as “good” and compliant (C6).

Though New Zealand's fisheries were mentioned as "the exception to the rule" with regards to complying to fisheries regulations (C6), some interviewees questioned the need for New Zealand to be involved in fisheries in the Southern Ocean (C1, C7, G4); particularly due to its small size, which is "not a big percentage in the fishing industry" (C7). Financial imperatives were mentioned as reasons behind New Zealand's involvement in Antarctic fisheries (C1, C7, G4, I1) as the country is "very heavily dependent on fisheries" (C5). Interviewees from the government, conservation and industry stakeholder groups mentioned and agreed that where financial imperatives are involved, there will always be conflict (C7, G4, I1), and that conflict between conservation and fisheries is already present in the Ross Sea (C7). An interviewee made an interesting point relating to conflict and financial profit from resources in the marine versus the terrestrial environments. She explained there is conflict in the Antarctic marine environment as "money is being made" whereas "right now in the terrestrial environment, money is only spent, I don't see money being made anywhere so there's less of a conflict in the terrestrial environment" (G4).

Many interviewees called for further protection of the Southern Ocean (C4, C5, E1, I1). One interviewee described the Ross Sea as "the nearest thing to virgin territory that we've got" (C6). Interviewees had different views on how to achieve further protection of the Southern Ocean, including the Ross Sea. Some believed there should be a ban on fishing (C6, C7, I1) as "we don't need it" (C7). One interviewee called toothfish "a luxury item that the world could do without, it's only feeding the fat and the ugly who can afford it now" (I1). Other interviewees called for "better management and protection" in order to keep up with the challenges ahead (C4, I1). And another hopes for a "strengthened Treaty" that will prevent resource extraction to become "a free for all" (E1). Though some interviewees were not in favour of the fishing industry being present in Antarctic waters, one interviewee pointed out that "they're quite legitimate [in] what they're doing... they're not doing anything wrong under the law down there" (I1).

An interviewee from the conservation stakeholder group who works on fishing issues explained that NGOs main concern with fisheries regards wildlife protection. To that effect they work closely with CCAMLR to develop policies to stop sea-bird bycatch, ensure krill fishing doesn't occur close to penguin colonies so that they don't compete for food and that MPAs that protect habitat for seabirds are created (C3).

An interviewee working on fisheries management noted that to call the Southern Ocean "pristine" after earlier heavy marine species harvesting "is probably a wee bit far-fetched" but also notes that currently "there are too many issues" as "fishing is carried out under a very strict regime in terms of disposal of waste, fuel and various other things" (I2). He considers CCAMLR to manage fishing in the

Southern Ocean under “a very conservative rule” which allows for the sustainable management of the fisheries. He explained:

“Fish stocks are managed under a very conservative rule... The rule says that you cannot reduce your spawning stock biomass to less than 50% and that is over a 35 year timeframe, so that timeframe actually extends out. So every time that you do an assessment... you are looking out 35 years to try to adapt to this 50% threshold. So effectively, in terms of a management technique, it’s a lot more conservative than what you see in most coastal fisheries around New Zealand.” (I2)

This fisheries management stakeholder does, however, point out that, although currently there are not many issues in the Antarctic fisheries, there are issues relating to monitoring and enforcement (I2). He also predicts that the issues ahead will relate to “things like, climate change, potential effects of pollution if you had a large disaster down there... [and] providing that you don’t have huge increases in IUU [illegal, unregulated and unreported] fishing I can’t really see things being much different” (I2). He added that with developments in science, fisheries management could potentially improve, he explained:

“Because the science in terms of managing fisheries is getting better all the time, the techniques we have for monitoring are improving, even things like good acoustic interpretation, better acoustic machinery in terms of the eco sounds used for stock assessments all these things are going to improve, so yes, with an increase in technology, better information I think we’ll probably improve the management.” (I2)

The same interviewee also noted that “the amount of fishing that is carried out in Antarctic waters compared to the amount of tourism is actually quite minimal” and he believes that “major impact is going to come from where you have the larger and more extensive vessels and the larger amount of people” (I2), referring to tourism vessels.

5.4.4 Introduced species

The introduction of, and potential establishment of non-native species, was identified as one of “the biggest problems [facing Antarctic conservation]” (S6). The potential for non-native species transportation and establishment in those areas was mentioned as a likely side effect of the increase in tourism numbers (E2, S1, S6). Although tourists were mentioned as potential transporters of non-native species, a couple of interviewees with experience in cruise ships as well as in science operations, mentioned they were impressed by the tough biosecurity controls, implemented by tourism operators (E2, S1). An interviewee from the science stakeholder group added scientists may be of greater concern in relation to distribution of introduced species. He explained:

“We [scientists] trample seeds and spores around as well and potentially we do it worse [than tourists] because we get picked up from one helicopter site to another helicopter in another location in Antarctica and get out again... Our accessibility within the region to multiple sites is a lot higher than tourists.” (S6)

Interviewees from the government and science stakeholder groups referred to efforts different NAPs have implemented in order to diminish the risk of non-native species introduction through their scientific operations (G2, G3, S1, S2). An interviewee from the government stakeholder group pointed out that NAPs did not perform well in the IPY [International Polar Year] Aliens in Antarctica survey, but that it was “not for lack of trying” (G2). She explained that although lots of NAPs have policies and programmes such as “don’t pack a pest”, funding may hinder their ability to implement better policies. She noted that “conservationists are calling for new clothing all the time” to reduce the risk of transporting potentially contaminated clothing back and forth between the NAPs’ ports of exit and Antarctica. However “NAPs cannot get funding to put new clothing on everyone so sometimes it’s not for lack of trying if the implementation isn’t great” (G2). To highlight the different standards in policies from NAPs, an interviewee compared the efforts of two “fairly proactive countries” (S2):

“To some countries [biosecurity] is really important. Australia has just invested in a \$3 million clearance area on its wharf, so every... material going to the ice has to go through this vetting... quarantine... centre, which is fantastic, what an amazing facility! While NZ doesn’t have that in place, we’ve got a pretty rickety warehouse that stuff that goes to the ice comes through, so different standards” (S2).

He emphasised that the only way to “minimise the risk of introducing non-native species to Antarctica” is if “everybody plays by the same standards”, which he notes is currently not the case (S2).

Other concerns relating mainly to a warming climate and non-native species were expressed by interviewees from all stakeholder groups (C7, E2, G5, I1, S2). An interviewee expressed his belief that climate change could “open up opportunities for new invasives to get down there” (G5) whilst another interviewee was concerned about potential “localised extinctions” of endemic species due to a warming climate and the introduction of foreign species (C7). Four interviewees noted that because the Peninsula has greater number of visitors and the temperatures are warmer, there is a higher chance of potential introduction and establishment (E2, G5, I1, S2). An interviewee with plant science and evolutionary biology expertise explained the effects of a warming climate on the Peninsula:

“It’s thawing quite rapidly across on the Antarctic Peninsula side... And what you potentially see is what you are starting to see in places like South Georgia and the Antarctic Peninsula, where the snow and ice actually retreat in summer, which then gives you more potential for more exotic colonization of plants. Probably southern movement of animals and that sort of thing so it’s going to change in the ecology. You may have northern predators for example, moving south as water conditions change you may have colonization of some land base flora in areas where you have not had it before, not to say that this has not happened in the past.” (I2)

An interviewee from the science stakeholder group, who first started working in Antarctica in the 1980s is disappointed at seeing conservation standards erode as in that era the “idea of non-native species establishing themselves in the continent and surviving was just not there” and now “we have got non-native plants established, surviving over time and even expanding their range in some places” (S2). He pointed out that “we are now not in a zero non-native species game anymore, we have to accept the fact that they are established so I think that is an example where just a gradual erosion of our conservation standards over time” (S2). Because of this gradual erosion of conservation standards and “non-native species being established in Antarctica both marine and in the terrestrial environment”, he urges for a “rapid and appropriate application of some of the [conservation and protection] tools that we [the ATS] got in place” (S2).

5.4.5 Resource exploration and exploitation

In line with survey respondent’s views, interviewees identified the potential for further resource extraction as a concerning potential direct impact on the Antarctic environment. Comments made by interviewees were mainly in relation to possible commercial exploration and exploitation of oil, gas, minerals and water reserves in Antarctica’s continent and seabed in the future.

Most interviewees representing all stakeholder groups commented on the topic and presented various concerns over the potential for resource extraction (C3, C4, C5, C6, C7, E1, E2, G1, G3, G4, I1, I2, S1, S2, S3, S4, S5). Only one interviewee was not worried about the potential for mineral extraction in “the foreseeable future” as he believes the “conditions are so difficult and they’re so far away from markets that it’s not going to be economic”, he also adds that “it’s not going to be technically feasible to do this for a while and it won’t be economically feasible to do that for even longer” (C3). A small number of other interviewees shared his views in that present mineral and oil extraction in Antarctica is “too difficult” (G3) and uneconomical (E1, G3). However technology was not seen as a barrier for resource exploitation by some interviewees (C5, E1). An interviewee with experience in the energy sector pointed out that oil companies are already drilling offshore in “3000 metres of water” which he believes is “not more hostile than off shore Antarctica” (E1). He also points out that offshore drilling in remote and difficult places such as the north slope of Alaska has been happening since the ‘80s and that dealing with icebergs and installing long pipelines, such as the one in the Gulf of Mexico already happens, hence his belief that “there is no technological barrier, it’s the cost” (E1).

Three interviewees believed that while Antarctica remains “expensive and difficult to get to” (G3) there will be no pressure to exploit its resources, but once “the economic equation is right” (E1) pressure to extract oil, gas and minerals in Antarctica will increase (E1, G3, S5). One interviewee also

pointed out that currently pressure to drill for oil has eased as “the US has started pumping more oil at home so the pressure on global oil resources isn’t great so there’s less pressure to push the boundaries [of oil exploration]” (S5).

Interviewees from all stakeholder groups foresee an increased pressure on the ATS to allow exploration and or extraction of mineral and hydrocarbon resources in the future (C6, E1, E2, G3, I2, S3,). However, interviewees from the industry, science and conservation stakeholder groups expressed their concern over the ability of the ATS to respond to pressure to mine in Antarctica (C6, I1, I2, S4). One interviewee commented that if there was “a mineral down there that is absolutely imperative or deemed to be imperative for the wellbeing of the human race... no ATS is going to protect it” (I1). An interviewee from the science stakeholder group believes that the ATS “works reasonably well right now”, however he describes it as “very delicate” as “it could be easily broken” if a country wanted to “go its own way” and it is only through “diplomacy that this [the ATS] has actually worked out to this point” (S4). Another interviewee agrees in that the ATS has worked well, but, he argued, it is partly due to the fact that there has not been a “real point of contention” (E1).

A further issue relating to the ATS and the potential for resource extraction related to different value systems from states involved in the ATS. Russia (C3, G3), China (G1), Korea (G1, G3) and Chile (G3) were all mentioned as countries with potential commercial aspirations. An interviewee from the government stakeholder group expressed his concern with regards to some states joining the Treaty:

“Whether it’s biological or mineral [wealth] or anything else... that’s not the view of the AT. I think ideally people would sign up for the AT and say ‘*yes we’ll put our ideas about resources to one side*’ but I don’t think that happens in reality, I think perhaps governments might have ulterior motives.” (G3)

Considering the importance of the Protocol with regard to mining activities in Antarctica, it is worth noting that it was only mentioned by a handful of interviewees (C3, C4, C7, S3, S5).

An interviewee with experience in Antarctic legal matters mentioned that although the Protocol bans “mineral resource activities” it is “hard to know where science stops and minerals exploration actually starts” (C3). He also highlighted the issue around a common belief in the Protocol expiring in 2048, and he pointed out “it’s a lot more complicated than that” (C3). To further highlight this matter it is interesting to note interviewees’ comments on the Protocol’s length. One interviewee mentioned the Protocol was “signed for 50 years” (S5), another said its “until at least 2055” (C4), another believed it may not stand in 30-40 years (S3) and another one mentioned it “needs majority decision on any changes of say mining access” (C7).

Solutions to some of the above expressed concerns were presented by interviewees. Most related to strengthening the ATS (C7, E2, I1, S1, S4) including imposing a “complete ban on Antarctica”, including for scientific research, so that it is not “explored or prospected for mineral resources or for genetic resources” (C7) and setting conservation standards, objectives and targets to be achieved so that conservation values don’t erode over time (S2).

The fact that the Southern Ocean has already been used for extractive commercial purposes was of concern to a couple of interviewees (C7, S2) who see the exploitation of resources could “easily move inland” (C7). The effects of climate change on the landscape were also noted as a concern as “parts of it open up and become more accessible as the ice disappears” (C7) and places such as the trans Antarctic mountains become more accessible (G3).

However, other interviewees suggested that hydrocarbon exploitation in Antarctica could potentially not become an issue as the world moves towards cleaner and sustainable energy sources due to the impact on climate change from burning fossil fuels (C4, E1, E2, G1, I2). Though, it was noted that only once we start developing alternatives we will “reduce the need to go to Antarctica to mine” (G1). It was also pointed out that if extraction of hydrocarbons happened in Antarctica, it will only “accelerate the whole impacts of climate change” (G5) and will be “delaying having to do something as far as... using energy efficiently” (E2).

The issue of countries going to war over Antarctic resources was also brought up. All interviewees believed no country would go to war over access to Antarctic resources in the foreseeable future (E1, G3, I2, S4, S5). A couple of interviewees mentioned potential war would depend on what resources are found and how valuable these resources are at the time (I2, S4). Another interviewee pointed out that “resources are really the thing that people most often fight over, think about most wars” (E1).

There was lots of uncertainty and speculation expressed among interviewees toward what may happen in the future in Antarctica. Interviewees even had different views on what valuable resources Antarctica has. Valuable resources mentioned by interviewees were oil and gas reserves (E1, G3, I1, I2), precious stones, such as diamonds (G3), minerals (E1, G3, I1, S4) including uranium and gold (G3) as well as minerals for electronics (E1). Another interviewee pointed out that water could become a valuable resource in the future too and remarked the possibility of finding a valuable organism or mineral combination that “may be the cure of cancer” or “some fantastic thing they find when they are doing their bio prospecting” (S4). Only one interviewee expressed the view that there are “little minerals in the AT area” as he believes there is “misinformation on Antarctic mineral resources” and that “the minerals industry is not really interested in Antarctica” (C3).

If valuable resources were found in Antarctica some interviewees believed governments would “go all over that” (S4) and once exploitation started there would “be a gold rush” (G1).

5.5 Perspectives on indirect human impacts

Members of all stakeholder groups spoke about the indirect impacts affecting the Antarctic environment, with some interviewees emphasising that these effects were of potentially greater magnitude than those created by direct human activity in Antarctica (C2, G2, G5, S2). One government interviewee believed that humans were “failing as a species to address those [indirect] impacts [on Antarctica]” (G5), while others felt that the only way to truly protect Antarctica is to address the indirect human impacts (C2, G5). The effects on the Antarctic environment from climate change and its auxiliary effects, the ozone hole as well as impacts arriving from sea and air currents, were all mentioned as indirect human impacts affecting Antarctica.

5.5.1 Climate change

Similarly to the views expressed by survey respondents, climate change was the interviewees most commonly mentioned indirect human impact affecting Antarctica, with all interviewees raising this issue. Climate change and its auxiliary effects were of most concern to many interviewees, some calling it “the biggest issue [affecting Antarctica]” (C1, G5), “the big destructor of the place” (G5), “the primary risk to Antarctica and the Southern Ocean” (C3), “the long term challenge” (C4), “the biggest risk to Antarctica” (E2) and a “huge pressure” (S6). Furthermore, when asked what is the main conservation challenge affecting Antarctica a number of interviewees mentioned climate change (C1, C3, C4, C6, E1, E2, G1, G3, G4, G5, S6).

5.5.1.1 Complexity and effects

Interviewees mentioned a range of ways climate change has and could further affect Antarctica, most made reference to the effects of global warming on “changes in the sea ice” (C1, S3), “impact on the ice sheets” (G2, S3), “mass balance change of glaciers” (C2), “glacial movements” (E2, G4, S3), “ocean acidification” (C2, C4, E2, S3, S6), melting of the ice (C5, I2, S3), rising sea levels (C1, C5, E2, G1, G3, G5, S3, S5), warming in the Peninsula (C3, C6, G3, G4) as well as impacts on the weather leading to an increase in severe weather events around the world (C5, C7, G5). An interviewee from the science stakeholder group with 15 years’ experience on Antarctic fish science explained that some effects of climate change, such as ocean acidification, though affecting other parts of the world, would be of greater impact in Antarctica, due to “chemistry related to the cold that means that the effect can be amplified around the Polar Regions” (S3). It was also noted that although “the entire world” impacts Antarctica through climate change, some of its effects were not be obvious yet as “a lot of changes are not yet seen because of the lag effect” (C2).

Interviewees from the conservation and science stakeholder group made reference to the complexity of climate change's effects on the Antarctic (C1, C6, S3). An interviewee from the science stakeholder group exemplified the complexity of climate change and its capacity to affect Antarctic ecosystems in different ways. She explained:

"So, obviously we've got climate change and melting of the ice... that is leading to really altered land environments but then... we've got huge downstream impacts on marine life as well. So we are really changing sea environments in terms of rise in temperatures, more freshwater, more layers of water, changes of oxygen available and we are talking about an ecosystem, either on top of below the sea that is supremely adapted to very cold and stable environment. And we've got changes happening at a rate that even we could not predict a few years ago. The models are completely being revised all the time and they are now saying things are happening a lot faster, so pace, pace of change, environmental change is a major concern." (S3)

A number of interviewees spoke about how climate change is affecting parts of the continent differently (C1, C3, C5, C6, G1, G3, S5). Interviewees from the conservation, science and government stakeholder group gave the example of the Antarctic Peninsula being the fastest warming place on Earth; yet in contrast to other parts of Antarctica, such as the Ross Sea, are seeing increases in sea ice (C3, C5, C6, G3, S5). Other examples of changes in different parts of the continent due to climate change were given (C3, C5, E1, S5), including changes in the distribution of penguin colonies (C3); as well as changes in glacial movements. An interviewee recalled glacial changes in the vicinity of Palmer station:

"When we first got there [to Palmer Station]... in 1990... The glacier came down almost to the station, it was used for freshwater. You go there now and the glacier has retreated; it must be several kilometres back from the station, actually a couple of islands have become exposed there that were under the ice, so I think that the most dramatic change are actually natural, well, natural, related to climate change." (E1)

The complexity of the effects of climate change were not only mentioned in relation to Antarctica, but how the effects on Antarctica will in turn affect the rest of the world. An interviewee from the government stakeholder group explained this view:

"Climate change has the potential to change the whole continent and the actions to prevent that from happening or slow down on its impact, are sitting in every other part of the world... and the impacts of Antarctica and the Arctic melting will be felt across the whole of the world. Because it's not only going to change our weather patterns but the sea level rise will change the whole coastal nature of places to a huge degree so, if we can't protect that element, then you know, we are going to make life harder for ourselves." (G5)

Worldwide sea level rise due to melting of ice in Antarctica was an issue of primary concern to many interviewees (C1, C4, C5, E2, G2, G3, G5). An interviewee from the conservation stakeholder group noted the level of impact Antarctic ice melt could have on the world if it were to melt and highlights the importance of protecting Antarctica:

"Antarctica has a unique role globally... it's got the biggest ice mass on the planet and if that

ice melts then a lot of people are going to be very worried in coastal areas. There is a few hundred million people on the planet who will have their houses flooded, potentially, over the next 500 years if we don't do something about global warming, so Antarctica is important in terms of that interest.”(C4)

Other effects of climate change on Antarctica and subsequently the world were mentioned by interviewees, including our ability to live by the coast (C1, C4, C5, E2, G2, G3, G5), grow food (C5, G2) and have access to water (C5, G2, S4).

5.5.1.2 Solutions and the future

Predictions on how Antarctica will be affected by climate change were varied and some pointed out there is still lots of uncertainty and lack of information to make accurate forecasts (G4, G5, S3). Some interviewees were uncertain about what changes will happen in Antarctica (E2, G4, G5), some were certain there will be changes (C6, C7, E2), others were unsure about when the changes will happen but gave predictions on when they could occur (C4, C7, E2, G3). An interviewee is expecting the Ross Sea Ice Shelf to disappear as it “has come and gone over about the last two and a half million years, 40 times and it's still there at the moment” (G3). If there is a 4 or 5 degree warming within the next 50 years, another interviewee predicts there will be “pretty big effects on the glaciers all over the continent and I assume that the Peninsula would look totally different” (E2). Another interviewee expects a significant part of “the West Antarctic sheet” to disappear “in a time frame that won't happen in my life or my child's life but in a still relatively foreseeable future” (C7). An interviewee from the conservation stakeholder group added that considering “the potential for the impacts of both ocean acidification and melting ice on Antarctica combined with the recovery of the ozone hole” that the “biggest change” is likely to happen in “the second half of the century rather than the first half” (C4).

Other areas mentioned with relation to likely future scenarios were the Peninsula (C6, E2, G3, G4), West Antarctica (C7, G4), and the Ross Sea Region (G1, G3). Changes in the Peninsula were of particular concern to some interviewees as its rapid changes carried a number of questions relating to how it will affect other areas in Antarctica (C6, G4). West Antarctica was mentioned as giving “warning signs” of rapid glacial movement, yet what and when will happen were considered a challenge as “we just don't know” (G4). An interviewee made mention of the historic huts in the Ross Sea Region and expressed concern over their future with an increase in sea level rise (G1). Three interviewees expressed particular apprehension towards the future of wildlife which rely on coastal areas of Antarctica for their survival (C6, G1).

Unlike most interviewees one interviewee from the science stakeholder group is not expecting major changes to occur in Antarctica in the next 40 to 50 years. She explained:

“I don’t think there will be any major change in the environment in the next 40 years. I am somewhat cynical about the fear around global warming, [it] gets hyped. So that’s where I vary hugely from a lot of the people you will hear from that will tell you that *‘the whole world is going to melt and sea levels are going to rise and the end of the world is nigh as we know it’*. I personally have a very cynical view of some of the fear mongering that goes with that [global warming] and I don’t think that we’ll see any major changes in the next 50 years.” (S5)

Another interviewee was not expecting any major changes in Antarctica in the next 30 or 40 years “unless there is huge changes in ice melt” in that timeframe (C4).

In addition to their views on issues relating to climate change and Antarctica, interviews also proposed a number of solutions. An interviewee from the government stakeholder group involved in conservation matters suggested that to protect Antarctica’s ecosystems from changes in climate they must “set up these systems and these ecosystems to respond and adapt [so that] they [are] in a healthy state and able to respond and adapt... to a changing environment.” (G5)

As far as who should be involved in taking action on climate change to protect Antarctica; individuals (C2, C4, G1, G5), NGOs (C4), governments (C1, C2, G1, G4, G5, S4), industry (G1, S4), the Antarctic community (G2), as well as the ATS (C6, E2, G3, S2) were mentioned. Individuals were called upon by interviewees to “reduce carbon emissions” (C4), “start standing up now and being vocal about it” (G1) and to help bring global focus back to Antarctic conservation (C4).

Although involvement from individuals was seen as desirable by some interviewees, an interviewee from the conservation stakeholder group mentioned that it has been proven that actions from individuals cannot make as big a difference to climate change as governments can (C1). An interviewee from the government stakeholder group further commented that even though actions from individuals had “limited effect”, they still needed to be involved as public opinion results in policy action (G5).

Governments were also seen as needing to take the lead on climate change (C1, C2, G1, G4, G5, S4). An interviewee from the government stakeholder group added that climate change was an “international problem” and as such it needed to be addressed at that level, which inherently involved “international politics” (G4). She adds that reaching global consensus on a world problem will not be easily achieved and that “it’s going to take some key people in some key positions to make some very bold moves that are going to put themselves and their careers at risk as well as their economy” (G4).

Interviewees from the government and science groups mentioned the need for private industry to be involved in climate change solutions as “government’s got to be driven by industry and industry you have to understand that we can’t keep on relying on fossil fuels” (G1); and because industry, such as large scale agriculture, will be heavily affected by the impacts of climate change (S4).

Not just individuals and governments, but the Antarctic community who have the knowledge on the potential impacts of climate change on Antarctica and the rest of the world, were mentioned as needing to advocate for Antarctic conservation (G2, S4).

Lastly, the ATS was mentioned as a key player needing to take action on climate change matters (C6, E2, G3, S2, S6). An interviewee believes the ATS needs to act faster or “climate change will overtake them rapidly” (C6). An interviewee from the government stakeholder group mentioned a couple of practical ways the ATS can protect Antarctic features. He explained:

“Why would we protect a feature that is going to be under water in ten years’ time? We know that Antarctica is warming, we know that there are glaciers flowing into this [Vanda] lake, and we know that the lake level has been higher in the past. Why would we protect a feature on the banks of a lake that we know is going to rise? What is the point? Why wouldn’t we try and find a similar feature somewhere that’s not going to be under water in ten years’ time and put some really good protection mechanisms around it.” (G3)

Three interviewees from the government stakeholder group emphasised the need to act on climate change before people started to get affected by issues such as sea level rise (G1, G3, G5). One of the interviewees commented on the fact that Antarctica had already been an example of global cooperation and reaching solutions for difficult problems. This was the case in the 1980s when the issue of the ozone hole was addressed (G3).

Some interviewees expressed concern about what the future might hold for their grandchildren and children (E2, G1, G3) as “climate change upon us and the world is totally going to change” (G1). An interviewee from the government stakeholder group emphasised the importance of targeting climate change as he believed “it is going to kill us in the end if we don’t manage it” (G5). He also noted that targeting climate change was the only real issue affecting Antarctica and that any other conservation efforts would be minor. He elaborated:

“It’s just such a big and obvious thing that is the one thing that... if we don’t sort that out, [it] will make any other effort we do look insignificant... Is like saying, ‘yes, we need to manage this species, we need to manage whales, we need to manage fisheries’ but none of that it’s going to matter if we can’t sort out climate variability.” (G5)

5.6 Chapter summary

This chapter presented the interviewees’ profile and background; their identification of stakeholders in Antarctica; opinions on the condition of Antarctica’s natural environment and barriers to

conservation, as well as their perspectives on direct and indirect human impacts affecting Antarctica and the Southern Ocean.

The interviewees' identification of Antarctic stakeholders resembled that of Polk (1998) yet they also identified the public and Antarctica's wildlife as key stakeholders in Antarctic conservation. Direct human impacts on the environment from Antarctic activities were seen as concerning, particularly due to an increase in direct human presence, however, impacts from indirect human impacts, namely climate change, were perceived as the area's greatest environmental challenge.

The presentation of interview participants' perspectives helped address three of the study's key objectives by exploring the interviewees' opinions on Antarctic stakeholders in conservation, key challenges and issues facing Antarctic conservation, as well as their insights on potential future scenarios for Antarctica and, Antarctic conservation.

The following chapter presents the interviewees' perspectives on Antarctica's governance system as well as their views on the future of Antarctic conservation.

6 Results Part 3. Interviewees' perspectives on Antarctic conservation: Governance and the future

This third and final results chapter explores the interviewees' perspectives on Antarctica's governance system and Antarctic conservation tools as well as the future of Antarctic conservation. The chapter contributes directly to central objectives of the study, including the identification of key challenges and issues, and potential future scenarios for Antarctic conservation. The chapter begins by identifying stakeholders' views on Antarctica's governance system as well as their views on the ATS protection measures, followed by a discussion of stakeholder perspectives on the future of Antarctic conservation.

6.1 Perspectives on Antarctic governance

All interviewees were aware of and acknowledged the ATS as the principal and overarching governing body of Antarctica and the Southern Ocean (see Chapter 2.3). Many views were expressed over the ATS and its related agreements, all of which are presented in the following section. Particular focus is paid to the ATS Antarctic protection measures, the Protocol and CCAMLR.

6.1.1 Antarctic Treaty System and the Antarctic Treaty

Interviewees from all stakeholder groups often referred to the AT and ATS interchangeably¹⁸. In general, interviewees spoke favourably of the ATS as: "a pretty good system" (C5), "it leads the world in terms of conservation management" (C4), "it works" (G1, G2), "it is doing quite well" (S1) and "globally [the ATS] is a very unique body of treaties" (C4). An interviewee from the science stakeholder group emphasised the importance of Antarctica for humankind, as he regarded it as "a touchstone for humanity" the place "where we are getting it right, where environmental standards, scientific research, are priorities"(S2). Similarly, the AT was highly praised by interviewees who referred to it as an "amazing piece of legislation" (C2, I1, S4), a "phenomenal landmark agreement" (S3), a "remarkable piece of implementation" (G2), a "beacon of hope" (G3) and "brilliant" (I1).

Though the ATS was highly praised, interviewees identified and elaborated extensively on a number of weaknesses. Table 6.1¹⁹ was created in an effort to provide a snapshot of the interviewees' diverse

¹⁸ Many of the comments made by interviewees on the Antarctic Treaty and Antarctic Treaty System were similar, this section will endeavour to note when the comments relate to either the Antarctic Treaty or Antarctic Treaty System.

¹⁹ See Appendix 6.1 to see Table 6.1 on strengths and weaknesses of the Antarctic Treaty System as identified by interviewees.

views on the ATS's strengths and weaknesses. As with the ATS, many strengths and weaknesses were mentioned with regard to the AT. Many of them mirrored those mentioned in reference to the ATS, but, they are not incorporated into Table 6.1; they are presented in the sections that follow.

Table 6.1 lists interviewees' views on the ATS's strengths in the first column, followed by a reference on the adjacent column to the interviewees who made those comments. The third column is arranged in the same manner and lists identified weaknesses. It can be observed from this table that interviewees identified an almost the same number of strengths and weaknesses.

Although the number of strengths and weaknesses is similar, interviewees dedicated considerably more time elaborating on the ATS's weaknesses. Interviewees' views on the matter will be presented and analysed more in depth in the following sections of this chapter.

6.1.1.1 Perceived Strengths of the Antarctic Treaty System and the Antarctic Treaty

Interviewees highlighted many strengths of the ATS. Devoting Antarctica as a place for peace (C1, C4, I2, S1, S3, S5) and science (C4, E1, G4, G5, I2, S1, S2, S3, S5) as well as making the area demilitarised (C3, C4, G5), nuclear-free (C4) and mining-free (C3, C4, C5, C7, S2, S3, S6) were all noted as remarkable strengths. The ATS's visionary policies in conservation (C1, C4, G2, S2) and the future-focused nature of its agreements (C1, C4, G2, S2, S5) were also highlighted as core strengths to the system.

The ATS was seen as having a high level of cooperation (C1, G4, S1, S2), collaboration (C3, E2, G2, G3, S2,) and dialogue between states from its inception (C1, C4, C5, C6, E2, G1, G2, S1, S2, S3, S4, S5) which was noted as being continuously reinforced by holding regular meetings (C6, G4). The fact that states have agreed to put their territorial claims aside and work together in Antarctic matters was also noted as remarkable (C3, C4, E2, G3, G5, I2, S1, S3, S4, S5, S6). Moreover, the inclusive nature (G2, G5) of the ATS and its multinationalism (C5, G4, I2), where states have been allowed to join over the years (C3, E1, G1, G2, G5, I2, S3, S4, S5) were highlighted as strengths.

The ATS was recognised as having evolved over time to addresses current issues and threats (C5, E1, G1, G2, I2, S3, S5) and as successfully managing the Antarctic environment (C2, E2, G1, G4, S5). Other stakeholders identified strengths such as the observation that the ATS "has survived the test of time" (C4, S1, S3), is long lasting (G2, S3), future focused (C7) and has "no end date" (S3). An interviewee from the conservation stakeholder group highlighted further assets of the system:

"I think that's the strongest thing, [that] people still feel that there is a need for protecting [the Antarctic] and having the set of rules [the ATS]. No-one has actually said 'oh what the heck, I couldn't care less, it's on international land, it's no man's land and I'm just going to go in and do whatever I want'. There's a lot of respect to the place, there's a lot of respect to the rules and obviously there's a lot of diplomacy involved in it." (C1)

With regard to the AT's merits, many reflected those mentioned as strengths of the ATS. Including countries agreeing to collaborate and dedicate the Antarctic as a place for peace and science indefinitely, placing territorial claims on hold, its longevity, and making the area nuclear free as well as demilitarised. The fact that the AT has evolved to further protect the Antarctic and has allowed states to join over time were also mentioned as strengths. Further mentioned strengths specific to the AT included the AT itself (C3, G2, G4) and the fact that the AT allows for inspection of "each other's bases" (C3, C4, G5, S1), which was seen as creating a "sense of openness" between states from its inception (C4). An interviewee from the science stakeholder group eloquently summarised the strengths of the AT, echoing the views of a number of interviewees. She explained:

"[The AT is] something that has held for a significant period of time. To have the foresight to devote a continent primarily to peace and science... and that it has withheld the pressures till today, over 50 years!... All the nations that had territorial claims have... agreed that those claims don't hold any weight at present... That is a fairly phenomenal example of peace creation internationally! And also the fact that... a huge number of nations have become... consultative partners to the Treaty... It shows how a landmark document and a legal entity it is. So there are obviously strengths, and the fact that it has no end date... [And] they've managed to put through things like the moratorium [on mining] under that system, they are to me really positive signs that international cooperation can work really well." (S3)

With regard to the ATS's effectiveness, all interviewees who discussed the matter believed the ATS is effective in what it set out to do (C1, C5, E1, G2). An interviewee expressed his view that the ATS has been effective as there has not been a "major point of contention that would break the Treaty up" and that the system has been able to evolve over time, modernising its approach to conservation (E1).

An interviewee from the government stakeholder group pointed out that most organisations involved in the Antarctic participate through the ATS, which she referred to as "the ultimate demonstration of conservation"; and being part of such a system "means the countries have agreed to uphold the ultimate level of conservation for the Antarctic" (G2). The ATS started in 1959 with the signing of the AT, which this interviewee believed is "the greatest thing that we ever did" (G2). She added that states agreeing to treat "10 percent of the world differently than any other place", and countries choosing to be a part of the ATS, was seen as great success for the management and protection of Antarctica (G2).

Other interviewees commented on the vision and conservation commitment from the original signatory states (C1, C4, G2, S2). One of them noted that "the people who established it had a broader sense of conservation ownership... there was a sense of global commitment to... protect Antarctica" (C4). An interviewee believed the ATS and its agreements are exceptional and ahead of

their time, particularly in their commitment to conservation (C4). Another interviewee added that there are many lessons that can be learnt from the Antarctic governance agreements (S2). He elaborated:

“From a planetary conservation perspective, surely there is one bit of the planet we’ve really got to look after as well as we possibly can... At least there is one place where we are actually agreeing on a common set of approaches, a common set of rules, to some common objectives at an international scale, on a continental scale. And I think THAT really matters for humanity. There are a lot of lessons that can be taken from the way Antarctic cooperation has been built up over the years, and that can be applied in other contexts.” (S2)

The interviewee further explained that cooperation is “the theme of the ATS” as it is written into the AT “as a primary motivator for parties working together in the region” which he noted is “impressive in this day and age when we are at war with each other quite frequently” (S2). He believed that the fact that states are working together in Antarctic affairs fosters “broader international cooperation” as well as “broader opportunities for discussion and dialogue”; particularly with countries who only have Antarctic affairs in common. He called this international relation aspect of the ATS: “a future investment for humanity” (S2).

The matter of cooperation and dialogue between states was also mentioned by other interviewees (C1, C4, C5, C6, E2, G1, G2, S1, S3, S4, S5). Many highlighted how the ATS is inclusive and has grown over time with a number of states acceding to the AT and CCAMLR (C3, E1, G1, G2, G5, I2, S3, S4, S5). An interviewee from the government stakeholder group believed “the ambiguity” of the AT when it was negotiated allowed for “greater participation in the system because if countries were able to interpret those simple provisions in a way that helps them they can join into the system” (G2). According to this participant, allowing countries to participate “is its greatest strength, for conservation” as “once countries start to step outside the system there really will be nothing diplomatically that other countries can do” (G2). She continued saying that “if countries worked outside that [the ATS] we’ve lost the ability to conserve the Antarctic so the more countries that participate in the ATS, the greater opportunity that we have a global community to conserve the Antarctic” (G2). She also noted that countries did not have to be part of the ATS but they choose to be and that countries had the right to withdraw from the Treaty at any time. Hence, in her view, managing “the system in a way that all countries feel that it’s meaningful to participate” is essential to the conservation of Antarctica (G2).

Interviewees noted that cooperation and dialogue have also allowed the ATS to evolve over time to further protect Antarctica with the creation and adoption of Conventions, Commissions, and the Environmental Protocol as well as through all the measures and resolutions adopted at annual meetings (C5, E1, G1, G2, I2, S3, S5). An interviewee from the science stakeholder group added that there is “quite strong governance within those conventions and commissions” (S3). Another

interviewee from the government stakeholder group emphasised the need for the ATS to continue to adapt in order to secure the conservation of the Antarctic environment into the future, calling for “a robust Treaty System that is adaptable to change and able to respond” (G4).

The relationship between science and policy was also highlighted as a strength to the system (G4, I2, S2), as policy is based on “scientific advice” (G4). An interviewee from the industry stakeholder group mentioned there is good scientific input at CCAMLR’s working groups and that the science they produce is “in most cases... very, very objective” (I2). Another interviewee pointed out that “policy makers are the decision makers” hence the importance of the ongoing partnership and communication between the science community and diplomatic representatives (S2).

Many interviewees were asked about how well the Antarctic environment was looked after through the ATS and a number of them believed the ATS is managing Antarctica very well (C2, E2, G1, G4, S5). Although the environment was considered well protected by the ATS, two interviewees called for even stronger environmental protection measures to be set in place (C4, E1). One of the interviewees explained:

“I think it definitely needs more protection and more management than it currently has. I think what the last 25 years has shown is that the issues have been changing in terms of conservation issues... There’s definitely a need for better controls and measures than there is in place at the moment.” (C4)

6.1.1.2 Perceived weaknesses of the Antarctic Treaty System and Antarctic Treaty

As well as expressing many strengths of the system and AT, interviewees perceived a number of weaknesses. With regards to the AT’s weaknesses, they too mirrored those expressed by interviewees in relation to the ATS (see Appendix 6.1). Weaknesses specific to the AT related the fact that the AT had “some glaring omissions to the environment”, including the exclusion of whales and that it “didn’t build in some checks and balances” in relation to how to deal with “wealth and money” as “it doesn’t cater for managing those things very well” (I1). States needing to have a base in Antarctica in order to “move up in seniority” to gain consultative party status, was also mentioned as a weakness as “that is not necessarily what is in the best interest of the Antarctic environment” (S1). States agreeing to policies but not ratifying them promptly was also pointed out as a weakness (C4, S6). Finally, a commonly mentioned weakness of the AT related to original signatory states seen as an “old boys club” (C2, C5, C6, S1), which interviewees saw as a “network for rich white nations” with “western world” views (C5) where “nobody points the finger at anybody else” (C6).

Weaknesses relating to the ATS as a whole, including its conventions and protocol, included that it is not legally binding internationally (C1, E2, G1, I1, I2, S4, S5). In reference to this, an interviewee called the system “a toothless tiger” as “there is nothing to stop another country coming in and start

to mine just on their own" (G1). The fact that ATS applies only to signatory states was identified as an issue as it can potentially bring problems to the management of the area (I2, S4), particularly when trying to regulate conservation initiatives such as MPAs. The lack of regulations specific to the tourism industry was also mentioned among one of the ATS's weaknesses (C1, C3, C7, I2). One interviewee pointed out that the ATS's "restrictions" on tourism are "just guidelines"; there are not "no real strict principles and laws" and therefore "it's a... laid back game... in terms of who answers to the blame question when things go wrong" (C1).

Other identified weaknesses of the ATS were its bureaucratic nature (C6, G1, S5) which was slow to act to issues arising (C4, C6, C7, E1, G1, G2, G4, G5, I1, I2, S1, S2, S3, S5, S6); a matter that was often discussed in conjunction with the ATS's consensus system. Weaknesses relating to the ATS's consensus system, diplomacy, political nature and geopolitics, multinationalism and definitions were all heavily elaborated on by interviewees, and in some cases as strengths of the system.

Interviewees' perspectives on these weaknesses are reviewed in the following section.

6.1.1.2.1 Consensus system

One of the most frequently mentioned topics in relation to the workings of the ATS was its consensus system. A number of interviewees saw the consensus model as a positive aspect of the system, as well as a weakness (C4, C7, G4, G5, I2, S2). An interviewee from the conservation stakeholder group believed the consensus system allowed for thorough discussion of issues yet, to reach consensus, could be a lengthy process which might change the nature of the original problem (C7).

Some interviewees felt very positive towards the consensus system (E1, I1, S1, S5, S6,). An interviewee described it as "powerful", as the system seeks to get all states involved "operating on the same page and working together" (S5). This feature was also seen as allowing for participation from all countries (I1) who then gain a "sense of ownership of the issues" (C4). However powerful the consensus system was seen to be, an interviewee pointed out that no decisions were meaningful if they were not "implemented or enforced" (E1).

Other interviewees felt less positive about the ATS's consensus decision making process.

Interviewees noted that reaching consensus "[took] takes time" (C6, G1), was "difficult" (S3), "hard" (S6) and "slow" (C7, G2, S2, S3, S6), meaning the system could not react "fast enough" (E1, G4, I2) to issues (G4) or changing circumstances (I2).

Other interviewees pointed out that with more states joining the ATS it would become harder to reach consensus (C3, C4, G5, I1, S1, S2,) and that the consensus decision making process could "not even work in the future" as "the more voices you have in there, there more likely that someone would say 'no, I disagree'" (S1). The inability of states to reach consensus and countries "blocking"

(G3, G4, S1, S6) further designation of MPAs through CCAMLR was given as an example of this issue (C3, C4, C6, G3, G4, G5, I1, S2, S6). In this matter only “few countries” opposed the MPA proposals stalling CCAMLR’s ability to deliver its “commitment to the system of MPAs” (C3). Other interviewees pointed out that consensus will always be difficult in “such a complex working environment... involving multiple nations” (G5) especially those states with “financial interests” (I1). An interviewee from the government stakeholder group mentioned added that it was “disappointing” that consensus could lead to “political games” (G3).

A couple of interviewees (G5, S6) also noted that the inability of countries to reach consensus in a timely manner, and the compromises made in order to reach mutual ground, led to issues not being addressed in time and to a “watered down version of what really needs to occur” (G5). Two interviewees (S2, S6) with direct experience in the ATS pointed out that the consensus system was “there for really good reasons” (S2) and that states needed to “make it work the best they can” (S2).

6.1.1.2.2 Diplomacy and geopolitics

The role of diplomacy and diplomats in the ATS was highlighted by interviewees from all stakeholder groups as positive (C3, C6, G5, I1, S2, S6), but a number of issues relating to diplomacy were brought up. High diplomat turnover in some states (G2, I1, S2), leading to institutional knowledge loss (G2, I1, S2), and delays occurring as new diplomats take time to understand Antarctic issues (G2, S2) were all mentioned as issues with the ATS and diplomacy. A representative from the government stakeholder group explained:

“One of the other weaknesses is in some cases a lot of countries don’t have dedicated Antarctic governance or policy people.... In some countries, the person who sits at the Antarctic table has been there 10 or 12 years, but in other cases they rotate every two or three... They might try to do the best they can, [but] that’s just too hard, you cannot get your head around anything in two or three years’ time.” (G2)

A couple of interviewees from the science stakeholder group pointed out further issues with the system, including differences between countries’ delegations – some are very large and others small - (S6) and lack of depth of knowledge from officials (S1, S6). The need for scientists to communicate their science in a practical, summarised and accessible manner was suggested as a way to ease these problems (S6).

Solutions to some of these issues were proposed by interviewees. One interviewee called for countries to place “a bit more weight to Antarctic issues” for “strengthening some of those relationships” (S2). Another interviewee referred specifically to New Zealand and the need to have “an elder statesman who has passion, knowledge and interest” to manage Antarctic affairs (I1). An additional suggestion was to introduce “mentors” who would assist new diplomats into Antarctic roles (G2). In an effort to further strengthen international collaboration, mentoring “could be not only within a country but it could be country to country” (G2). The downsides of this are that “(1) it

takes money and (2) it takes time” and “countries are less likely to have international collaboration at a ATCM level because it’s national policy sitting around the table” than at NAP level where “it is one country trying to help another deliver its science and there’s a lot more openness or friendliness to that” (G2).

Other concerns expressed by interviewees in relation to diplomats, were the lack of connection with Antarctica (C1, C6, I1). An interviewee from the conservation stakeholder group believed diplomats did not know “what they are talking about in terms of the reality of Antarctica” and that they “[did] not have an affiliation [with the Antarctic] but a political agenda” (C1). A further comment on the matter was brought up by an interviewee from the industry stakeholder group who believed there is a “disconnect” between the policy representatives and the NAPs, which he sees as “two different beasts” (I1).

Although interviewees acknowledged the value of diplomacy, many expressed negative views towards the political nature of the ATS. Countries forming alliances (C2, G3, S4, S6), “powerful players inside the system” exercising “their will” (S4), single countries “blocking” progress on issues (C3, C5, G3, G4, S4, S6), letting the “politics of the world” affect decisions on the management of Antarctica (C5, G3, G4, G5), lack of political will (C6, E1, G5, I1, S2, S4), taking a long time to ratify policies (C4, S6), and placing national interests ahead of “the greater good” (C1, C5, E1, E2, G4, G5, I1, S4), were all mentioned as challenges relating to the political nature of the system.

Interviewees from the industry, government and science stakeholder groups pointed out that political tensions are not the same in all ATS forums. Political posturing was seen as much less in the ATCM as at CCAMLR, mainly due to the presence of commercial imperatives in the latter (G3, G4, I1, S2).

Further issues raised by interviewees relating to weaknesses in the ATS due to its political nature were the fact that Antarctica was a geopolitical area (C2, E1, G4, I1, S3), where states had diverse interests (C1, C2, C4, E1, E2, G3, G4, G5, I1, S3) including commercial (C1, C5, E1, G4, I1, I2, S4) and territorial (C2, E1, G4, I1, S3). These were all noted as standing in the way of governments making altruistic decisions for the Antarctic region; an interviewee added that countries “will not always come acting in good faith and have completely neutral discussions on things about what is best for Antarctica” (G5). Interviewees made many comments in relation to the geopolitical nature of Antarctica including that countries were party to the ATS “for geopolitical reasons primarily and science second” (C2). An interviewee from the science stakeholder group added that countries’ “subtle actions... undermine[s] the Treaty” and “interfered with what the Treaty [was] meant to support” (S3). An interviewee from the government stakeholder group strongly believed that

countries needed to leave aside their resource and geopolitical interests as well as their “political agenda” in order to move forward (G4).

Countries’ inability to agree on the proposed Ross Sea MPA was repeatedly mentioned by interviewees as an example of the geopolitical issues affecting the ability of the ATS to work towards Antarctic conservation (C2, C3, C4, C5, G3, G4, I1, I2, S4, S6). An interviewee from the industry stakeholder group strongly believed that the difficulty of countries agreeing to the proposed MPA is “geopolitics” because “it’s all about ownership, it’s all about control, it’s all about... the wrong reasons” (I1). However, the fact that “the AT was signed in the middle of the cold war” was mentioned by an interviewee as a reason for hope as the members of the ATS had shown that they can “put those geopolitical agendas aside”. (C3)

Another geopolitical issue raised in relation to the ATS was the presence of national interests based on territorial claims (C3, E1, E2, G4, I1, I2). Countries with territorial claims in the Peninsula were predominantly mentioned as countries exerting their sovereignty and causing tension between ATCPs (C3, E1, G3). Chile (G3, I2), Argentina (G3), and “South American countries” (G3, S4) were all mentioned as strongly asserting claims and causing “tension” (G3). An interviewee from the science stakeholder group added that although the ATS was a “difficult political space” with countries agreeing to manage a commons with underlying territorial claims, the system had worked to date (S3).

An interviewee with a life time of experience in Antarctic affairs further explained the problem and mentioned that the “crux of the issue” was “giving up your own sovereignty to some international organisation”, such as the ATS, as “some countries believed that Antarctica was part of their national territory” (E1). Another interviewee added that “long term” there could be a “land grab” and a “resource grab”, hence the need for a strong ATS that could have oversight of those interests (G4). It was also noted that science was used as a way to “exert presence in Antarctica” (E1) (C1, C3, E2, G1, I1,) and that it was the most cost effective way to do so (E1).

An interviewee noted that conservation was also seen as a way to assert territorial claims through using “protection as a way of subtly asserting sovereignty” (S1). She used the case of historic huts to illustrate:

“If there are British huts in the Peninsula then the UK is going to do the upkeep of them so long as the ATS exists I think. Because as that exists it sort of freezes the claims, and so long as those claims are frozen so to speak, they are not GONE.” (S1)

Ways to move forward in protecting Antarctica as well as dealing with countries’ territorial interests were suggested by interviewees (S1, S2). One interviewee suggested that a way to get around the

“taint” of territorial claims when presenting conservation projects is to work together with states to present projects jointly, for example:

“The current players in the Ross Sea Region [are], Korea, Italy, the US. The majority of those countries are not claimant nations, there is only one claimant nation [NZ], and if they are supportive of whatever the conservation work is or the protected area work is... [And] if a collective group of countries take the initiative to the parties as a whole, hopefully it won’t have that taint of territoriality over it.” (S2)

6.1.1.2.3 Issues relating to multinational character of the Antarctic Treaty System

Although some interviewees saw the multinationalism of the ATS as a strength (C5, G4, I2), many associated weaknesses with it. Consultative Parties not sharing the same native language was seen as problematic for a number of reasons including the possibility of inaccurate translations and interpretation of policies (C1, C3, G2, G3, G4, S3) as well as lack of inclusion in the policy making process (G2). An interviewee from the government stakeholder group gave the example of states not being able to express themselves in their own language at “intercessional contact group discussions”, which are online discussions which happen between ATCMs and take place “only in English”. A further example of issues with interpretations was given by the interviewee which illustrated the complexity of working with different languages. She explained:

“I was in a meeting in China and I was talking about capacity building. [I was] very happy about it and at the end they said ‘*why do we want to build more buildings?*’ Because to them capacity building is about building capital and I was like, ‘*oh my whole thing was just lost, my whole half hour there....I’m going to have to go back and start again*’ because I was talking about building human capacity.” (G2)

The issue of interpretation of policies was linked not only to Parties having different languages, but to having different values (C1, C3, E1, G3, G4, S3, S4, S5) which an interviewee referred to as not aligned “with the spirit of both conventions” (C3). An interviewee from the conservation stakeholder group further emphasised this point:

“You’ve got the problem of translations, interpretations and the ethical values. Values of... life in this planet, from human life to lifestyles...so that’s where things are starting to become a little bit in a mixed bag, and so the interpretation of the set of rules is of some concern. I’m not saying that the western interpretation is the right one but... I think it [the ATS] was set out to be an interpretation of the values of the western society and now with more players in this ATS the values are changing, and so you hear more about the use of the resources, future resources, the future use of Antarctica and you hear it more and quite openly, more now than what you did in the 1990s or even more 2000s.” (C1)

Another interviewee from the conservation stakeholder group pointed out that the AT and CCAMLR were well “set up” and have a “good framework for taking Antarctic conservation forward over the next decades” (C3). However, for this to happen “it will rely on a continuation of the cooperation that was experienced when the AT was signed in the first instance; that countries will look for the purpose of Antarctica of being an area for peace and science” not an area for “minerals and other

extractive values” (C3). He further added that “sustainable conservation initiatives, environmental management, should remain at the core of both of those conventions” (C3).

Another point made in relation to the disparity on interpretation of policies between different countries was brought up by three interviewees (E1, G3, G4) and related to the fact that “all the Treaty is implemented through national legislation” (E1) hence “it really comes back to ultimately how is environmental protection and regulation seen in your own country and that can vary quite significantly” (E1). One of the interviewees noted that there are countries that “don’t have a very rigorous environmental history in their own country so why are they going to all of a sudden be held to some standard in Antarctica that they are not even going to enforce in their own backyard?” (E1).

Further issues with interpretations and definitions were identified in relation to the policy realm and trouble agreeing to meanings of words (S3, S6). It was also noted that unlike the science realm, in the policy sphere there was room for misinterpretation of concepts and ideas (G2, S6), which could impact negatively on environmental policy implementation (S6).

With regards to disparity of interpretations, it was pointed out that even within the ATS (S3) and within countries’ Antarctic related agencies, conservation was interpreted differently (I1). An interviewee from the science stakeholder group mentioned that conservation under CCAMLR and the AT did not mean the same thing and placed the conservation value of marine areas at a lower level than the land (S3). Another interviewee saw the definition of conservation as a sustainable use of marine living resources under CCAMLR as a weakness of the ATS (S3). She also pointed out that “different nations had different interpretations” and “even within the commission” as “there had been a lot of discussion over the years over that very phrase [sustainable use] and what did it exactly mean in the commission” (S3).

The issue of definitions was also mentioned with regards to the AT. An interviewee who had been involved in ATCMs commented that “people would spend hours defining something” as “certain countries, languages... mean things differently and it’s very hard to get definitions that match up” (S6). He believed that although agreeing to definitions is an important part of the process, it could also lead to delays in action being taken in certain issues (S6).

6.1.1.3 Issues relating to the workings of the Antarctic Treaty System with a growing number of acceding states

Antarctic governance issues with relation to the multicultural nature of the ATS were seen as increasing with the number of states acceding. An interviewee mentioned the ATS was “almost getting too big to manage” (I1) whilst another believed that having multiple land managers was “a complete shemozzle” (G5). A number of interviewees commented on the growing number of

acceding states (C1, C2, C3, E2, G1, G3, S1, S3, S4), which many saw as a concern (C1, C3, C4, C6, E1, E2, G1, G3, G4, S1, S3, S4). Interviewees' concerns with the matter related mainly to increasing difficulty in reaching consensus (C3, C4, G5, I1, S1, S2), and of most concern were the growing diversity of interests (C3, C4, E2, G1, G4, S3) and values on the Antarctic (C1, C3, C6, E1, G1, G3, G4, S3, S4).

Through their comments, some interviewees expressed mistrust over new states being involved in the ATS (G1, G4, S4) as well as a sense of disparity in values between states involved in the ATS from its inception and newly acceding states (G4, S3, S4). An interviewee from the science stakeholder group articulated the sense of uncertainty over more states joining the ATS. He explained:

“We’ve got a whole bunch of new players coming in and nobody really knows how that’s going to work out, although there’s some dire predictions on one side and really great predictions on the other.... it comes back to... the whole idea of value... NAPs have various policies, these policies are based on values... attitudes, traditions and you have to recognise those and work within those restrictions” (S4)

Further comments on the difference in values between older and newly acceding states to the ATS were mentioned by interviewees. One interviewee expressed the view that was “a shame that certain countries” see the Antarctic as “a resource” and added that this was not a “mentality and culture” shared by “countries that have been operating there for a long time” (G4). Another interviewee hoped new states were joining the ATS “for the right reasons” and they were there to “contribute to the dialogue” and that “the collective increases in quality and level of discussions” (E1). An interviewee from the science stakeholder group commented specifically on “Asian countries” needing not only to accede to the ATS but to be active participants and “start taking initiatives of their own and not just being passengers in this process” (S2).

Some interviewees were very clear on their concerns with relation to specific countries being participant to the ATS. China (C3, C6, E1, E2, G1, G3, I2, S3, S5) and Korea (C6, E1, G1, G3, S5) were the two countries most mentioned by interviewees. Interviewees' concerns about China related mainly to their interest in Antarctica's natural resources (C3, C6, E2, S3) as well as the country's economic (C3, E2) and political influence (C3, E2). An interviewee from the conservation stakeholder group with vast experience in Antarctic governance forums mentioned that China “was aggressive and opposed a wide range of environmental initiatives [at CCAMLR] and even challenged CCAMLR's ability to manage the environment”. He went on to comment that if China continued to present this view then it “represent[ed] quite a risk for the system” as China's “economic and political influence... [was] increasing all the time” (C3).

Interviewees from the government and science stakeholder groups saw New Zealand, Australia and the US as countries demonstrating best practice on environmental affairs and acting in a mentorship role to newly coming states (G3, G4, S2). One of the interviewees mentioned that if people could “understand and have a similar world view [of conservation] to New Zealand... and agree to our world view I think we’ll [would] go a long way to protecting the environment” (G3).

Not all interviewees saw the increase in states being involved in the ATS as undesirable or problematic (C2, C5). An interviewee from the conservation stakeholder group called for the “original allies” to be “a little bit more open minded” and “see where our racism lies” (C2). Another interviewee, also from the conservation stakeholder group, saw the ATS’s “western world oriented system” as a weakness and believed new states, such as China, Korea, Malaysia and India should “have their say in the system” (C5). However, she believed new states need to “accept what has been achieved so far through the system” and that the Antarctic was to be protected (C5).

6.1.1.4 Stakeholder views on an alternative management system for Antarctica

Most interviewees were asked if they could think of a better way to manage the Antarctic, and they unanimously agreed that they could not (C1, C5, C6, C7, E1, E2, G1, G2, G3, G4, G5, I1, I2, S1, S3, S4). An interviewee from the government stakeholder group had particular praise for the ATS’s ability to evolve over the years and highlighted the creation of the CEP as success which needed to continue (G2).

Some of the comments made alluded to the fact that although not a perfect system (C6), the ATS was “certainly preferred to no international agreement” (E1). An interviewee from the government stakeholder group praised the ATS and suggested the problem was with the states involved. He explained:

“[The ATS] it’s a really ambitious way to operate. To have... everyone [who] has got an interest and will prove an interest in the site, sitting around the table trying to negotiate things... I think it’s an idealisation; a model of how human society should work and perhaps the issue isn’t with the system, is with countries. It’s... with humanities’ inabilities to get beyond some petty issues. If we’re all bigger people we could probably make that system work really effectively, but it gets tainted by human weakness.”(G5)

Some interviewees mentioned the long proposed idea of incorporating the management of Antarctic activities to the United Nations (UN) umbrella, and they all agreed it would not work (E1, E2, G1, I1). An interviewee added that regulating Antarctic affairs through the UN would “become even more bureaucratic than what it [was] at the moment” (G1).

Interviewees gave suggestions on ways the ATS could be improved. A couple of interviewees from the government stakeholder group suggested that a high majority system could be more efficient than the current consensus model (G3, G5). One of them explained:

“If you had to get 90% or 95% of the majority to proceed it would certainly take out those individual countries blocking any action that is required, so in a way it would get around some of the self-interests.” (G5)

Changing the consensus model to a majority decision making process was rejected by an interviewee from the science stakeholder group who believed it would allow for states to get disheartened with the system, which could create further issues (S6).

Better communication systems within the ATS (C3), with other relevant organisations (C3, G2, S6), such as the Intergovernmental Panel on Climate Change (IPCC), as well as within countries’ Antarctic agencies (G2, I1), were all mentioned as initiatives that could strengthen the system. An interviewee called for a “better integrated management” as he sees that “the integration of CCAMLR in the AT could be significantly enhanced in terms of working much more closely together rather than simply saying this is your responsibility and this is ours” (C3). Creating better communication between international panels and organisations that implement policies that would affect work in Antarctica ought to be created (C3, G2, S6), as well as ensuring that different Antarctic agencies within the countries have adequate communication networks (G2, I1).

Some suggestions expressed related more directly to national policy implementation than ATS operations. For example, an interviewee suggested that it would be good to have consistency in countries’ national Antarctic legislation (G3). Another interviewee called for better funding, as an increase in resources would help implement policy better (G4). The example of Antarctica New Zealand, with 30 staff and only 2 dedicated to environment-related issues was given and mentioned that “if you had more money and time and people we could do a lot more” (G4).

6.1.2 Protocol on Environmental Protection to the Antarctic Treaty

All interviewees were aware of the Protocol as an integral part of the ATS, and it was commented on by interviewees from all stakeholder groups (C1, C2, C3, C4, C5, C6, C7, E1, G1, G3, G4, G5, I1, S1, S2, S3, S5, S6). An interviewee deemed it the biggest and “most important” (S1) part of the ATS with regard to Antarctic conservation, and its addition to the ATS was seen as modernising the ATS’s “approach to conservation” (E1). The Protocol was also acknowledged as working “well” (C2, G1, S3) and being “good for Antarctica” (S6). An interviewee elaborated on the topic:

“The Protocol was much more detailed [than the previous ATS agreements] and it tackled a lot of the issues at the time... like waste management disposal... Most of the attention of the Treaty is on environmental issues now... I think it [the Protocol]... gave it [ATS] a... better framework to conducting environmental management.” (E1)

Interviewees noted many positive aspects of the Protocol. The provision for inspections and auditing of bases (C2, C4, G1), requirements for environmental impact assessments for all activities (G1, G4, G5) and more notably, the prohibition of mining activities (C3, C4, C5, C7, I1, S2, S6). The creation of the CEP was also noted by interviewees from the government and conservation stakeholder groups as a very positive addition to the ATS (C1, C4, G2, G4). An interviewee commended the work of the CEP saying it has been “productive” as it has “helped move things a lot quicker than they have been” by “getting countries to focus on it [environmental issues]” (C4). Another interviewee also praised the work of the CEP and mentioned it was “not only doing a good job but it [was] becoming stronger and stronger” as the CEP was “doing a lot more of the measures, decision and resolutions [than at the ATCM]” (G2). She added that the CEP oversaw the “whole protected area scheme” and was becoming a “driving force within that system and [had] not been around that long” (G2). The interviewee partly accredited the success of the CEP to “good leaders”, “individual countries like NZ taking on particular areas and projects” and the ability of those countries to “champion an idea and keep pushing that forward until it becomes a collective decision” (G2).

Corroborating the views expressed by survey respondents, many interviewees believed the Protocol had been effective in protecting the Antarctic environment (C7, G1, G3, S5). Interviewees commented on the environmental management improvements since the Protocol came into force (C7, G1, S5) and noted the “high demands” that were now in place (G1). Another interviewee pointed out that the Protocol has changed the way NAPs operate in Antarctica and has catered for the ATS’s multinationalism (S5). An interviewee from the government stakeholder group agreed that the Protocol has been able to address countries’ diverse “world views” (G3). However, with more countries joining the ATS, improvements in technology and increased knowledge, presence and financial investment in Antarctica, he believed a review of the Protocol was due (G3). Another interviewee from the government stakeholder group believed most countries complied with the Protocol and that “the strength [came] out with countries like NZ or Australia or the US” who were “demonstrating best practice” and place “political pressure on other countries to... clean up their act” (G4).

It was noted by an interviewee from the industry sector that the mining ban imposed by the Protocol was as a great change from CRAMRA (I1). However, an interviewee from the conservation stakeholder group believed “the mining ban” has also been part of the reason that the worldwide conservation focus was diverted elsewhere (C4). He believed this was of importance as he saw the lack of focus on conservation in Antarctica as the main barrier to protecting Antarctica into the future (C4).

Furthermore, some issues in relation to the ban on mineral activities arose from people's misunderstandings about the ban having an end date. A couple of interviewees from the science stakeholder group involved in ATS meetings believed the system could be questioned by the year 2048 (S2, S6). One of them explained:

"I don't tend to put a lot of weight on the 2048 date, I think it will have some influence in the way that people think and there is a lot of misconception about that 2048 date, which I think plays into some people's thinking around it, but there is no doubt it will have an influence. For some reason, even in the public perception is a line that seems to have been drawn into the future and that can be play into the way the political thinking of the system works. So, as we get nearer towards that seemingly influential debate date, I think the system could start to be challenged." (S2)

Another interviewee added that, if the ATP did not have "a good long term consensus around the protection of Antarctica from the perspective of mining" by 2048, the ATS could "fall over very quickly". He believed this would be "by far and away the biggest test for the AT" (S6).

Although the Protocol introduced many good provisions on the management of Antarctica interviewees brought up a number of areas where it has been less than effective, including that some countries ignore aspects of it (C7, E1, G4 I1, I2), there is lack of monitoring (E1, I2), there are no mechanisms to enforce rules (C1, C4, C7, E1, E2, G1, G3, G4, I1, I2, S4, S5, S6) or make countries comply with failings brought up on inspections (C4, G1, G3, G4). States not ratifying the Protocol (C1, S6) and or the liability annex (C4, E1) were mentioned as some of its greatest shortfalls (C1, S6). A couple of interviewees (C4, E1) brought particular attention to the liability annex which was used to demonstrate the "lack of focus on Antarctica" by states taking longer "than they should do" to agree on important environmental protection decisions (C4). A couple of interviewees noted that "all the right decisions" could be made but if they were not "implemented or enforced" (E1) then they were "just a whole lot of words written on paper" (I2). Another noted shortfall of the Protocol related to the provision for EIA of activities, which although it was noted as "good" (G4), it was also mentioned as being "not rigorous" (E1) and "rather superficial" in practice (C3).

An interviewee who has been involved in the CEP since its inception believed a more strategic and proactive approach to Antarctic conservation was needed in order to move forward in Antarctic conservation (S2). He added that although work had commenced on a conservation strategy for Antarctica, which would provide "focus and guidance on Antarctic conservation matters", it would not succeed unless ATP "own[ed] it" - which could be a challenge as "they [ATCPs] may not like the idea of setting conservation standards into the future". The interviewee emphasised the importance of having a conservation strategy and setting "genuine conservation goals" to be achieved, as only once there were aims in place success could be measured (S2).

6.1.2.1 Antarctic Protected Areas

Antarctic Specially Protected Areas (ASPAs) and ASMAs were observed as good and important tools for conservation under the Protocol by a number of interviewees (C2, G1, G3, G5, S2, S4, S5). An interviewee from the government stakeholder group agreed that ASPAs and ASMAs are good tools for protection, but proposed to take into account their broader area in order to provide effective protection. He used the example of a lake to show his view:

“A lake feature. That ASPA is fed by rivers or is fed by snow melt or fed by ground water percolating through... so rather than protecting the wider area that feeds that area, all they are doing is putting a line around the actual feature itself. You could be 3kms up the river putting bromine into the water as a radioactive tracer and it flows into your ASPA so I think more thought needs to be put into the wider protection.” (G3)

The interviewee added that knowledge on what the future of Antarctica would look like in the future should be taken in to consideration when planning to protect areas (G3). He believed that the effects of global warming, such as sea level rise and impacts from melting glaciers, should be taken into consideration when selecting areas for protection and perhaps “find a similar feature somewhere that [was] not going to be under water in ten years’ time and put[ting] some really good protection mechanisms around it” (G3).

With regard to their strengths, an interviewee noted the “large number of protected areas designated across the continent” as well as “a growing interest in the standards around protected area management” as their strong suit (S2).

Three interviewees who have worked in the Ross Sea Region gave accounts of ASMA and or ASPA rules being violated (C2, G1, S2), highlighting a communication breakdown between policy makers, NAPs and people working in the field. However, one interviewee believed especially designated protected areas are administered “very strongly”, particularly at Scott Base and noted that “if you step over the line and you have to fill out paperwork until the cows come home, so you don’t step over that line!” (C2). Other interviewees concurred with the opinion that NZ’s NAP complies with ASMA and ASPA rules (G1, S3) but noted that not all countries are compliant (C2, S3). One interviewee added that “it’s all up to interpretation and compliance” and that “other nations... [did] not have the same ideals and values” hence they adhered to the Protocol “on a different level” (S3).

Regarding Antarctic protected area weaknesses, it was noted that they were not representative (C3, C4, E1, G3, S2, S6) and they did not “currently meet the standards set within the AT of a representative protected area network” (S6). Some interviewees referred to the Antarctic protected area network as being “random” (C3, E1) or as a “stamp collecting” exercise (G3, S2, S4). Stamp collecting was referred to as the creation of protected areas in the vicinity of bases “because we’ve

identified some things that might need protection" (G3), rather than "looking more holistically" (G3) at what needs protecting by "using environmental domains" (G3) or applying them "in a systematic way" (S2). Interviewees criticised the lack of progress on adopting a systematic approach to the identification and creation of protected areas in continental Antarctica (C3, C4, E1, G3, S2). One of the interviewees believed countries recognised the issue "but have been very unwilling to or unfocused to actually move forward in terms of creating a better sense of protected areas" (C4). Another added that protected areas "tend[ed] to be driven by countries that [had] either a claim in that part of Antarctica or research bases nearby or wish[ed] to protect long term monitoring sites" (C3). One of the interviewees expressed his belief that "the biggest challenge going forward... [was] to really provide a scientific based framework for conservation, across the board" (E1). A couple of interviewees (C3, C4) noted that CCAMLR, "despite its hiccups" (C4), had "a better system in identifying nine planning domains and actually developing a system for the systematic development of marine protected areas" (C3).

Another noted downfall of Antarctic protected areas was the lack of wilderness areas under protection (C3, C4, G3, S2, S6). Although interviewees noted Antarctica's wilderness qualities as worthy of protection (C4, G3), they also noted that this was the least used reason for the creation of a protected area in Antarctica (C4). This issue was noted of particular importance now that people were "going and deliberately searching out wilderness" which highlights that "the whole management of wilderness in Antarctica [was] not particularly well addressed" (C3). An interviewee believed part of the reason for the lack of wilderness protection was that countries "had not really got to grips with what wilderness [was] is and what values could be protected in Antarctica" (C4). With regard to wilderness conservation, New Zealand was seen as a "leading player trying to get better interest in wilderness conservation in Antarctica" (C4) at ATCM (C3, C4, S6). New Zealand was also mentioned as "extremely forward thinking about how they tackle environmental protection in Antarctica and how you define use of the various areas and the differences between ASPAS and ASMAS" (S3); and as actively advocating for a "systematic approach to breaking up Antarctica into a system for protected area networks" (S6). In addition to New Zealand, SCAR (S2) and NGOs (C3, C4) were also mentioned as advocating and working on strengthening the Antarctic protected area system.

Some interviewees presented their views on how protected areas could be strengthened and expanded (C3, G3, S2, S3). An interviewee with experience on the matter would like to see "policy makers and scientists coming together to look at some representative examples" at a workshop, where a couple of examples from a couple of bioregions could be chosen. A "joint policy/science approach" would help "put some boundaries around some areas" and "get the science to tell us why

these are important and then draft out a management plan for that” (S2). He also added that ASPAs and ASMAs were good tools, but the system should not feel restrained by them. He gave an example of other ways of protecting areas:

“The site guidelines for tourism sites is an example of that, is not prescribed anywhere yet we’ve made it work, we now have an accepted practice of site specific guidance for visitors coming ashore. So those sorts of things we can think about as well.” (S2)

A couple of interviewees (S2, S6) highlighted the importance of engaging scientists in the process as “there need[ed] to be that scientific basis and underpinning” to show the protective area system was “not representative and that they really need[ed] to do more work around the protected area networks” (S6).

6.1.3 Commission and the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)

Other than the Protocol, the Commission and CCAMLR were commonly mentioned by interviewees as key parts of the ATS’s environmental protection mechanisms. Interviewees from all stakeholder groups commented on CCAMLR’s strengths (C3, G3, I2, S2), many of which were mentioned by an interviewee from the industry stakeholder group with experience in Antarctic fisheries affairs. He noted:

“[CCAMLR] It’s a multinational organisation.... in terms of the scientific input from the working groups, I think they probably have some of the best people in the world ... I think they started with a very good set of rules... I think the management organisation, that works on a whole ecosystem places... it’s very good. I think for consultation they work quite closely with a lot of the external organisations... Environmental groups... have representation in CCAMLR; so things get pretty well aired... and I think because you’ve got 25 members although things progress quite slowly, you do actually have the ability to stop any direct lobbying.” (I2)

In terms of CCAMLR’s role in managing the Southern Ocean fisheries, some interviewees praised the Commission and called it “one of the best if not the best regional fisheries bodies” (C3), “one of the best” (I2), “as good as a fishing convention as any” (S2) and that “it’s really good at what it does” (G4). However, not all interviewees agreed (C6, G5), one interviewee noting that people “seem to be pretty poor at managing marine resources... particularly in Antarctica” (G5).

Although CCAMLR was seen by interviewees as the entity who managed resource extraction in the Southern Ocean, an interviewee with experience in the system clarified that CCAMLR was not a Regional Fisheries Management Organisation (RFMO) and that its mandate was broader than most RFMOs (C3). Another noted distinction was that unlike many RFMOs many of CCAMLR members did not have extractive interests in the Southern Ocean (C3). This was seen as a strength as those states “have actually joined what [was] a conservation commission as opposed to a resource extraction

commission” (C3). It was also noted that CCAMLR did not manage all aspects of the Southern Ocean and that the IWC, CCAS and the IMO hold important roles and regulate different activities (C3).

Interviewees noted many positive outcomes from establishing CCAMLR (C3, G3, I2, S2). CCAMLR “set reasonably to very robust catch limits on fisheries” (C3), and successfully addressed seabird bycatch (C3, S2) as well as “marine bycatch” (S2). It controlled illegal fishing “better than any other regional fisheries body” (C3) through “catch documentation schemes” (C3, S2). They have implemented a “vessel monitoring system” (C3) and have created a “sub-committee that looks particularly at compliance and they can recommend that certain vessels are struck off” (G3). One interviewee noted that there was “a lot of innovation in CCAMLR” and that it was “quite a strong component of the [AT] system” (S2).

Another positive aspect of CCAMLR was its commitment to the creation of “a system of MPAs” (C3). However, an interviewee noted CCAMLR had “yet to deliver on the commitments it has made” (C3). A number of interviewees attributed CCAMLR’s consensus model for its lack of progress on the matter (C3, C4, C6, G3, G4, G5, I1, S2, S3, S6) as consensus was “needed to get designation” (C3). The creation and challenges of establishing MPAs through CCAMLR have already been discussed in this and previous chapters. Most interviewees had a view on the MPA debate and the topic was repeatedly mentioned as an example of geopolitics, political posturing, the consensus decision model and commercial imperatives halting progress on conservation issues. Although there have been challenges in establishing further MPAs in the Southern Ocean, and similarly to the views of survey respondents, many interviewees were confident that further MPAs will be agreed upon and established in the future (C5, C6, C7, I1, S3, S5). However a couple of interviewees noted it will take years before any MPA is designated, as political tensions that are currently blocking the Ross Sea MPA proposal will take time to ease (G3, I2). An interviewee involved in CCAMLR meetings added that he does not think MPAs in the Southern Ocean are necessarily needed, as “2/3 [of the Ross Sea] is actually closed [to fishing]” which he noted are “effectively MPAs that are set up by CCAMLR, they are just not called MPAs, they are closed areas for fishing and to a lot of other things because of environmental protocols that are impacted” (I2).

With regards to CCAMLR’s weaknesses, many echoed those of the ATS and some have been discussed earlier in the chapter. Interviewees noted that CCAMLR is slow to react to important issues (C6, G5, I2); it has issues with interpretations and definitions of policy (S3) as well as with monitoring (C6), reporting (C6), policy enforcement (C6, E2) and pollution (C6). Its consensus decision making system was seen as a weakness of The Convention and Commission as it hinders and prolongs progress on issues (C6, G5). Other weaknesses noted by interviewees related to the fishing aspect of

CCAMLR. A couple of interviewees believed CCAMLR has not been able to “limit fishing capacity” (C3, G5) and others expressed their concern over illegal fishing activity (C5, I2).

In relation to the future of the Southern Ocean, an interviewee believed there will be “more fishing pressures” and that CCAMLRs ability to manage them “is going to be key” to its protection (C3).

6.2 Perspectives on the future of Antarctic conservation

As well as their perspective on Antarctica’s governance and its intricacies, interviewees were asked their views on the future of Antarctic conservation. This next section presents their observations.

In line with the timeframe when the Protocol could be revised in the year 2048, interviewees were asked about their views on the potential condition of the Antarctic environment in 30 to 40 years’ time. The majority of interviewees believed that the Antarctic environment will change in that time frame (C1, C6, C7, E2, G1, G3, I2, S3), and a smaller number expected it to remain in a similar condition (C4, I1, S5). It is interesting to note that the views of interviewees differed from that of survey respondents in this matter, as unlike the interviewees, the majority expect the Antarctic’s natural environment to remain in similar condition, and a minority expect it to deteriorate.

All interviewees who believed the Antarctic environment will change in the future based their predictions on the assertion that climate change will affect the Antarctic. An interviewee noted that “the world is warming up” and “that is going to affect Antarctica... in ways that probably the public doesn’t even understand” (C6). Another interviewee believed that the world will warm twice as much as predicted which will cause “some pretty significant effects in Antarctica” (E2). An interviewee from the government stakeholder group with a background in science explained that “we do know from past climate records” that changes in the Antarctic landscape “happen and they happen reasonably quickly”, hence we cannot expect things to remain the same (G3).

One of the interviewees who is not expecting the Antarctic environment to change significantly in the next 30 to 40 years’ time noted that “30 years is not even a twinkling of an eye in terms of the natural systems” in Antarctica, and if the area was to experience changes in that timeframe they’ll be “small seasonal changes” (I1). Another interviewee believed changes will occur in the Antarctic environment but they are likely to occur in the second half of the century as “impacts of both ocean acidification and melting ice” are felt over Antarctica (C4).

Expected changes to the Antarctic environment noted by interviewees included losing “a significant part of the west Antarctic [ice] sheet” (C7), an increase of snow free areas in summer (I2), ice sheet retrieval (I2), changes in the distribution of species (I2, S1), increased potential for exotic plant

colonization (I2, S1), increased presence of northern predators moving south as water conditions change (I2) as well as further changes in the ecology of the region (I2).

The Antarctic Peninsula was repeatedly mentioned by interviewees as the area which is expected to change the most due to climate change related effects (C6, C7, E2, G1, I2). Interviewees mentioned increases in temperature will affect ice shelves (C7, G1) and glaciers (E2, G1) unravelling a very different landscape (E2, G1) as well as changing the ecology (I2) and wildlife distribution (C6). One of the interviewees was also concerned that the effects of ice melt in the Peninsula will lead to increased accessibility and consequently increased opportunities for mineral resource extraction (C7).

Although many of these predictions are not favourable for the conservation of the current condition of the Antarctic environment, and unlike survey respondents' views who had a more neutral outlook on the future, the great majority of interviewees expressed a sense of optimism towards the future conservation of Antarctica (C2, C4, C5, C7, G1, G2, G4, G5, I1, I2, S1, S5, S6). Some interviewees attributed their optimism to the fact that people are aware of the challenges facing the globe and they have the power to "manage this" and "be the generation... that made the change" (G1). Others believed there is enough interest from countries and individuals to protect the Antarctic (C4, G2, S1, S4) in a collaborative way (C4), and that there is enough "good will" to do so (G2). One interviewee pointed out that Antarctic conservation is gaining global attention and that although progress may seem slow it is not "going to go backwards, it'll go forward" (S5). Other interviewees believed species, including humans, will adapt to Antarctica's challenges and changes (S4, S5) and that Antarctica will "protect itself" (I2). Other interviewees felt hopeful about the future conservation of the Antarctic (C1, S3), with one noting that people will "start asking for a change... in the way we conduct ourselves, lifestyles and use of resources" which should impact positively on Antarctica (C1).

Similarly to survey respondents' views, a smaller number of interviewees felt pessimistic about the future conservation of the Antarctic (C6, E2, G3). One of the interviewees felt this way as he sees Antarctica possessing "too many resources... that are too valuable" for them to be protected from exploitation (G3). Another interviewee believed climate change is "worse than what people think", and there is no way to stop its effect on the Antarctic (E2).

An interviewee involved in AT affairs, expressed a more neutral view towards the future conservation of the Antarctic. He conveyed a sense of optimism towards people in the system who are passionate about conservation, but, he noted that these people are the minority and that "most countries, are

really passive and turning up at meetings seems to be enough" (S2). He added that if the "few individuals" who lead "the charge", "move on or lose their job", then "you lose momentum" (S2).

In an effort to gather insights to potential solutions, interviewees were asked to mention one thing that would be essential to securing the future conservation of Antarctica. Interviewees' views on the matter were associated with four topics, these being: modern conservation science, climate change, the ATS and public engagement.

Three interviewees (E1, S3, S6) suggested that what is essential to the future conservation of the Antarctic is to apply modern conservation science to bring "conservation of Antarctica into the 21st century" (E1). The interviewees called for increased scientific research efforts in order to create a better protected area network (E1, S3, S6).

Other interviewees saw dealing with human-induced climate change (E2, G5) and climate variability (G5) as the most important things for the future of Antarctic conservation. One interviewee noted that "reducing human induced climate change" is essential as "climate is going to kill us in the end if we don't manage it... it's just such a big and obvious thing that... if we don't sort that out [it] will make any other effort we do look insignificant" (G5). Another interviewee added that society needs to remove its model of growth in order to tackle these issues (C1).

A number of interviewees referred to matters relating to the ATS as of most importance for securing the conservation of Antarctica into the future. These included getting all countries to obey and comply to what they have agreed to when they signed up to the ATS (C3, G3, G4), maintain dialogue between ATS states, improve communication within the ATS and states (I1), as well as strengthening the ATS so that it is able to rapidly adapt and respond to arising challenges (G4), removing the "politics of the world from the politics of Antarctica" (G4) and gaining political will from all ATS parties (S2). An interviewee involved in the ATS elaborated on some of these matters:

"I think it's going to be that political will that needs to come from the parties. That is going to be the thing that is going to secure conservation standards long into the future. Is that statement of political will to achieve good conservation practice well into the next few decades, that is the thing that I think it's going to be secured, it's got to shift, that political mind set around making the system as effective as it possibly can be." (S2)

Finally, what most interviewees thought was essential to securing the future conservation of the Antarctic was communicating and creating awareness of the importance of the Antarctic to the world (C4, C5, C7, G1, G2, S1, S4). To communicate and make people understand the global importance of Antarctica (C4, G2, S1), nurturing respect for the environment, and respect for what the Antarctic has

and is (G1), as well as “the good will of people” were all mentioned as essential to seeing the Antarctic continent and Southern Ocean protected into the future.

6.3 Chapter summary

This chapter concludes the presentation of the qualitative data gathered through interviews with New Zealand Antarctic stakeholders. Interviewees’ views and opinions on the ATS, AT, Protocol and CCAMLR and as on what the future may look like for the Antarctic environment provided valuable insights into the identification of key challenges and issues, as well as potential future scenarios for Antarctic conservation – both core research objectives of the study.

Many strengths and weaknesses to the ATS and related agreements were highlighted and although their weaknesses could be seen as outweighing the strengths, the overall feeling amongst interviewees was positive about governance, the future of the ATS, and Antarctic conservation. Also, interviewees had the chance to present their views on the future scenarios for Antarctic conservation and although changes are expected to occur, they conveyed a sense of optimism and hope for what the future might bring to the Antarctic.

In the next chapter the findings of this research project will be linked to the literature and interpreted in the context of contemporary common pool resources management frameworks, to reveal what the views of New Zealand Antarctic stakeholders in Antarctic conservation mean for the future conservation of Antarctica.

7 Concluding discussion

This concluding chapter brings together the literature and learnings from this research with the aim of discussing the views of New Zealand Antarctic stakeholders on Antarctic conservation. This chapter is organised as follows. First an outline of the objectives of the research study and its participants are presented. Second, key Antarctic stakeholders, together with their roles and interests in Antarctica are discussed, and Polk's (1998) classification of Antarctic stakeholders is revised. Third, a summary of key challenges and issues facing Antarctic conservation are discussed in consideration with the literature around this topic. Fourth, future scenarios and solutions for Antarctic conservation are presented. Fifth, the data gathered is analysed and discussed in the context of contemporary CPR management frameworks. Finally, the chapter concludes with key messages and suggestions for future studies on the topic, along with updates on key socio-cultural and political events that are currently influencing some of the Antarctic challenges identified in this research.

7.1 New Zealand stakeholder perspectives on Antarctic conservation

As the conservation of the Antarctic continent and the Southern Ocean face unprecedented challenges that span beyond their boundaries, it was important to gather the views and opinions on Antarctic conservation of key stakeholders in Antarctic conservation from one of the countries involved in its management system. To this end, the perspectives on Antarctic conservation from New Zealand Antarctic stakeholders were sought. In order to do so, a mixed-methods approach was undertaken, and four objectives were explored. Both qualitative and quantitative research methods, in the form of an online survey and in-depth interviews, were used in order to gather the most complete understanding of the topic possible and collect both depth and breadth of information (Babbie, 2004). The research objectives were:

1. Identify key stakeholders in Antarctic conservation as perceived by key New Zealand Antarctic stakeholders as well as through document analysis and literature review.
2. Investigate key challenges and issues facing Antarctic conservation as observed by New Zealand stakeholders and relevant literature.
3. Interpret the data gathered in the context of contemporary common pool resource management frameworks.
4. Examine stakeholder views on potential future scenarios for Antarctic conservation.

The study engaged a diverse range and comprehensive number of New Zealand Antarctic stakeholders who were systematically identified and contacted. This resulted in 108 people

participating in a quantitative survey, as well as 22 qualitative interviewees. All of Polk's (1998) stakeholder groups were represented in the study. Many survey respondents and all interviewees were affiliated to multiple Antarctic interest groups. This highlighted the interrelationships between Antarctic interest group sectors, the difficulty of categorising people into one stakeholder group as well as noting participants' breadth of knowledge in Antarctic matters as their interests and involvement were multifaceted. Survey respondents' and interviewees' long association with Antarctic affairs offered rich insights into the topics addressed in the study.

To the researcher's knowledge, this is the first time a New Zealand-based study has incorporated quantitative and qualitative methods to gather the views and opinions on Antarctic conservation of over 100 New Zealand Antarctic stakeholders, and has analysed them in the context of contemporary common pool resources management frameworks.

7.2 Key findings and discussion

The key findings and discussion considering the literature will be presented and organised under four headings representing each of the research objectives.

7.2.1 Key stakeholders in Antarctic conservation

Interviewees identified governments, the scientific community, tourism and fishing industries, NGOs, the general public along with Antarctic flora and fauna as key stakeholders in Antarctic conservation (see Table 7.2) representing a web of stakeholders with an interest in protecting the Antarctic into the future.

Governments and the science community were amongst the top three most mentioned or highly rated stakeholders in the interviewee process and survey in relation to being key Antarctic stakeholders that advocated and had the most influence in conservation matters. In relation to the literature, the government and the science community were both mentioned by Polk (1998) as stakeholders in Antarctica, though his view on the reason for their involvement was related to sovereign rights and utilisation of Antarctica as a place to study, respectively (see Table 7.1).

Table 7.1 Societal segments with interests in Antarctica (Polk, 1998, pg. 1395)

Societal segments	Interests
Governments	Sovereign rights
Scientists and researchers	Utilise the Antarctic continent as a place to study
Commercial industry	Commercial activities, including tourism, minerals and fisheries
Conservationists	Preserve Antarctica

This study suggests that both governments and the science community are involved in Antarctica at a much more meaningful level, as they were portrayed by research participants as two of the most important and influential stakeholders in relation to protecting the Antarctic (see Table 7.2). It is also worth noting that interviewees made specific reference to New Zealand and its representatives in the ATS forum, not only as key stakeholders in Antarctic conservation but as active and influential participants in the system. New Zealand was viewed as driving environmental advocacy within the ATS by having people in key positions within the ATS that have been passionate and able to forge positive change. New Zealand was also viewed as leading by example and demonstrating best practice in its operations in the Antarctic.

Table 7.2 Stakeholders in Antarctic conservation with roles and interests as perceived by the New Zealand Antarctic stakeholders who participated in this research project

Stakeholders	Roles	Interest in the Antarctic
Governments	Regulate for Antarctic conservation	Protection and sovereignty
Scientific community	Advocate, influence and inform for Antarctic conservation	Protection and understanding of Antarctica
Tourism industry	Protection	Protection of Antarctica to secure tourism trade
Fishing industry	Protection	Protection and access to fish stocks
NGO	Advocate	Antarctic conservation
The public	Pressure governments to actively protect Antarctica	Quality of life
Antarctic flora and fauna		Livelihood

Interestingly, the most mentioned key stakeholder in Antarctic conservation by interviewees and conversely the least influential on Antarctic conservation by survey respondents was the public. In addition, the public were not included as one of Polk's (1998) "societal segment with interests in Antarctica" (Polk, 1998, p. 1395), nor were they identified by interviewees as advocates for Antarctic conservation. Although the public was not identified by Polk (1998) nor specifically by Friedheim and Akaha (1989), the latter do provide a broader view on stakeholders - as they proposed that everyone on Earth is a stakeholder - which would include the public. Friedheim and Akaha (1989) relate the inclusion of everyone on Earth as a stakeholder to the power of Antarctica to affect the world's ecosystems, which clearly underpins the significance of Antarctica as a global commons.

The fact that the public was identified as the most important stakeholder and yet it was not seen as influential nor vocal about Antarctic protection, was identified as an issue by some interviewees. The importance of support and advocacy for Antarctic conservation from the public was seen as fundamental in holding governments accountable for creating and enacting policies for Antarctic conservation, hence the importance of an informed and vocal population. Not surprisingly the most

mentioned essential element to protecting the Antarctic into the future was communicating the value and importance of Antarctica to the public.

The tourism industry was another key stakeholder in Antarctic conservation mentioned by participants. This aligns to Polk (1998) who includes the tourism industry in his categorisation of Antarctic stakeholders due to their interests in the commercial tourist trade. This view was echoed by interviewees who pointed out that the tourism industry is involved as a key stakeholder in Antarctic conservation as the industry needs Antarctica's seemingly untouched status to be conserved and native species protected in order to continue to sell the place as a desirable tourist destination. It is interesting to note that the tourism industry was not widely seen as active advocates nor as holding significant influence over Antarctic conservation matters; though the tourism industry's influence was expected to rise over the upcoming years and their environmental protection systems were praised.

When referring to advocates for Antarctic conservation NGOs were by far the most mentioned. This matches Polk's (1998) view on the reason for NGOs' categorisation as Antarctic stakeholders that he noted as seeking to protect Antarctica (see Table 7.1). The fishing industry was also identified by interviewees as a stakeholder in Antarctic conservation, as to be involved in the fishing industry long term they need to ensure the fish stocks are sustainably managed and protected. The fishing industry's involvement in conservation is not altruistic and in essence matches Polk's (1998) view that the fishing industry's interest are in exploitation of resources. With regards to their level of influence in Antarctic conservation, survey respondents ranked the fishing industry second to last. However, interviewees noted that their influence in the system is growing and will continue to grow in years to come.

The media was rated as the second most influential group in its capacity to stimulate change that positively affects Antarctic conservation. If this was the case, and taking into consideration the need to educate people on the importance of the Antarctic, the media could play a very significant role in protecting Antarctica into the future through delivering the message of the importance of Antarctic conservation to wider audiences. The media was not included in Polk's (1998) list of Antarctic stakeholders, and perhaps it should not be as their suggested role relates to conveying a message rather than having a direct stake in Antarctica. However, the media's effects could class them under Polk's (1998) conservation group as they would be seen as interested in Antarctic conservation.

Another identified stakeholder which was not previously identified by Polk (1998) nor Friedheim and Akaha (1989) is Antarctica's wildlife. Antarctica's wildlife does also not align with Grimble and

Wellard's (1997) definition of stakeholder as they define it as "any group of people, organised or unorganised, who share a common interest or stake in a particular issue or system" (Grimble & Wellard, 1997, p. 175). Antarctic wildlife was identified as a stakeholder in Antarctic conservation in the interview process and this study suggests that Antarctic wildlife is a key stakeholder in Antarctic conservation as they are the group who will be impacted directly by changes in the Antarctic environment.

To illustrate the interviewees' views on Antarctic stakeholders, their roles and how they interact for the benefit all stakeholder groups, Figure 7.1 was created. The figure shows stakeholders in green and the arrows between them display their connections and roles.

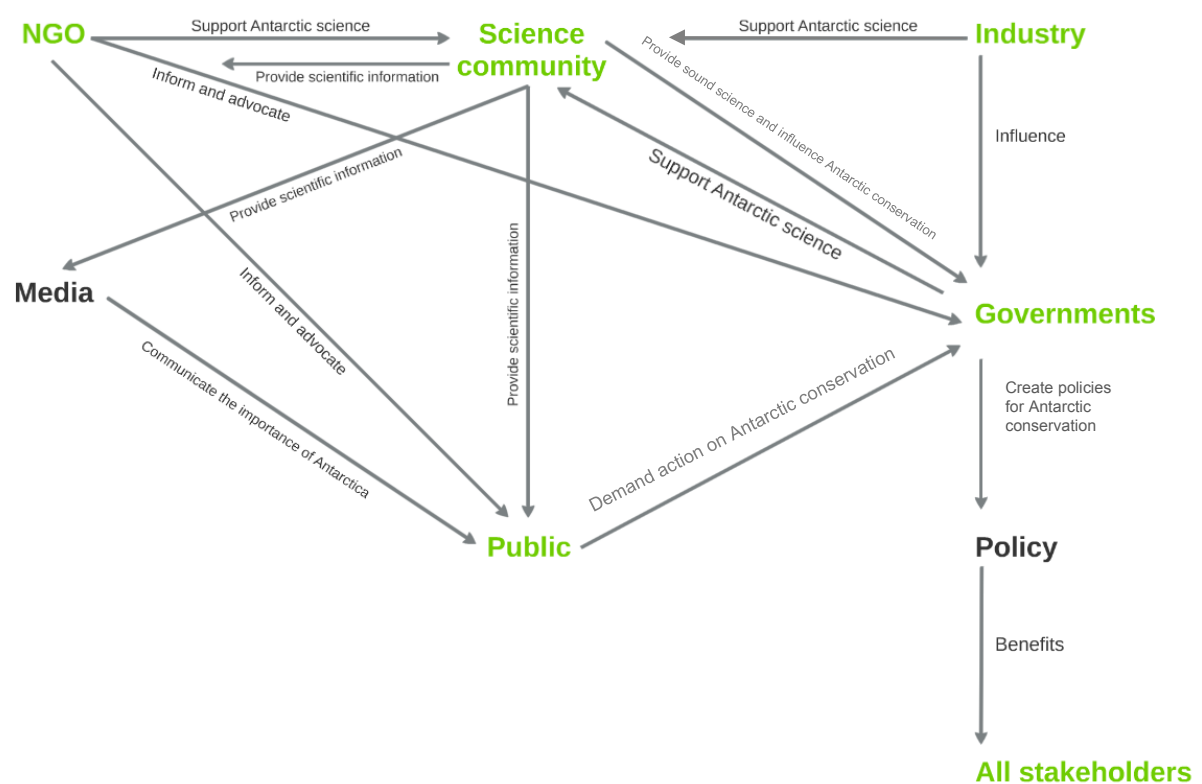


Figure 7.1 Antarctic stakeholders and their roles in Antarctic conservation as perceived by research participants

An example of the connections between stakeholders shown in Figure 7.1 sees the science community, NGOs and the media providing Antarctic conservation related information to the public, who then demands action on Antarctic protection to Governments involved in the ATS. The governments receive pressure from the public and NGOs to act on Antarctic protection and receive scientific evidence from the science community to make informed decisions on Antarctic matters. Industry and the science community also use their influence on governments to forge action on Antarctic protection. These latter steps result in governments involved in the ATS to create policies for Antarctic conservation that in turn benefit all key Antarctic conservation stakeholders. In this

case, all stakeholders can be seen as relating and complementing each other for the betterment of Antarctic conservation. However, it was revealed in the present study that the roles and connections shown in this example do not always operate this way, as external factors and pressures on different stakeholders affect their roles on Antarctic conservation.

Polk (1998) offered an important platform to study Antarctic stakeholders in this research study. Although Polk's (1998) intent was not to create a comprehensive list of Antarctic stakeholders and their interests, research participants' views on Antarctic conservation made Polk's (1998) classification of stakeholders and interests seem narrow. Survey participants and interviewees generally agreed with Polk's (1998) list of Antarctic stakeholders and their interests, but presented a wider view on their interests in Antarctica. Perhaps this outcome relates to the fact that participants were asked to comment on Antarctic conservation stakeholders rather than Antarctic stakeholders. Nevertheless, two additional Antarctic conservation stakeholder groups were included by research participants, these being the public and Antarctica's wildlife. The identification and inclusion of these two groups seem significant as they will be the most affected by changes in the environmental condition of Antarctica, and highlight the importance of Antarctica as a global commons.

7.2.2 Key challenges and issues facing Antarctic conservation

The second aim of this study was to identify key challenges and issues facing Antarctic conservation. Overall, survey participants' and interviewees' views on present and future challenges facing Antarctic conservation were like those identified in the literature review; though interviewees provided a much more detailed account of Antarctic issues and presented some conservation challenges not previously identified in the review of literature. Interviewees expanded greatly on the matter and provided a high level of detail on their concerns on Antarctic conservation that were presented in Chapters 5 and 6.

Interviewees' and survey respondents' knowledge on Antarctic conservation issues is perhaps not surprising considering participants' demographics - highly educated individuals with many years of involvement in Antarctic matters and forums- suggesting a cohort of individuals interested on Antarctica's current affairs.

As well as commenting on a range of Antarctic conservation related issues, survey respondents and interviewees proposed a number of solutions that have been presented in detail in the previous three chapters.

Chown et al. (2012) identified many of the challenges facing Antarctic conservation stemming from growing pressures on the Antarctic environment, namely pressure from growing interest in its resources, increasing human activities in the area and impacts from global systems. Survey

respondents and interviewees acknowledged these challenges, which are discussed in the following sections under three themes: direct human impacts, indirect human impacts and Antarctica's governance system.

7.2.2.1 Challenges facing Antarctic conservation from direct human impacts

Identified key challenges facing Antarctic conservation from direct human impacts stemmed from the main activities in the Antarctic, these being science and logistics, tourism and fishing. Survey respondents and interviewees also mentioned the potential for mining activities as a challenge effecting and affecting Antarctic conservation. In an effort to compile the identified challenges and potential solutions to these issues, Table 7.3 was created. The first column states the activity source of the challenge, the adjacent column lists the challenges and the last column shows proposed solutions as identified by interviewees and survey respondents.

Table 7.3 Antarctic conservation challenges relating to direct human impacts on the Antarctic environment, and proposed solutions as perceived by survey participants and interviewees

Activity	Identified challenges facing Antarctic conservation	Proposed solutions
National Antarctic Programmes	<ul style="list-style-type: none"> - Increased direct human impacts on the Antarctic environment from an increase in science activities - Pollution from bases - Proliferation of bases - Need to increase science efforts and at the same time reduce environmental footprints 	<ul style="list-style-type: none"> - Increase and encourage collaboration between states, NAPs and NGOs - Share resources with other states/NAPs (e.g. spaces on research ships) - Experiment and promote alternative ways of doing science (e.g. remote sensing technology) - Implement modern and efficient building technologies and energy production in new bases - Upgrade and adapt to modern energy production and building technology in existing bases - Clean up the historic pollution from bases - Allocate adequate resources to NAPs to run bases and programmes that are compliant with the Environmental Protocol - Reassess the criteria for becoming a consultative member to the AT
Tourism	<ul style="list-style-type: none"> - Increase in visitation numbers - Increased risk of maritime accidents - Increased risk of affecting sensitive ecosystems and wildlife should a maritime accident occur - Increased risk of maritime accidents as ice melts opens new pathways 	<ul style="list-style-type: none"> - Restrict visitor numbers - Increase binding controls over tourism - Establish better protected area management networks - Add more designated landing areas for tourists - Place stronger tourism guidelines through the CEP and ATCM

	<ul style="list-style-type: none"> - Management of tourism diversification - Impacts on wildlife and ice free areas from an increase in tourism visitation over summer months - Protection of wilderness areas 	<ul style="list-style-type: none"> - ATCM and CEP to address diversification of tourism - ATS to address wilderness protection
Fishing	<ul style="list-style-type: none"> - Increased fishing interests in the Southern Ocean - Pressure on Antarctic food webs from an increase in fishing - Increased number of vessels interested in fishing in the Southern Ocean and the risks associated with a potential increase in low cost fishing vessels in the area - Pollution from rubbish disposal methods and fishing practices - Countries and fleets not adhering to fishing regulations - Monitoring and enforcement of fishing regulations - Effects of pollution should a fishing vessel disaster occurs - Illegal, unregulated and unreported fishing 	<ul style="list-style-type: none"> - Further protection of the Southern Ocean - Better management and protection of the Southern Ocean - Strengthen CCAMLR - Place wildlife protection mechanisms - Developments in science to improve fisheries management
Natural resource exploitation and exploration (e.g. minerals, hydrocarbons, water)	<ul style="list-style-type: none"> - Potential for natural resource extraction - Pressure on the ATS to allow exploration and or extraction of mineral and hydrocarbon resources in the future - Countries with commercial aspiration acceding to the AT - Parties to the AT not holding the same conservation values for the Antarctic - Narrow difference between science exploration and mineral exploration - Popular misconception that the Protocol expires in 2048 - Uncertainty and speculation over what resources exist in Antarctica 	<ul style="list-style-type: none"> - Strengthen the ATS - Impose a complete ban on mineral activity in Antarctica so that it is not explored, studied or prospected for mineral or genetic resources - Set conservation standards, objectives and targets to be achieved so that conservation values do not erode over time - Find alternatives to energy production as less dependence on hydrocarbons will lessen pressure to extract them
National Antarctic Programmes, tourism and fishing industry	<ul style="list-style-type: none"> - Introduction and establishment of invasive species 	<ul style="list-style-type: none"> - Implement tough biosecurity controls - All NAPs to implement the same biosecurity controls - Rapid and appropriate application of ATS conservation tools

With regard to the challenges affecting Antarctic conservation from NAP operations, interviewees' opinions were closely aligned to those of Tin et al. (2009) and are summarised in Table 7.3. The only challenge addressed by interviewees and not identified in the studied literature was the need to

reduce environmental footprints whilst increasing Antarctic science efforts. Solutions to these challenges, including the latter, were identified by interviewees and listed in Table 7.3. For example, a proposed solution to the previously identified challenge was to implement remote sensing technology²⁰.

Identified challenges from direct human impacts included those of the tourism sector. Survey respondents and interviewees identified a range of challenges relating to this industry (listed in Table 7.3), most which were previously identified in chapter 2 (see for example Convey et al., 2012; Jabour, 2014; Lamers et al., 2008; Liggett et al., 2011; Stewart & Draper, 2008). The increased risk of maritime disasters as ice melts opens new pathways in the Peninsula region, and protection of wilderness areas were also identified by interviewees as challenges facing Antarctic conservation.

With regard to the fishing industry and challenges facing Antarctic conservation stemming from it, interviewees identified a much more comprehensive range of issues than those mentioned in Chapter 2. This could be in part due to the involvement of some very knowledgeable interviewees on Antarctic marine living resources and fishing industry, some who are involved in CCAMLR discussions. Although the management of fisheries in the Southern Ocean was praised by many interviewees, conservation challenges relating to fishing in the area were in part related to CCAMLR. Issues in relation to illegal, unregulated and unreported fishing, as well as challenges arising from monitoring and enforcement of regulations were some of the challenges mentioned. An increase in fishing interests in the Antarctic and the potential increase of sub-standard fishing vessels in the area which could lead to maritime disasters were also identified as concerns. Mechanisms to address some of these issues were identified, including the establishment of MPAs, strengthening CCAMLR regulations and the development of science for bettering fisheries management.

Finally, the potential for extraction of a range of natural resources – namely metals, minerals, hydrocarbons and water - was identified as a great conservation challenge for Antarctica into the future. The potential for exploration and future exploitation of natural resources was noted by Chown et al. (2012) who see it as a possibility as global demand for resources increases and technological advancements continue. All but one identified challenge relating to this issue were associated with matters of the ATS, including misconceptions of the moratorium on mining expiring in 2048, and states with commercial interests in the Antarctic joining the system.

²⁰ Barriers, strategies and the feasibility of applying some of these solutions proposed by interviewees are beyond the scope of this study.

7.2.2.2 Challenges facing Antarctic conservation from indirect human impacts

Although there were many challenges related to direct human impacts on the Antarctic environment, impacts and challenges from indirect human impacts were perceived by survey respondents and interviewees with much greater importance and magnitude. Climate change and its varied effects on the Antarctic, such as ocean acidification, ice melt and sea level rise, were mentioned by survey respondents and interviewees as of most concern. These concerns mirrored those of Chown et al. (2012) and Antarctic and Southern Ocean Coalition (2012) which were described in Chapter 2.

Climate change and its auxiliary effects on the Antarctic environment were the main cause of concern in relation to indirect human impacts and were referred to as the main challenge facing Antarctica in the long term. This view was partly due to climate change's ability to affect large areas and the difficulty in controlling it. Consequences of climate change on Antarctica and its interrelated sea level rise will affect people living in low lying areas worldwide and will create climate instability altering weather patterns and food production. These points described by Rodger (2013) and Rosenzweig et al. (2001) were mentioned by a number of interviewees who used them to emphasise the importance of keeping Antarctica as environmentally stable as possible. It was also noted that action from governments and people all over the world is needed to overcome these challenges. The importance of acting on climate change was noted by a couple of interviewees who emphasised that the only way to truly protect the Antarctic is to address climate change.

Impacts of climate change not identified in the review of literature but elaborated on by interviewees included opportunities for alien species introduction and establishment, as well as geophysical changes in the Peninsula. Warming in the Peninsula exposing new and uncharted maritime routes, and impacts on wildlife from changes in their ecosystems were mentioned as challenges facing Antarctic conservation from climate change. The latter point was addressed by Rogers et al. (2012) who noted that the ecological balance of the Antarctic will be altered due to sea level rise.

In an effort to compile key points made by interviewee and survey respondents on challenges facing the Antarctic from indirect human impacts, Table 7.4 was created. The table lists Antarctic conservation challenges relating to climate change as well as solutions effecting those challenges as proposed by interviewees. Some of the proposed solutions for addressing climate change related directly to the Antarctic sphere, such as asking ATCPs to act on climate change, and others were very broad and global related, such as the reduction of carbon emissions.

Table 7.4 Antarctic conservation challenges relating to indirect human impacts on the Antarctic environment, and proposed solutions as perceived by survey participants and interviewees

Challenges facing Antarctic conservation	Proposed solutions
Climate change and its auxiliary effects on the Antarctic (e.g. ice melt, sea level rise, ocean acidification, warming in the Peninsula area, opportunities for invasive species establishment, etc.)	<ul style="list-style-type: none"> - ATCPs to have a stance and act on climate change - Place a combined effort from individuals, NGOs, governments, industry, Antarctic community as well as ATS to combat climate change and reduce carbon emissions - Antarctic community to be vocal about climate change - Bring focus to Antarctic conservation - Change environmentally degrading behaviour - Include industry in finding solutions for climate change - Antarctic community to advocate for Antarctic protection from climate change
Protection of Antarctic ecosystems from climate change	<ul style="list-style-type: none"> - Protect Antarctic ecosystems so that they are able to adapt and respond to changes in the environment

7.2.2.3 Challenges facing Antarctic conservation from Antarctica's governance system

Identified challenges facing Antarctic conservation that derive from the Antarctic's governance system were presented in Chapter 6. Table 6.1²¹ listing the ATS's strengths and weaknesses as identified by interviewees. Referring to ATS's weaknesses is relevant, as many of the challenges facing Antarctic conservation are related to the system's weaknesses. Most of the strengths of the ATS as summarised in Table 6.1 were previously noted in the review of literature, yet most of its weaknesses were solely expressed by the interviewees and identified as challenges to Antarctic governance and or Antarctic conservation.

In examination of Table 6.1 it can be observed that the strengths in the system mainly relate to the ATS agreements themselves, whereas the weaknesses relate to the way the system operates. Some of the listed strengths are clauses of the AT agreement, including devoting Antarctica to peace and science, placing territorial claims on hold and the fact that its membership is open for states to accede. Conversely, the weaknesses related to matters such as joining states having commercial or geopolitical interests in Antarctica, the ATS's inability to respond rapidly to raising problems and a disconnect from diplomats and the Antarctic. These matters relate directly to issues of international relations and not with the ATS's agreements themselves.

One of the main identified weaknesses facing Antarctic conservation relates to the ATS's consensus system and the difficulty of reaching consensus, as well as its limited capacity to react rapidly to

²¹ See Appendix 6.1 to see Table 6.1.

pressing matters. The case of CCAMLR members not agreeing on proposed marine protected areas in the Southern Ocean was given as an example of the consensus system stalling conservation in the Antarctic, as was noted previously by Brooks (2013). Addressing the issue of designation of representative marine and terrestrial protected area networks will no doubt pose a challenge in the years to come considering barriers presented by the consensus decision making model. Moreover, difficulty in reaching consensus was only expected to increase as more countries became consultative members to the AT. The increase in consultative members was not the only perceived difficulty for reaching consensus into the future, but also the fact that states bring with them sets of values which may differ to those brought along by others on Antarctic conservation matters. Interviewees made specific mention of South American and Asian countries valuing commercial and resource extractive values above others on the Antarctic. This concern was not identified in the literature review, but it has been documented by scholars (see for example Brady, 2013a; Friedheim & Akaha, 1989; Hemmings, 2012). Interviewees proposed that extractive and commercial values differ significantly to those agreed on through the ATS agreements. It was suggested that having states party to the AT who do not share the same values of protection for the Antarctic creates mistrust between states, making the management of the Antarctic more complex. Although many issues regarding the consensus decision making process were raised, most interviewees believed it is worth continuing, as ultimately, all Parties move together on the issue.

Other issues relating to the political and multinational nature of the AT relate to states' placing national interests ahead of the common good. Countries with, or with the right to, territorial claims were viewed as exerting presence through their NAP and conservation objectives in the region. Some countries were also perceived as letting international relations affect progress on Antarctic matters. The example of countries blocking the designation of MPAs in the Southern Ocean was given. The commercial industry influencing countries' decisions on Antarctic affairs was also raised as an issue. It was proposed that the only way to truly move forward on Antarctic conservation affairs is to eliminate the territorial claims as well as to remove "the politics of the world from the politics of Antarctica" (G4). This is a challenge the ATS is likely to face for years to come.

A further challenge relating to a growing multicultural membership relates to the fact that the ATS was seen by interviewees as an agreement between western states, and as other countries, from various backgrounds, get involved it is important to keep the agreements relevant to all Parties. It was suggested that involving and listening to all Parties to the ATS is of great importance for creating a sense of ownership over issues and solutions facing the Antarctic. To this effect, diplomacy and diplomats will no doubt play a significant role in maintaining good relations between Parties to the ATS for the benefit of Antarctic conservation into the future.

7.2.3 Antarctic futures

Survey respondents and interviewees had slightly different views about what the future may hold for the Antarctic. No concrete views for Antarctic conservation were identified, but many concerns were expressed.

Survey respondents and interviewees' main concerns for the future conservation of the Antarctic were similar to those expressed by Chown et al. (2012) and related to the impacts of climate change, potential for further exploitation of natural resources and effects on the environment from the growth in the tourism and fishing industries. Many interviewees elaborated on the severity of impacts from climate change being felt differently across the Antarctic. The Peninsula was mentioned as the area which will be most impacted by climate change. Rising temperatures are expected to effect ice shelves and glaciers, wildlife distribution and create new uncharted landscapes.

Many questions in the survey and in the interviewee process referred to predicted conditions for the Antarctic by the year 2048. This was in order to gather participants' perspectives on potential future scenarios for Antarctic conservation by the time the rules around modifications or amendments to the Protocol could change. Although the date could technically be irrelevant - as modifications to the Protocol can be enacted before then – misconceptions about the real significance of that date were revealed, as some interviewees and survey participants saw the year 2048 as the Protocol's expiry date. Some interviewees also believed the Protocol and AT could be challenged by the year 2048, particularly if Consultative Parties do not share the same conservation values for Antarctica by then.

When faced with the question if the Antarctic environment will change in the medium term (30-40 years from now) just over half of the survey respondents expect it to remain similar, whereas the majority of interviewees expect it to change. All interviewees who believed the Antarctic environment would change based their predictions on the belief that the effects of climate change would be observed in that timeframe.

Only a small percentage of survey respondents and interviewees forecasted the condition of Antarctica's environment to deteriorate or remain unchanged, respectively. Changes expected to happen in the Antarctic as mentioned by interviewees were: changes in the region's ecology, distribution of species, ice coverage and exotic plant colonization. Survey respondents believed there was a high likelihood of an increase in human activity in places not currently visited on the continent and of an increase in tourist numbers by the year 2048.

Interviewees as well as survey participants were clear about the need to protect Antarctica, its ecosystems, wildlife, landscapes and wilderness; and both, interviewees and survey respondents, felt

positive about the designation of MPAs in the future. Yet, they were disappointed at the lack of effort placed in protecting wilderness areas and creating a representative network of terrestrial protected areas. These concerns have been documented by scholars (see for example Shaw, Terauds, Riddle, Possingham, & Chown, 2014; Terauds et al., 2012; Tin & Hemmings, 2011), but were not identified in the literature of conservation challenges in Chapter 2. Moreover Liggett et al. (2014) warn that the current environmental practices and governance systems are not equipped to adequately protect the Antarctic environment with the current environmental challenges facing the area.

Interviewees' gave their opinions on what is needed to protect the Antarctic into the future, including addressing governance issues within the ATS, apply modern conservation science tools, address climate change and engage with the wider public on the importance of Antarctic conservation. Table 7.5 summarises the interviewees' opinions on the matter.

Table 7.5 Interviewees' opinions on what is essential to securing the future conservation of the Antarctic

Areas needing to be addressed	Matters needing to be addressed
Modern conservation science	<ul style="list-style-type: none"> - Apply modern conservation science to Antarctica - Increase scientific research to provide information to create a better protected area network
Climate change	<ul style="list-style-type: none"> - Need to address and reduce human induced climate change and climate variability
ATS	<ul style="list-style-type: none"> - Need for parties to the AT to obey and comply with the Treaty, Protocols and agreed measures - Maintain dialogue between states that are party to AT - Improve communication within the ATS (e.g. between CCAMLR and CEP) - Strengthen the ATS to rapidly adapt and respond to arising issues - Remove the politics of the world from the politics of Antarctica - Political will from all parties to the ATS
Public engagement	<ul style="list-style-type: none"> - Create awareness of the importance of the Antarctic to the world - Communicate and educate people on the global importance of Antarctica - Develop respect for the environment - Gain "the good will of people" to protect Antarctica

Survey respondents and interviewees from all stakeholder groups expressed uncertainty towards the future of the Antarctic but felt either neutral or positive about the future conservation of the area. Comments were made about changes taking place that will help Antarctic conservation, including that there is growing interest and good will to protect the Antarctic.

7.2.4 Contemporary common pool resource management frameworks

One of this study's aims was to analyse the data gathered in the context of contemporary common pool resource management frameworks. Hardin's (1968) 'tragedy of the commons' and Ostrom's (1990) contrasting common pool resource management frameworks were the frameworks chosen for this analysis.

7.2.4.1 Key stakeholders in Antarctic conservation

Antarctic's numerous stakeholders hold a range of roles and interests in the area. One interviewee noted that stakeholders are associated to the sources of pressure on the Antarctic, another interviewee spoke of stakeholders wanting something out of their involvement. At the root of Hardin (1968) theory is the proposal that rational beings will always seek to maximise their gain and that common resources will be over used if not privatised or under government ruling. On the other hand, Ostrom (1990) proposed that it was possible for people to organise themselves and manage commons for the benefit of everyone.

Antarctica's governance arrangement could be seen as resembling that of Ostrom's (1990) theory, as the management of this large commons is driven by a group of states with an interest in its protection, conservation and science values. The initial stakeholders of Antarctica and its governance regime were states and scientists who participated in a yearlong scientific programme in and around the Antarctic (Antarctic Treaty Secretariat, 2011). Governments and the scientific community have been active players in the conservation of Antarctica since the inception of the Treaty. States' involvement prior to the signing of the AT was associated to territorial claims that were mentioned and placed on hold in the AT (The Antarctic Treaty, 1959). After agreeing on the AT, claimant states have continued to have a presence in Antarctica through their National Antarctic Programmes and have collaborated to govern and study the Antarctic. The AT calls for holding no activities or acts that could be seen as asserting territorial sovereignty over Antarctica, and states have agreed to this (The Antarctic Treaty, 1959). However, as described by interviewees and survey respondents, some states continue to exert their presence in Antarctica and use their science programmes as a way to maintain their connection to the Antarctic with an underlying national interest. States have also used their voting powers to stall progress in Antarctic conservation, undermining previously agreed upon measures, such as protecting a representative example of marine ecosystems, habitats and biodiversity (CCAMLR, 2011). Such behaviour undermines the basis of collaboration and conservation set in the ATS agreements which these states have acceded to. They also raise warning bells, as some states behave in a manner that is more in line with Hardin's (1968) self-interest paradigm rather than Ostrom's (1990) call for collaboration for mutual benefit - values which the ATS is based on.

Scientists and the scientific community have also had a long-term affiliation with the Antarctic and were identified by survey participants, interviewees and the literature, as key stakeholders in Antarctic conservation. This study proposed that scientists' role in Antarctic conservation is to advocate, influence and provide information for policy-making for Antarctic conservation. Science is at the core of the ATS, and the success of the International Geophysical Year helped cement the foundations for collaboration for the protection of the Antarctic through the AT (Antarctic Treaty Secretariat, 2011). Science's role in the ATS is pivotal, as science is a key aspect of the AT which calls for "freedom of scientific investigation", "cooperation" and exchange of "scientific observations and results" (The Antarctic Treaty, 1959).

Although scientists were not seen as primary advocates for Antarctic conservation by interviewees, the science community is actively involved in Antarctic conservation. The Scientific Committee on Antarctic Research is present as an Observer at ATCM providing delegates with "objective and independent scientific advice" on scientific matters affecting the management and conservation of the Antarctic (Scientific Committee on Antarctic Research, 2016a). The Scientific Committee on Antarctic Research's report on their involvement at the last ATCM and CEP meetings lists their submission of working, information and background papers, as well as numerous agreements and commitments to the ATS forum. Most of SCAR's engagement and commitments with the ATCM and CEP relate to environmental and conservation issues, such as providing updates on Antarctic Climate Change and Environment reports, supporting the Environments Portal project, providing information regarding the outcomes of the Monaco Assessment on biodiversity, and providing information on the impact of underwater noise on marine biota (Scientific Committee on Antarctic Research, 2016a). Through their scientific and advisory role in the ATS and other avenues, such as the Monaco Assessment, the Scientific Committee on Antarctic Research is involved in Antarctic conservation affairs.

In 2003 Dietz et al. (2003) proposed that three of Ostrom's (1990) principles for robust CPR institutions are of utmost relevance to address problems in larger commons. These are: analytic deliberation, nesting and institutional variety (see Figure 2.1 in Chapter 2). Analytic deliberation is about creating dialogue between involved CPR users, scientists and interested people on environmental systems with adequate information. This dialogue process provides valuable information, builds trust between parties and can address conflict "well enough to produce consensus on governance rules" (Dietz et al., 2003, p. 1910). The present study proposes that the Antarctic science community is a key player in the ATS and in the governance of the Antarctic as it can act as a cornerstone for promoting dialogue and problem solving.

Although scientists and the science community are involved in Antarctic conservation, they are the group representing the main activity on the continent today (Secretariat of the Antarctic Treaty, 2011), hence they are the source of many of the direct impacts on the Antarctic environment. There is more science based activity in the Antarctic than ever as the number of acceding states increases. The First SCAR Antarctic and Southern Ocean Horizon Scan has also called for more science to be performed as the Antarctic holds clues to understanding this warming world (Kennicutt, Chown, Cassano, Liggett, Peck, et al., 2014). This will inevitably lead to greater scientific and logistics presence in the Antarctic and a growing human footprint. The science community must be careful to not impact heavily on the Antarctic whilst increasing their scientific efforts.

Another identified stakeholder in Antarctic conservation was the tourism industry. The tourism industry was praised by interviewees for their commitment and actions for Antarctic protection, which were also identified as crucial to their business success, as their business depends on taking tourists to a seemingly pristine place. The tourism industry is regulated primarily by IAATO, a self-regulated organisation founded 25 years ago with the aim of advocating and promoting safe and environmentally responsible travel to the Antarctic (IAATO, 2016b). The International Association of Antarctica Tour Operators' robustness as a CPR management institution was analysed by Haase, Lamers, and Amelung in 2009. They found that IAATO is a robust institution but that its institutional structure may be compromised by an increase in tourism operators and tourist numbers. IAATO is a good example of a group of individuals with an interest in sustainably using a CPR and organising themselves in order to achieve this. It is proposed here that IAATO contributes to Ostrom's (1990) principles of "analytic deliberation", "nesting" and "institutional variety". As IAATO is involved in the dialogue with ATPC and environmental organisations ensuring good management and regulation of tourism in Antarctica (IAATO, 2016b) and contributes to the layers of institutional arrangements as well as contributing to institutional variety for managing one of the main activities in the Antarctic.

Prior to the signing of the AT, marine resource extraction was the most prominent activity in the Antarctic. In this period no regulations were in place and the Southern Ocean's marine living resources were extracted at will. Hardin (1968) specifically mentions "the freedom of the seas" and refers to the grim outcome that whales and fish species face when harvested under no regulation. The Southern Ocean was a clear example of Hardin's (1968) claims, where seals and whales were harvested to almost extinction. Although commercial whaling and sealing no longer take place, the fishing industry is actively involved in commercial harvesting of marine species which is now regulated through CCAMLR. Interviewees identified the fishing industry as a stakeholder in Antarctic conservation as they believed the industry needed sustainable and renewable fish stocks. The fishing

industry has been actively involved in CCAMLR and was noted by an interviewee from the fishing industry, as working alongside states for the creation of marine reserves in the Southern Ocean. However, it was noted by interviewees that not all fishing fleets and fishing vessels operate in the same manner and that illegal, unregulated and unreported fishing exists. These activities create concern as their attitude embeds selfishness and resembles the behaviour described by Hardin (1968), which leads to the 'tragedy of the commons'. It was assured by a number of interviewees that CCAMLR's fishing regulations are extensive and that the industry is well regulated.

The findings from the present study suggest that the fishing industry is now an active player in the Antarctic and contributes to the analytic deliberation principle for robust CPR governance institutions as it participates in CCAMLR's forum, contributing to the discussion of governance and rules of the Southern Ocean.

Another identified stakeholder in Antarctic conservation are NGOs. Non-Governmental Organisations have been involved in Antarctic conservation for many years and were particularly active at the time of the negotiations of the Convention on the Regulation of Antarctic Mineral Resource Activities in the late 1980s. Although interviewees believed their active presence as Observers in the ATS forum is not as active as it once was, NGOs were still involved in ATCM and CCMLR as key advocates for Antarctic conservation. In doing so they are also contributing to the analytic deliberation principle for robust CPR governance institutions.

Finally, the public as well as Antarctica's biodiversity were identified as key stakeholders in Antarctic conservation. Their stake in keeping the Antarctic environment stable is critical, as they will be the groups most affected if Hardin's (1968) grim outcome on management of commons becomes a reality in the Antarctic. The public and Antarctica's biodiversity are represented in the ATS through governments and NGOs. It was mentioned by interviewees that one of the key actions for protecting Antarctica into the future is to communicate the value of the Antarctic to the people of the world. Interviewees hoped that once the public understood the importance of protecting this value, pressure will be placed on governments to work together to overcome the challenges facing the Antarctic and the ATS for the benefit of the Antarctic and everyone on Earth.

7.2.4.2 Challenges facing the Antarctic

Ostrom et al. (1999) state that the management of "large scale resources that depend on international cooperation" are among the most difficult to manage and that collaboration is the essence of a successful management system. The authors also presented a number of challenges facing the global commons and their management, all of which mirror those identified by interviewees as challenges facing the Antarctic and its governance system. Ostrom et al. (1999) state that having a larger number of participants in a CPR makes it harder to agree on rules and enforce

them. The involvement of diverse cultures and the difference in values were also noted as a challenge in managing global CPRs as finding common ground and understanding becomes challenging. Global CPRs interconnectedness also make it challenging to govern, as policies that address concerns in one commons will impact others, hence the need for global collaboration. Issues of acceleration of change were also mentioned, problems and their sources are evolving rapidly and ways of managing them continuously change. To govern global commons, internationally agreed and voluntary assented treaties are needed; states joining at different stages allows for some states to affect resource management policies to their advantage. Finally, Ostrom et al. (1999) warn that we only have one planet to work with and we cannot afford to make mistakes. Although these challenges are not minor and can be seen as pointing towards a 'tragedy of the commons' scenario, Ostrom et al. (1999) believe lessons from successfully managed smaller CPR can be used as a starting point to address some of these challenges. In addition, Dietz et al. (2003) remind us that large-scale resources have been able to be managed successfully through international governance regimes, such as in the case of the Montreal Protocol on substances that deplete the ozone layer. Hence the successful management of global commons, such as Antarctica, is possible but it requires making hard decisions which are often made under uncertainty, and opposed interests and human values (Dietz et al., 2003).

Dietz et al. (2003) proposed five governance requirements to help address challenges particular to large commons and connect with the principles for robust CPR institutions (see Figure 2.1). The requirements are: provide necessary information, deal with conflict, induce compliance with rules, provide infrastructure and encourage adaptation and change.

To gather the views of Antarctic stakeholders on the institutional success of the ATS, survey respondents were asked a range of questions regarding Antarctic governance based on Ostrom (1990) principles for successful CPR regimes. Survey respondents responded in a very neutral manner to the statements (Chapter 4, Figure 4.5) implying neither great conviction on the performance of the ATS nor great disbelief. However, all responses under 50 in a scale from disagreement to total agreement (0=completely disagree to 100=completely agree) related to statements to do with the way the ATS operates. The statements related to enforcement of sanctions upon violation of environmental regulations, effective mechanisms for conflict resolution between ATPs, the ATS's ability to adapt to change and following of regulations and guidelines of the Protocol in day-to-day operations in Antarctica. Interviewees also alluded to similar issues relating to the way the ATS operates, showing a relationship of thought between survey respondents, interviewees as well as the literature (See for example Convey et al., 2012; Hughes, 2010; Liggett et al., 2014).

Out of the five governance requirements proposed by Dietz et al. (2003) to strengthen CPR institutional robustness, three were reflective of issues facing the ATS as identified by survey respondents: dealing with conflict, rule compliance and adaptation and change. This gives an insight into matters that the ATS can address to overcome some of the challenges it faces and become a stronger CPR governance institution.

It was noted that the challenges facing Antarctica's governance are reflective of issues of large CPRs. Although the barriers for success are not minor and interviewees as well as survey participants identified areas for improvement within the ATS to become a stronger CPR governing body, successful management of large commons can and have been attained. Identifying and acknowledging weaknesses and challenges of the system are the first steps to addressing them and moving forward. Ostrom et al. (1999) reminds us that not addressing these challenges is not an option, as global commons do not have replacements. These challenges must be acted upon in order to avoid the tragedy that Hardin (1968) warns us about.

7.2.4.3 Future scenarios

Interviewees and survey respondents expressed concerns over the future of the Antarctic. Impacts from climate change, the potential for exploitation of minerals and other natural resources as well as effects from a growing tourism and fishing industry, were viewed as placing pressure on the Antarctic environment and creating an uncertain future for the area. There were also speculations towards the political and governmental future of the Antarctic beyond the year 2048. Moreover, challenges relating to states' diverse values on the Antarctic, as well as the ATS's operation and political nature hindering Antarctic conservation initiatives were identified. In addition, and although this study did not propose to fully assess the institutional robustness of the ATS, the ATS meets a number of Ostrom's (1990) principles for robust governance institutions, particularly those proposed by Dietz et al. (2003) as relevant for large scale resources; thus suggesting that the Antarctic governance structure is set up to address its current challenges.

While the future of the Antarctic is uncertain, the challenges it faces have been identified and willingness to address these has already been shown by a range of stakeholders working and advocating for its protection. Dietz et al. (2003) show us that management of large commons under international governance regimes can be successful and that Hardin's (1968) 'tragedy of the commons' can be avoided. Positive future scenarios for Antarctic conservation will depend on our ability to address the identified weaknesses of the system. However, as identified by Liggett et al. (2014) and Dietz et al. (2003) it will require the disposition and good will of everyone on Earth to address these issues.

7.3 Conclusion

The relevance of the present study lies in its timeliness as the Antarctic faces multiple and unprecedented challenges as direct and indirect impacts on the area create uncertainty over its future conservation. This study suggests that by gathering the perspectives of Antarctica's stakeholders in Antarctic conservation from one of the countries involved in its governance, the stakeholders' collective views on Antarctic conservation can be articulated. If this contributes to a growing awareness of Antarctic conservation concerns, the research has the potential to influence Antarctica's environmental decision making.

The significance of this empirically-based project stems from contributions of a methodological and theoretical stance. The research engaged a comprehensive range of New Zealand Antarctic stakeholders using qualitative and quantitative research methods in order to gather the most complete understanding of their perspectives on Antarctic conservation possible, collecting both breadth and depth of information, something never believed to have been done at this scale before in New Zealand.

The project revised Polk's (1998) classification of Antarctic stakeholders and proposed the inclusion of the general public and Antarctica's flora and fauna as key stakeholders. It also identified a range of conservation challenges facing Antarctic conservation from direct and indirect human impacts, as well as challenges stemming from its governance system. Climate change was noted as the most important challenge facing Antarctica now and into the future, whilst challenges related to the ATS's operations and political nature were seen as the greatest weakness of Antarctica's governance system.

The future conservation of Antarctica was discussed, yet no clear predictions were identified, although mounting "pressure" on its environment was viewed as a key theme into the future. Finally, the data gathered was analysed in the context of contemporary CPR management frameworks. The analysis concluded that there are reasons for optimism for Antarctica's future and that Hardin's (1968) 'tragedy of the commons' could be avoided in the Antarctic, as Antarctica's governance structure is well set up and meets many of Ostrom's (1990) principles for robust CPR institutions, including those proposed by Dietz et al. (2003) as fundamental for managing large commons. Yet, the ATS needs to be more adaptable, effective, and able to respond to growing internal and external challenges and pressures in order to continue to protect the Antarctic environment for years to come.

Gathering the views of all New Zealanders was out of reach for this study. However, it is proposed that a study involving the New Zealand public as a key stakeholder in Antarctic conservation would

greatly enhance the learnings from this research. Similarly, gathering the views from Antarctic stakeholders from other states involved in Antarctic governance would create a more complete picture of the current thinking on Antarctic conservation and could help identify concerns, and potential solutions perceived by stakeholder groups from other states. Furthermore, gathering the views of Antarctic stakeholders at a future date would provide a good comparison of changes in stakeholder perspectives on Antarctic conservation through the years.

Overall, it is hoped that this research can contribute to the literature on Antarctic stakeholder analysis, Antarctic conservation and resource management, and more importantly to the future conservation of the Antarctic.

Since the data gathering process ended, a number of social, cultural and political developments showing a growing will to protect Antarctica and the global commons have been observed. In 2015 Pope Francis released an encyclical calling for the protection of the global commons (Pope Francis, 2015). Later on that year a group of Antarctic and biodiversity experts released “The Monaco Assessment” highlighting key issues facing Antarctic conservation (all which have been identified in this study) and proposed actions to address them (Chown et al., 2015). One of the key outcomes of The Monaco Assessment is a proposed plan for action for protecting the Antarctic’s biodiversity into the future. This document is expected to be released in the later part of 2016 (Scientific Committee on Antarctic Research, 2016b). In 2016 Parties to the United Nations Framework Convention on Climate Change (UNFCCC) agreed, signed and ratified The Paris Agreement (United Nations Framework Convention on Climate Change, 2016a), an agreement to “accelerate and intensify the actions and investments needed for a sustainable low carbon future” (United Nations Framework Convention on Climate Change, 2016b).

In the same year and during the ATCM in Santiago de Chile, Consultative Parties to the AT adopted a resolution affirming their support for the mining ban under the Protocol and confirming their commitment to the prohibition of mineral resource activities in the Antarctic (Secretariat of the Antarctic Treaty, 2016). In addition the “Santiago Declaration on the Twenty Fifth Anniversary of the signing of the Protocol to the AT” was adopted (Secretariat of the Antarctic Treaty, 2016). The Declaration mentions a number of important challenges facing the ATS identified in this study and vowed their commitment to addressing them (Consultative Parties to the Antarctic Treaty, 2016). In September 2016 IUCN Members at the IUCN World Conservation Congress approved the motion of “Achieving representative systems of protected areas in Antarctica and the Southern Ocean”, encouraging and supporting further protection of the Antarctic (IUCN, 2016).

Lastly, and in direct relation to conservation matters raised in this research, CCAMLR’s Member countries have agreed to establish a 1.55 million km² MPA in the Ross Sea. This MPA aims to “provide

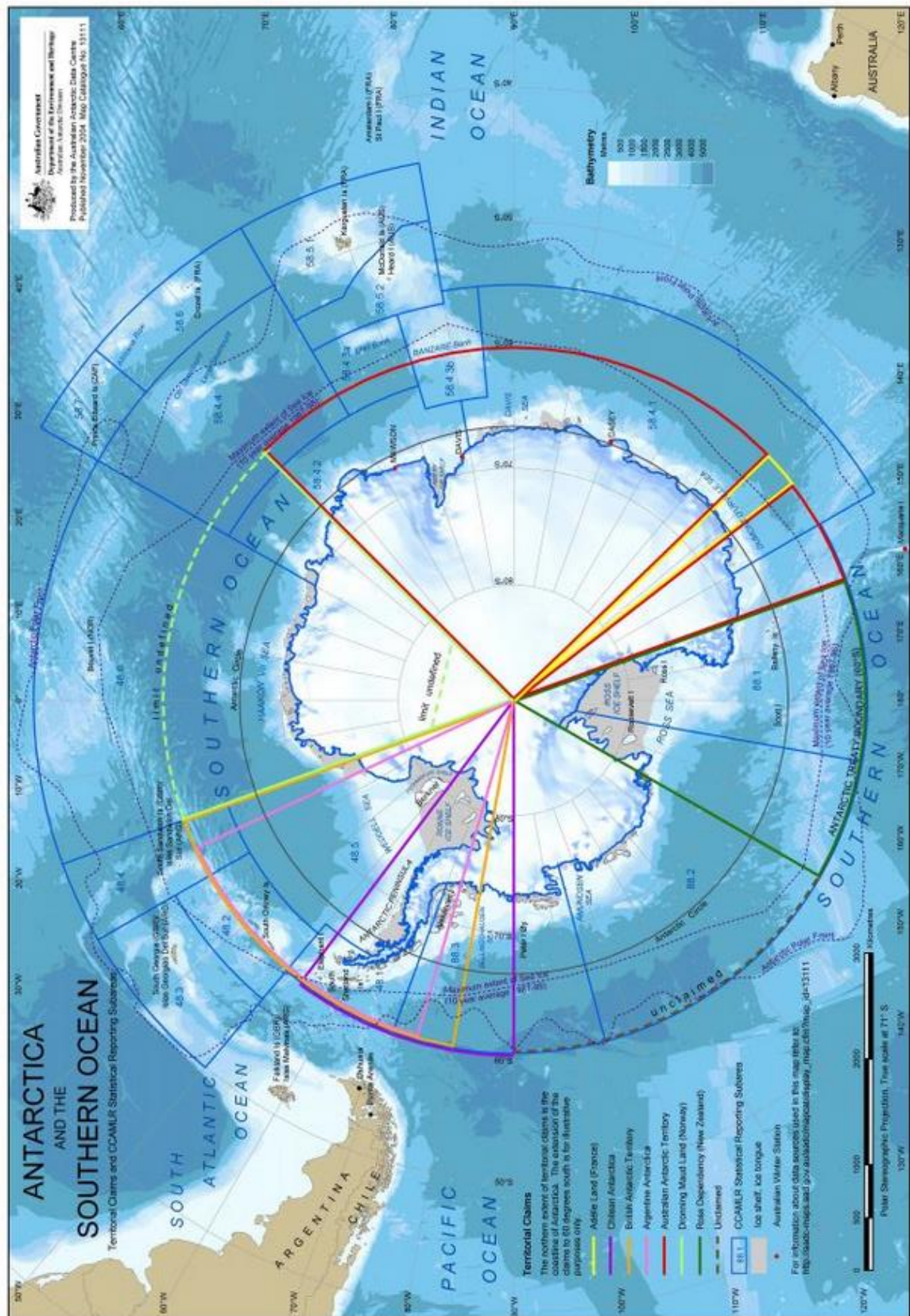
protection to marine species, biodiversity, habitat, foraging and nursery areas, as well as to preserve historical and cultural sites” by protecting it from human activities including commercial fishing, which will be prohibited in the area (CCAMLR, 2016). The MPA will come into force in December 2017, six years since it was first proposed and after much negotiation and collaboration between member states (CCAMLR, 2016).

All these developments are concrete evidence that there is growing political will to address some of the challenges facing Antarctic conservation. Steps for applying modern conservation science methods to Antarctica, an international agreement for combating climate change, commitment from ATCP to address some of their core issues and informing the public of the importance of protecting the global commons, are all solutions proposed by interviewees and survey respondents in this research for addressing the challenges facing Antarctica. The fact that the challenges are being acknowledged permits some cautious optimism for a positive future for Antarctic conservation.

Appendices

Chapter 2 appendices

Appendix 2.1 Map of Antarctica illustrating territorial claims.



Appendix 2.2 List of Consultative and Non-Consultative Parties to the Antarctic Treaty

Country	Entry into force	Consultative status	Environment Protocol	CCAS	CCAMLR
Argentina	23 Jun 1961	23 Jun 1961	14 Jan 1998	X	X
Australia	23 Jun 1961	23 Jun 1961	14 Jan 1998	X	X
Austria	25 Aug 1987				
Belarus	27 Dec 2006		15 Aug 2008		
Belgium	23 Jun 1961	23 Jun 1961	14 Jan 1998	X	X
Brazil	16 May 1975	27 Sep 1983	14 Jan 1998	X	X
Bulgaria	11 Sep 1978	05 Jun 1998	21 May 1998		X
Canada	04 May 1988		13 Dec 2003	X	X
Chile	23 Jun 1961	23 Jun 1961	14 Jan 1998	X	X
China	08 Jun 1983	07 Oct 1985	14 Jan 1998		X
Colombia	31 Jan 1989				
Cuba	16 Aug 1984				
Czech Republic	14 Jun 1962	01 Apr 2014	24 Sep 2004		
Denmark	20 May 1965				
Ecuador	15 Sep 1987	19 Nov 1990	14 Jan 1998		
Estonia	17 May 2001				
Finland	15 May 1984	20 Oct 1989	14 Jan 1998		X
France	23 Jun 1961	23 Jun 1961	14 Jan 1998	X	X
Germany	05 Feb 1979	03 Mar 1981	14 Jan 1998	X	X
Greece	08 Jan 1987		14 Jan 1998		X
Guatemala	31 Jul 1991				
Hungary	27 Jan 1984				
Iceland	13 Oct 2015				
India	19 Aug 1983	12 Sep 1983	14 Jan 1998		X
Italy	18 Mar 1981	05 Oct 1987	14 Jan 1998	X	X
Japan	23 Jun 1961	23 Jun 1961	14 Jan 1998	X	X
Kazakhstan	27 Jan 2015				
Korea (DPRK)	21 Jan 1987				
Korea (ROK)	28 Nov 1986	09 Oct 1989	14 Jan 1998		X

Malaysia	31 Oct 2011				
Monaco	31 May 2008		31 Jul 2009		
Mongolia	23 Mar 2015				
Netherlands	30 Mar 1967	19 Nov 1990	14 Jan 1998		X
New Zealand	23 Jun 1961	23 Jun 1961	14 Jan 1998		X
Norway	23 Jun 1961	23 Jun 1961	14 Jan 1998	X	X
Pakistan	01 Mar 2012		31 Mar 2012		X
Papua New Guinea	16 Mar 1981				
Peru	10 Apr 1981	09 Oct 1989	14 Jan 1998		X
Poland	23 Jun 1961	29 Jul 1977	14 Jan 1998	X	X
Portugal	29 Jan 2010		10 Oct 2014		
Romania	15 Sep 1971		05 Mar 2003		
Russian Federation	23 Jun 1961	23 Jun 1961	14 Jan 1998	X	X
Slovak Republic	01 Jan 1993				
South Africa	23 Jun 1961	23 Jun 1961	14 Jan 1998	X	X
Spain	31 Mar 1982	21 Sep 1988	14 Jan 1998		X
Sweden	24 Apr 1984	21 Sep 1988	14 Jan 1998		X
Switzerland	15 Nov 1990				
Turkey	24 Jan 1996				
Ukraine	28 Oct 1992	04 Jun 2004	24 Jun 2001		X
United Kingdom	23 Jun 1961	23 Jun 1961	14 Jan 1998	X	X
United States	23 Jun 1961	23 Jun 1961	14 Jan 1998	X	X
Uruguay	11 Jan 1980	07 Oct 1985	14 Jan 1998		X
Venezuela	24 Mar 1999		31 Aug 2014		

Source: http://www.ats.aq/devAS/info_reports.aspx?lang=e&rpt=pty accessed 29 September 2016.

Chapter 3 appendices

Appendix 3.1 Online survey



New Zealand's specialist land-based university

Perspectives on Antarctic conservation

The purpose of this survey is to gather views on Antarctic conservation.

The term Antarctica will be used, throughout the document, to refer to the area south of 60°S latitude, including water, land and ice shelves. It should take between 15-20 minutes to complete this survey. Please respond to all questions you feel comfortable answering.

The results of this survey may be published but at no time will your identity be linked to any results/data dissemination. All information and data provided will be treated as confidential. Your participation is voluntary and you may withdraw from the survey at any time by exiting your web browser.

If you have any questions regarding this survey please contact the main researcher at Gabriela.GomezFell@lincolnuni.ac.nz, or the researcher's supervisors at Stephen.Espiner@lincoln.ac.nz and Emma.Stewart@lincoln.ac.nz. Permission to administer this survey has been granted by Lincoln University Human Ethics Committee.

I give my consent to completing the survey and understand that I may withdraw from the survey at any time by exiting the web browser.

☐ Yes

☐ No

Survey Completion
0% 100%

>>

. To start the survey, please provide some basic background information about yourself.

Q1. In terms of your interest in Antarctica, to which of the following groups do you currently belong? (Please select as many as applicable)

- ☐ Science
- ☐ Government
- ☐ Commercial Fishing
- ☐ Antarctic tourism
- ☐ Non-Governmental Organisation
- ☐ Policy
- ☐ Education
- ☐ Arts
- ☐ Other(s)

Q2. Please select your highest educational level achieved? (Please select one)

- ☐ High school diploma
- ☐ Undergraduate degree
- ☐ Post graduate diploma/certificate
- ☐ Master's Degree
- ☐ Doctorate
- ☐ Other, (please specify)

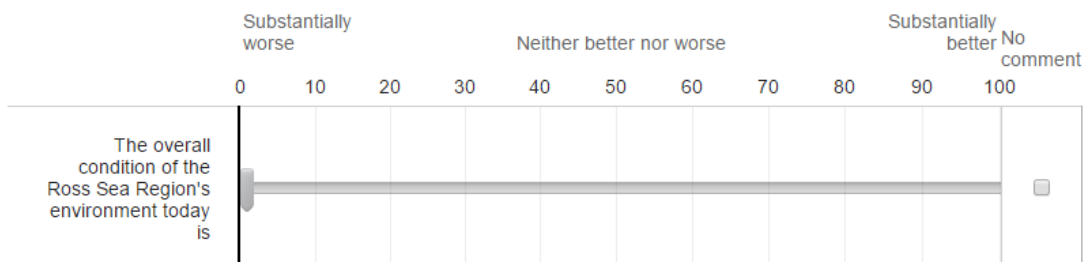
Q3. How many years have you been working on and/or researching Antarctic matters?

The following section concerns conservation challenges and issues in the **Ross Sea Region**. Please note that this section relates only to the **Ross Sea Region** in Antarctica.

Q4.

How would you rate the overall condition of the Ross Sea Region's natural environment now, compared to when the Protocol on Environmental Protection to the Antarctic Treaty came into force in 1998?

(Place the slider at the point on the scale which best represents the current condition of the Ross Sea Region's environment compared 1998. If you think the environment has declined substantially in the last 16 years, leave the slider at "0". 0 = Substantially worse, to 100 = Substantially better. If you do not wish to comment/don't know, please select "No comment")



Q5. Please rank the following conservation challenges by placing the most important challenge facing the Ross Sea Region today at the top of the list. (Click and drag each element to regroup placing the most important at the top and the least important at the bottom of the list).

Climate change

Ocean acidification

Invasive alien species

Fishing

Whaling

Pollution

Government support

Tourism

Impacts of science and logistics

Other(s), (please specify):

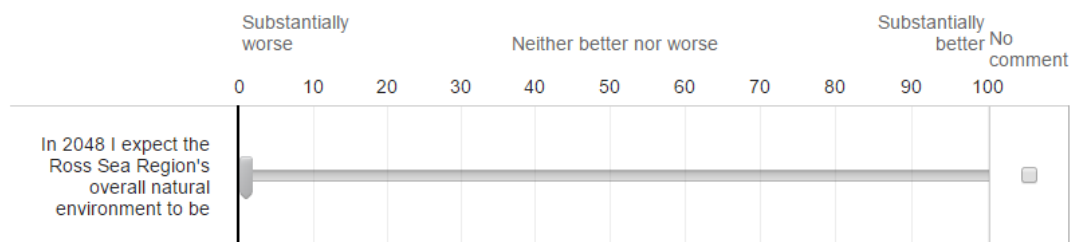
Q6. Do you think the conservation challenges facing the Ross Sea Region today will remain the same in 2048, when the Protocol on Environmental Protection to the Antarctic Treaty could be reviewed? (Please select one answer)

- ☐ Yes
- ☐ No
- ☐ No comment

Q7.

What are your expectations of the overall condition of the Ross Sea Region' s natural environment in 2048, when the Protocol on Environmental Protection to the Antarctic Treaty could be reviewed?

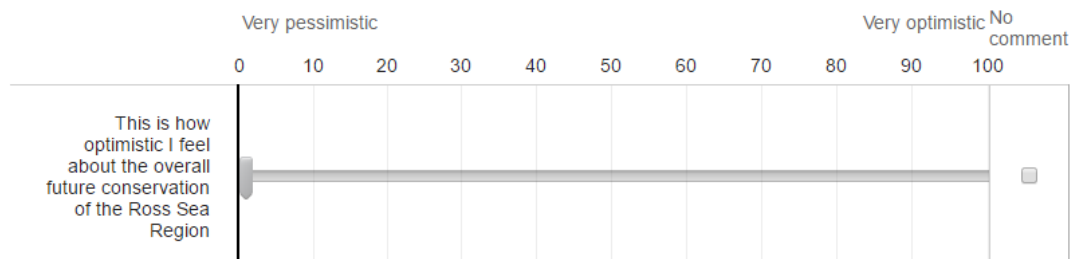
(Place the slider at the point on the scale which best represents how the Ross Sea Region's environment will be like in 2048. If you think the environment will be substantially worse, leave the slider at "0". 0 = Substantially worse, to 100 = Substantially better. If you do not wish to comment/don't know, please select "No comment")



Q8.

How optimistic are you about the overall future conservation of the Ross Sea Region?

(Place the slider at the point on the scale which best represents how optimistic you are about the future conservation of the Ross Sea Region. If you feel very pessimistic, leave the slider at "0". 0 = Very pessimistic, to 100 = Very optimistic. If you do not wish to comment/don't know, please select "No comment")

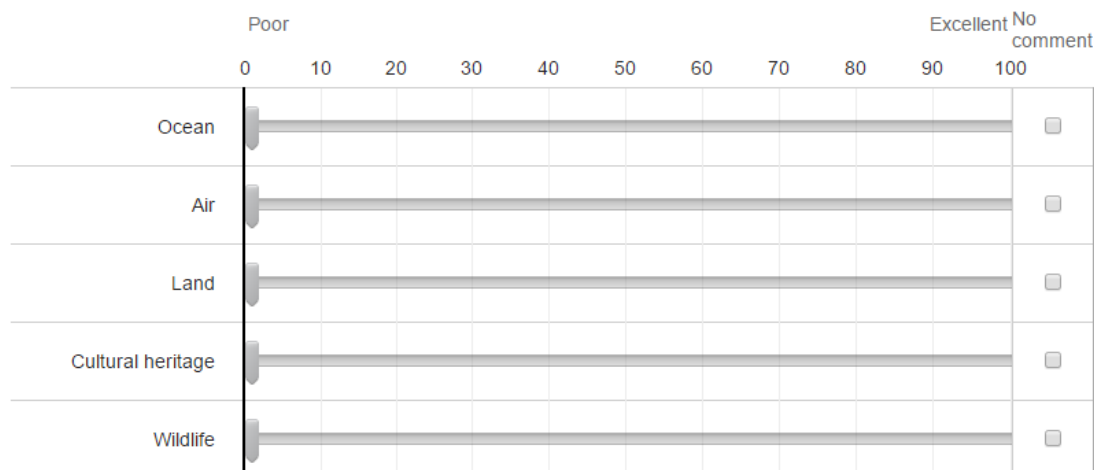


The following section concerns challenges and issues facing **Antarctic conservation**. Please note that we refer to Antarctica as the area south of 60°S latitude, including water, land and ice shelves.

Q9.

How would you rate the condition of Antarctica's oceans, air, land, cultural heritage and wildlife today?

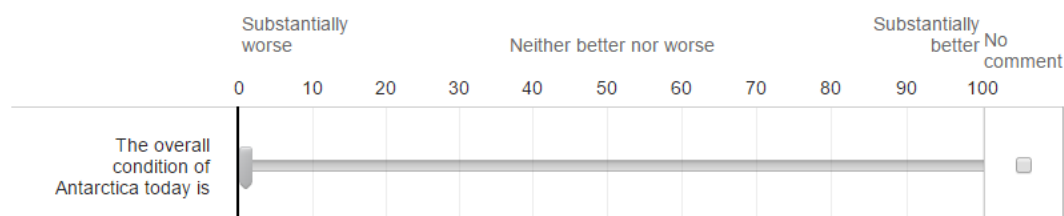
(Place the slider at the point on the scale which best represents how you think the condition of these Antarctic elements are currently. If you think they are in poor condition, leave the slider at "0". 0 = Poor, to 100 = Excellent. If you do not wish to comment/don't know, please select "No comment")



Q10.

How would you rate the overall condition of Antarctica's natural environment now, compared to when the Protocol on Environmental Protection to the Antarctic Treaty came into force in 1998?

(Place the slider at the point on the scale which best represents the current condition of Antarctica's environment compared 1998. If you think the environment has declined substantially in the last 16 years, leave the slider at "0". 0 = Substantially worse, to 100 = Substantially better. If you do not wish to comment/don't know, please select "No comment")



Q11. What do you think are the most important things to protect in Antarctica? Please rank the following elements by placing the most important at the top of the list. (Click and drag each element to regroup placing the most important at the top and the least important at the bottom of the list)

Wildlife

Landscapes

Ecological systems

Historic sites and artefacts

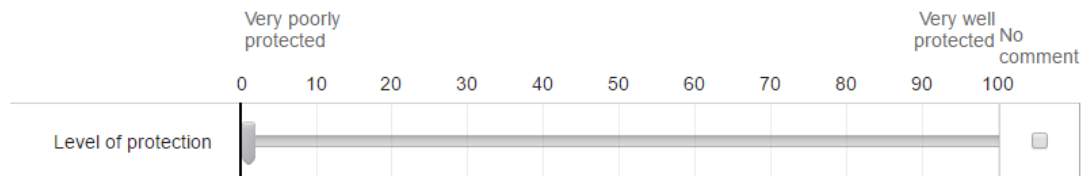
Other(s), (please specify):

Q12.

The Protocol on Environmental Protection to the Antarctic Treaty (1991) establishes Antarctica as a "natural reserve devoted to peace and science" and provides for the comprehensive protection of the Antarctic environment and dependent and associated ecosystems.

How well do you think the Antarctic environment and dependent and associated ecosystems are currently being protected?

(Place the slider at the point on the scale which best represents how well you think the Antarctic environment and dependent and associated ecosystems are currently being protected. If you think they are very poorly protected, leave the slider at "0". 0 = Very poorly protected, to 100 = Very well protected. If you do not wish to comment/don't know, please select "No comment")



Q13. Please rank the following Antarctic conservation challenges by placing the most important challenge facing Antarctica today at the top of the list. (Click and drag each element to regroup placing the most important at the top and the least important at the bottom of the list).

Climate change

Ocean acidification

Invasive alien species

Fishing

Whaling

Pollution

Government support

Tourism

Impacts of science and logistics

Other(s), (please specify):

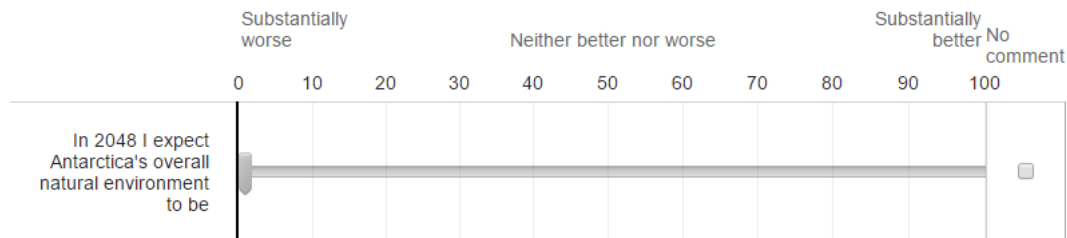
Q14. Do you think the conservation challenges facing Antarctica today will remain the same in 2048, when the Protocol on Environmental Protection to the Antarctic Treaty could be reviewed? (Please select one answer)

- ☐ Yes
- ☐ No
- ☐ No comment

Q15.

What are your expectations of the overall condition of Antarctica's natural environment in 2048, when the Protocol on Environmental Protection to the Antarctic Treaty could be reviewed?

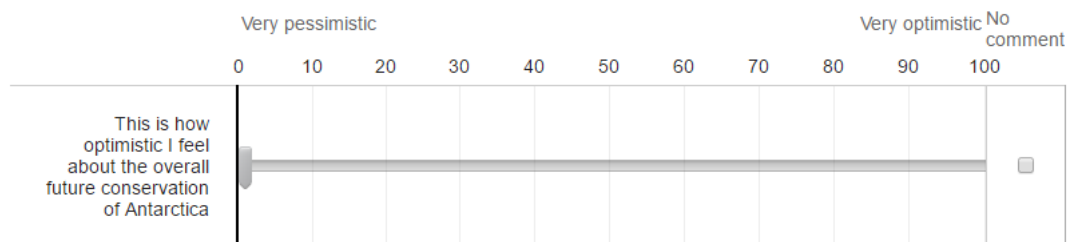
(Place the slider at the point on the scale which best represents how Antarctica's environment will be like in 2048. If you think the environment will be substantially worse, leave the slider at "0". 0 = Substantially worse, to 100 = Substantially better. If you do not wish to comment/don't know, please select "No comment")



Q16.

How optimistic are you about the overall future conservation of Antarctica?

(Place the slider at the point on the scale which best represents how optimistic you are about the future conservation of Antarctica. If you feel very pessimistic, leave the slider at "0". 0 = Very pessimistic, to 100 = Very optimistic. If you do not wish to comment/don't know, please select "No comment")

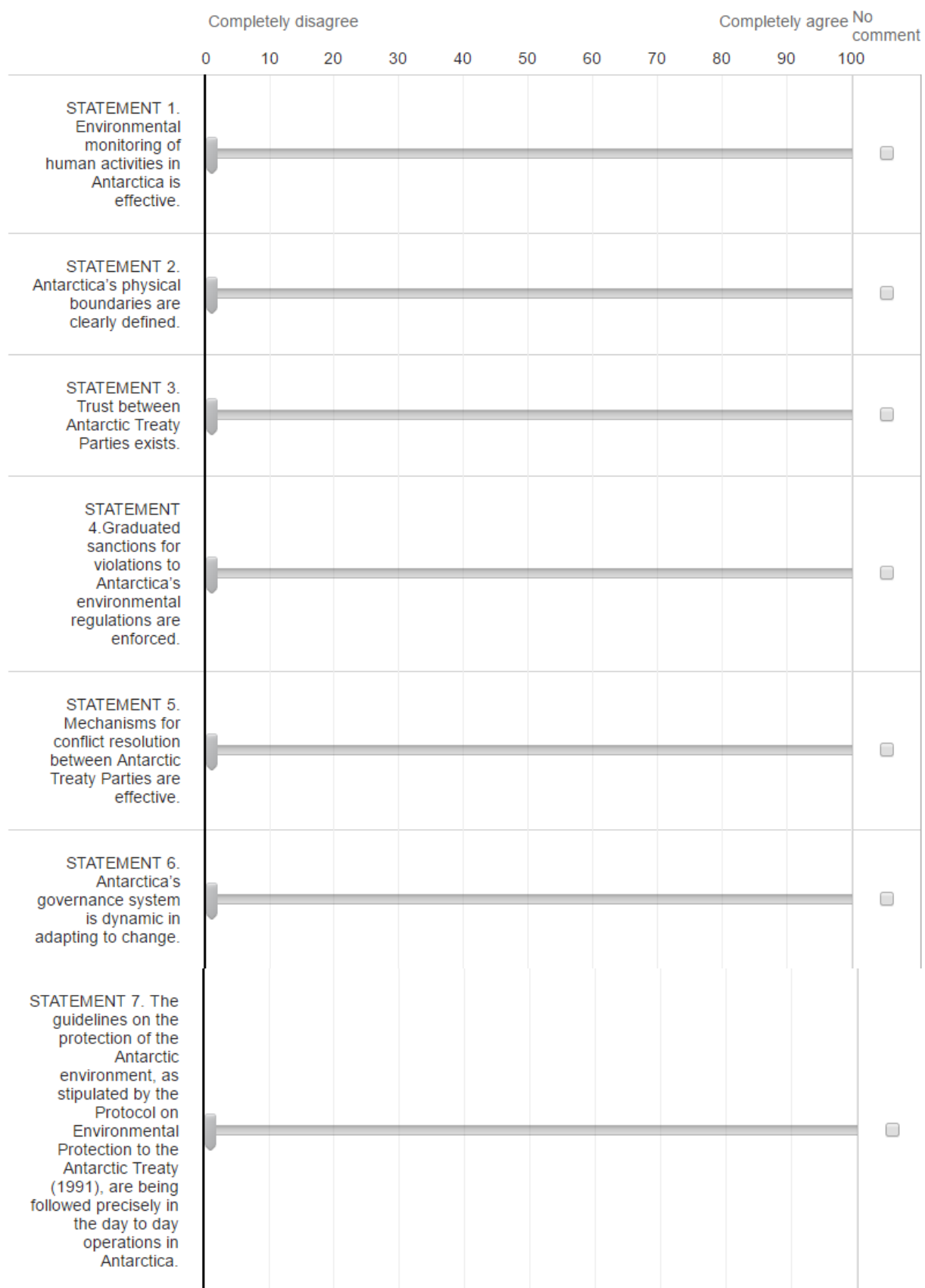


This section relates to Antarctic governance.

Q17.

The following are a set of statements relating to Antarctic governance. Please indicate the extent to which you agree or disagree with the following statements by placing the slider at the point on the scale which best represents your level of agreement.

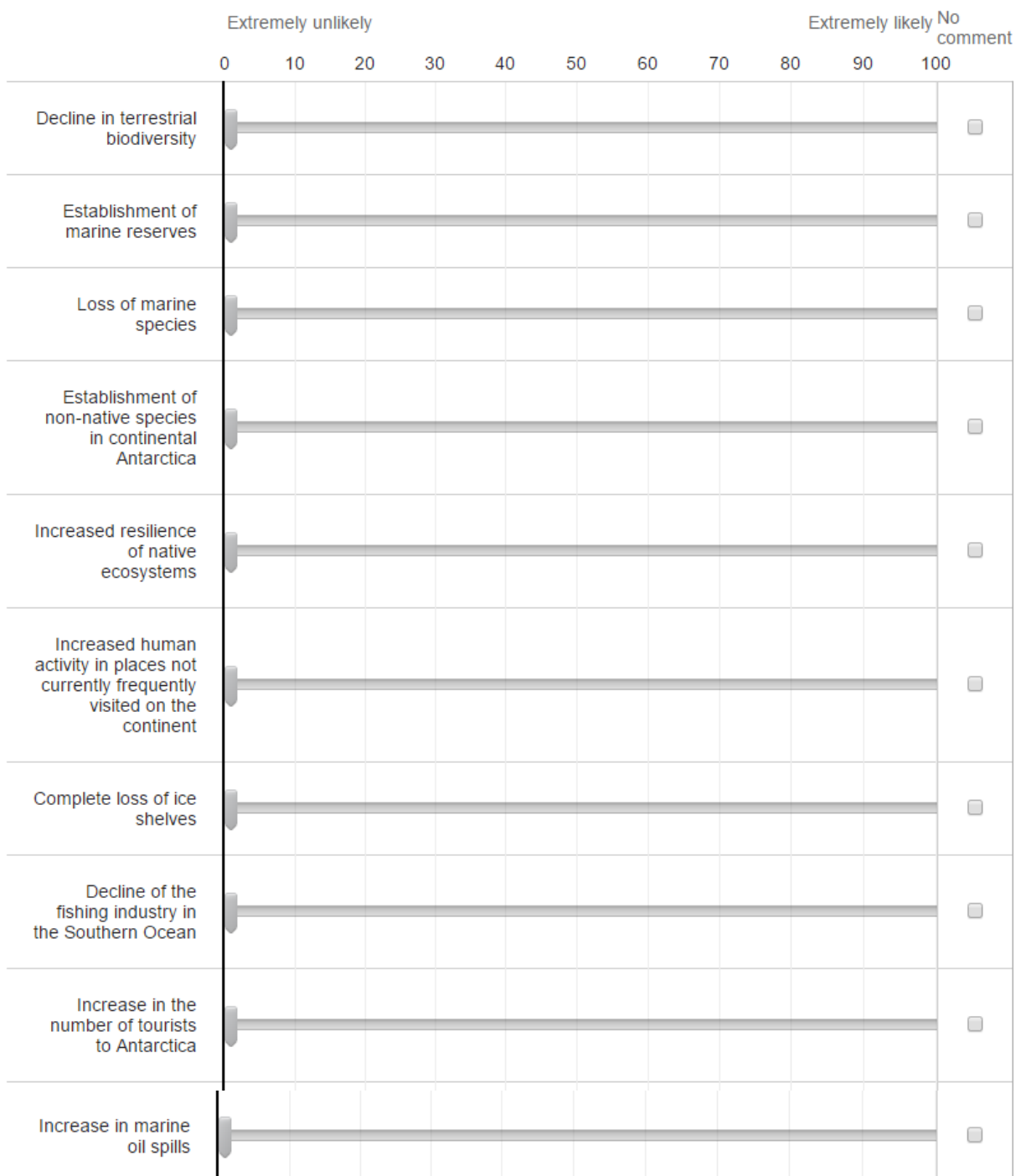
(If you completely disagree, leave the slider at "0". 0 = Completely disagree, to 100 = Completely agree. If you do not wish to comment/don't know, please select "No comment")



. **This section related to future scenarios for Antarctic conservation.** Tell us what you think the future will hold for the conservation of Antarctica. Please note that we refer to Antarctica as the area south of 60°S latitude, including water, land and ice shelves.

Q18. How likely or unlikely do you think these Antarctic environmental scenarios are of occurring in 2048, when the Protocol on Environmental Protection to the Antarctic Treaty could come up for renewal?

(Place the slider at the point on the scale which best represents your perception on the likelihood of these scenarios occurring in Antarctica in 2048. If you perceive the scenario is extremely unlikely to occur, leave the slider at "0". 0 = Extremely unlikely, to 100 = Extremely likely. If you do not wish to comment/don't know, please select "No comment")



This last section relates to the different stakeholder groups that play a role in Antarctic conservation matters.

Q19.

In terms of their capacity to stimulate change that positively affects Antarctic conservation, how influential do you think the following groups are?

(For each group place the slider at the point on the scale which best represents how influential you feel these groups are currently to Antarctic conservation. If you think a group is not at all influential, leave the slider at "0". 0 = Not at all influential to 100 = Extremely influential. If you do not wish to comment/don't know, please select "No comment")

	Not at all influential	Extremely influential	No comment									
	0	10	20	30	40	50	60	70	80	90	100	
Natural scientists												<input type="checkbox"/>
Social scientists												<input type="checkbox"/>
Governments												<input type="checkbox"/>
Pro-conservation lobby groups												<input type="checkbox"/>
International Organisations (e.g. IUCN)												<input type="checkbox"/>
Commercial fishing companies												<input type="checkbox"/>
Antarctic tourism operators												<input type="checkbox"/>
Non-Governmental Organisations (NGOs)												<input type="checkbox"/>
Education sector												<input type="checkbox"/>
Media												<input type="checkbox"/>
Individual citizens												<input type="checkbox"/>
Other(s). (please state): <input type="text"/>												<input type="checkbox"/>

Q37. Do you have any comments on Antarctic conservation that you would like to share? (Please write below. There is no maximum word limit)

To finalise, please provide some more detailed information about you.

Q20. What is your age range?

- ☐ 18-30 years of age
- ☐ 31-40 years of age
- ☐ 41-50 years of age
- ☐ 51-60 years of age
- ☐ 61-70 years of age
- ☐ 71-80 years of age
- ☐ 81+ years of age

Q21. What is your gender?

- ☐ Male
- ☐ Female

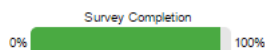
Q22. What is your nationality?

Q23. Which is your country of residence?

Congratulations! you have made it to the end of the survey! Thank you for your insights into Antarctic conservation matters. This survey is part of a larger study which seeks to gather a range of perspectives on Antarctic conservation.

If you would like to participate in a face to face [45-minute interview](#) at a later time and place that suits you please click on the link that will appear on your screen after submitting your answers to provide your contact details. Please be assured that your details **will not** be stored together with your data. If you would rather arrange a convenient time, date and place for the interview directly with the researcher, please contact her at Gabriela.GomezFell@lincolnuni.ac.nz to let her know you are willing to be interviewed.

You have now finished the questionnaire. **Thank you** for your time and views on Antarctic conservation. To record your answers please click on the >> icon at the bottom right of this page. If you do not wish to submit your answers press the cross at the top right of the screen or exit the web browser.



<<

>>

Thanks again for your insights into Antarctic conservation matters.

If you would like to take part in a 45-minute interview at a later time and place that suits you, please follow this link www.lincoln.ac.nz/interviewdetails to leave your contact details and we'll be in touch.

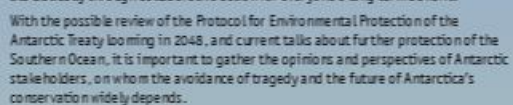
Have a great day.

An analysis of New Zealand Antarctic stakeholder views

¹ Masters student
Faculty of Environment, Society and Design
Lincoln University, New Zealand

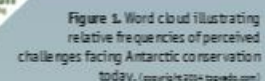
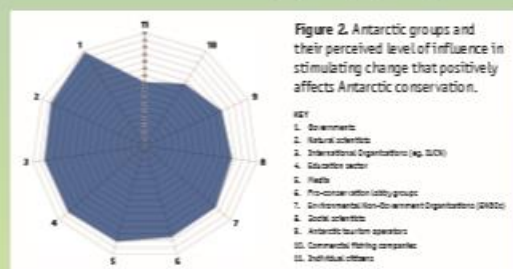
² Senior Lecturer in Parks, Recreation and Tourism
Lincoln University, New Zealand

Few places illustrate the complexities of a global commons better than Antarctica, the only place where nations have agreed to protect the environment of a whole continent and where, conversely, challenges such as ocean acidification, economic utilisation of natural resources and threats to its unique biodiversity imply a 'tragedy' in the making. In the commons management literature, Hardin (1966) warned of the potential for 'tragedy of the commons' as a result of human greed. In contrast, Ostrom (1990) believed in the ability of humans to behave altruistically through collaborative action for everyone's long term benefit.



An online survey was designed based on four Antarctic conservation themes: challenges and issues; governance; potential future scenarios; and key stakeholders. In an effort to gather a broad initial snapshot of perspectives on Antarctic conservation, the survey was distributed to all University of Canterbury Gateway Antarctica postgraduate studies alumni (N=208) between April and May 2014. A 19% response rate was attained yielding 39 suitable surveys for analysis.

Perceived key challenges facing Antarctic conservation today (see Figure 1) relate to climate change and its effect on the Antarctic environment, ecosystems and biota. The impacts of tourism and fishing were also of concern along with the potential for mineral extraction after 2048.



Over half of the respondents (54%) believed the conservation challenges facing Antarctica will change by 2048. Among the recurring themes, pressure to 'open' the continent for resource extraction, further fishing pressure and impacts of global warming taking effect in Antarctica were prominent. Most respondents (71%) believed ecosystems are the most important things to protect in Antarctica today.

On a relative scale of influence (0—not at all influential; 100—extremely influential), governments ($M=78.79$, $SD=16.02$) were perceived as being the most influential in their capacity to stimulate change that positively affects Antarctic conservation (see Figure 2). The perceived influence of media ($M=70.56$, $SD=22.64$) is noteworthy as it was seen as having more influence than pro-conservation lobby groups ($M=67.21$, $SD=15.54$) and Environmental Non-Governmental Organisations ($M=66.29$, $SD=20.16$).

Antarctica is facing challenges that expand beyond its boundaries. Climate change and pressure from industry were perceived by this group of New Zealand Antarctic stakeholder as the most important conservation challenges facing Antarctica today and in the future. While governments and physical scientists were seen as having the greatest capacity to effect positive change in Antarctic conservation, securing the future conservation of Antarctica is likely to depend upon collaboration between all stakeholder groups. Mindful of the potential for collective action, the second stage of this project seeks to explore the views of a broader range of New Zealand Antarctic stakeholders on the future of Antarctic conservation.

We would like to thank Daniela Liggett and Katrina Hall from University of Canterbury Gateway Antarctica for distributing the survey; Tracy Berno from Lincoln University for her advice, feedback and support; and the respondents for trusting their opinions to us.

Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. New York, NY: Cambridge University Press.

Appendix 3.3 Card with invitation to online survey



**Perspectives on
Antarctic conservation**

Please take our short survey to tell us about your views on Antarctic conservation; it should take 15-20 minutes to complete. We do not ask your name or contact information. Thank you.

Go to:
www.lincoln.ac.nz/antarcticperspectives

Contact: **Gabriela Gomez Fell**
email: gomezg@lincoln.ac.nz



The bottom section of the card features a green background. On the left is a square QR code. To its right is the Lincoln University logo, which includes a crest and the text 'Lincoln University', 'Te Whānui Whakatoa o Aotearoa', and 'AUTUMN - NEW ZEALAND'. Below the logo, it says 'New Zealand's specialist land-based university'.

Appendix 3.4 Interview schedule

Interview schedule

Explain

- The nature of the research – Survey/interviews. Looking at gathering perspectives and views on Antarctic conservation.
- Info sheet
- No right or wrong answers
- Welcome to seek clarification

Give assurances about

- confidentiality/anonymity

Remind

- participation is voluntary
- right to withdraw from the interview at any time, for any reason (by 30 November 2014)

Ask

- permission to record and make notes (backup to recording machine)
- interview will be fully transcribed and sent to them for review/comments
- to sign consent form

TEST RECORDING DEVICE

Background information:

- Tell me about your connection with Antarctica?
- How is _____ involved in conservation matters in Antarctica?
- What is your role with _____?
- How long have you been working on Antarctic matters? Can you tell me a bit more about your previous roles working on Antarctic matters?
- Have you had the chance to visit Antarctica? How many times? Where? Ross Sea Dependency? Pole? Peninsula? Islands? Deep field locations? Bases? How long have your visits been for?

Theme I: Antarctic conservation challenges and issues

- How would you describe the current condition of the Antarctic environment?
- What do you think are the main conservation challenges in Antarctica today? Why?
- What do you think is the main barrier/obstacle to Antarctic conservation? (Things that get in the way of the solution)
- Why does Antarctica need 'protecting'? From who? Who for?

Theme II: Antarctic governance

- What mechanisms are you aware of that protect the Antarctic environment? How well do you think Antarctica's environment is being looked after?
- In your opinion what are the strengths of the ATS. How about its weaknesses?
- Are you familiar with the Protocol on Environmental Protection to the AT? How effective do you think it is? Why?
- What other ways could the Antarctic environment be managed?

Theme III: Stakeholders in Antarctic conservation

- Who do you see as the key stakeholders in Antarctic conservation? At a NZ level?

- What role do you think New Zealand stakeholders have in the future conservation of Antarctica?
- Who do you see as NZ advocates for Antarctic conservation? Why do you see them as advocates? How effective do you think these advocates are? Why?
- Can you think of Antarctic stakeholders who are not involved in Antarctic conservation? Who are they? Why do you think they are not involved? Why should they be involved?

Theme IV: Potential future scenarios for Antarctic conservation

- What do you think the condition of the Antarctic environment will be like in 30-40 years' time? Why?
- What might the future of Antarctic conservation be in 30-40 years' time?
- Are you optimistic or pessimistic about the future conservation of Antarctica? Why do you feel this way?

Ross Sea Region - RSR

- Now, how about the RSR? Do you think the conservation challenges of the Ross Sea Region differ from the rest of Antarctica? How so? Will they change?
- How about its stakeholders; Does the RSR have different stakeholders? Who are they?
- What do you think the future holds for the future conservation of the RSR?
- Are you optimistic or pessimistic about the future conservation of the RSR? Why do you feel this way?

Wrap up:

- If you can think of one thing that is essential to securing the conservation of the Antarctic environment what would it be?
- Is there anything you would like to add? - Thank you for your time.

Appendix 3.5 Lincoln University ethics committee approval

Application No: 2014-22

15 August 2014

Title: Perspectives on Antarctic conservation. An analysis of NZ Antarctic stakeholder views

Applicant: Gabriela Paz Gomez Fell

The Lincoln University Human Ethics Committee has reviewed the above noted application.

Thank you for your response to the questions which were forwarded to you on the Committee's behalf.

I am satisfied on the Committee's behalf that the issues of concern have been satisfactorily addressed.

I am pleased to give final approval to your project. Please note that this approval is valid until three years from today's date at which time you will need to reapply for renewal.

May I, on behalf of the Committee, wish you success in your course.

Yours sincerely

Caitriona Cameron
Acting Chair, Human Ethics Committee

PLEASE NOTE: The Human Ethics Committee has an audit process in place for applications. Please see 7.3 of the Human Ethics Committee Operating Procedures (ACHE) in the Lincoln University Policies and Procedures Manual for more information.

Appendix 3.6 Research information sheet

Lincoln University

Perspectives on Antarctic conservation **Research Information Sheet**

You are invited to participate in a project entitled: Perspectives on Antarctic conservation.

This project is part of my Master's degree at Lincoln University and aims to critically examine and evaluate New Zealand stakeholder perspectives on Antarctic conservation. I am interested in identifying key stakeholders in Antarctic conservation, challenges and issues facing Antarctic conservation as well as identifying potential future scenarios for Antarctic conservation.

Your participation in this research is voluntary and you may decline to answer any question. You may also withdraw from the research (up until December 31, 2014) by contacting me via email or phone (contact details are listed below).

Your participation in this project will involve:

An interview of about 45 to 60 minutes. During this time you will be asked for your professional opinions, views and experiences on Antarctic conservation matters.

Interviews will be conducted at a time and place to suit you and will be digitally recorded. The interviews will be transcribed in full and you will have the opportunity to review your own interview transcript if you wish. If you prefer not to be recorded I will take notes throughout the interview – these notes will also be available for review once they are written up.

If you are willing to participate in this research I need you to sign the attached consent form and return it to the researcher before the interview.

In the performance of the tasks and application of the procedures, there are no foreseen risks. However, if you do not feel comfortable about the interview you can withdraw at any time. Please also note that you are entitled to withdraw your interview data from the research prior to December 31, 2014.

The results of the project may be presented at an academic conference and be published (such as a research report or an academic journal), but you may be assured of your anonymity in this investigation: the identity of any participant will not be made public, or made known to any person other than the researcher, her supervisors and the Lincoln University Human Ethics Committee, without the participant's consent. To ensure anonymity and confidentiality the following steps will be taken:

- Real names and contact details will not be used as a part of data dissemination.
- Descriptors, such as "Antarctic scientist" will be used instead of names in any written or oral presentation.
- No individual identifying information will be presented in public.
- The signed consent form will be stored separately to the transcript of your interview.

The project is being carried out by:

Name of principal researcher: Gabriela Gomez Fell

Contact Details: gomezg@lincoln.ac.nz 0210597874

The researcher's supervisors will be pleased to discuss any concerns you have about participation in the project.

Name of Supervisors:

Dr Stephen Espiner

Senior Lecturer in Parks, Recreation & Tourism

Department of Social Science, Parks, Recreation & Sport

Faculty of Environment, Society & Design

p +64 3 4230485

stephen.espiner@lincoln.ac.nz

Emma J. Stewart PhD

Senior Lecturer in Parks & Tourism

Social Science, Parks, Recreation, Tourism & Sport

Environment, Society & Design

p +64 3 4230500 f +64 3 325 3857

emma.stewart@lincoln.ac.nz

The Lincoln University Human Ethics Committee has reviewed and approved this research project.

Appendix 3.7 Interviewees' consent form

Consent Form

Name of Project: *Perspectives on Antarctic conservation*

I have read and understood the description of the above-named project. On this basis I agree to participate as a respondent in the project, and I consent to publication of the results of the project with the understanding that anonymity will be preserved. I understand also that I may withdraw from the project (up until November 30, 2014), including withdrawal of any information I have provided. I consent to the interview being (please tick the box as appropriate):

a) Recorded on an audio device ☐

b) Recorded by hand written notes only ☐

Name:

Signed:

Date:

Appendix 3.8 Information sheet for online or phone interviewees

Lincoln University

Perspectives on Antarctic conservation **Research Information Sheet**

You are invited to participate in a project entitled: Perspectives on Antarctic conservation.

This project is part of my Master's degree at Lincoln University and aims to critically examine and evaluate New Zealand stakeholder perspectives on Antarctic conservation. I am interested in identifying key stakeholders in Antarctic conservation, challenges and issues facing Antarctic conservation as well as identifying potential future scenarios for Antarctic conservation.

Your participation in this research is voluntary and you may decline to answer any question. You may also withdraw from the research (up until November 30, 2014) by contacting me via email or phone (contact details are listed below).

Your participation in this project will involve:

An interview of about 45 to 60 minutes. During this time you will be asked for your professional opinions, views and experiences on Antarctic conservation matters.

Interviews will be conducted at a time and place to suit you and will be digitally recorded. The interviews will be transcribed in full and you will have the opportunity to review your own interview transcript if you wish. If you prefer not to be recorded I will take notes throughout the interview – these notes will also be available for review once they are written up.

If you are willing to participate in this research [click here](#); this link will direct you to a secure site where you'll be able to provide consent for the interview. Please complete this step prior to the interview.

In the performance of the tasks and application of the procedures, there are no foreseen risks. However, if you do not feel comfortable about the interview you can withdraw at any time. Please also note that you are entitled to withdraw your interview data from the research prior to November 30, 2014.

The results of the project may be presented at an academic conference and be published (such as a research report or an academic journal), but you may be assured of your anonymity in this investigation: the identity of any participant will not be made public, or made known to any person other than the researcher, her supervisors and the Lincoln University Human Ethics Committee, without the participant's consent. To ensure anonymity and confidentiality the following steps will be taken:

- Real names and contact details will not be used as a part of data dissemination.
- Descriptors, such as "Antarctic scientist" will be used instead of names in any written or oral presentation.
- No individual identifying information will be presented in public.
- The signed consent form will be stored separately to the transcript of your interview.

The project is being carried out by:

Name of principal researcher: Gabriela Gomez Fell

Contact Details: gomezg@lincoln.ac.nz 0210597874

The researcher's supervisors will be pleased to discuss any concerns you have about participation in the project.

Name of Supervisors:

Dr Stephen Espiner

Senior Lecturer in Parks, Recreation & Tourism

Department of Social Science, Parks, Recreation & Sport

Faculty of Environment, Society & Design

p +64 3 4230485

stephen.espiner@lincoln.ac.nz

Emma J. Stewart PhD

Senior Lecturer in Parks & Tourism

Social Science, Parks, Recreation, Tourism & Sport

Environment, Society & Design

p +64 3 4230500 f +64 3 325 3857

emma.stewart@lincoln.ac.nz

The Lincoln University Human Ethics Committee has reviewed and approved this research project.

Appendix 3.9 Online consent form



New Zealand's specialist land-based university

Consent Form - Lincoln University Policies and Procedures

Name of Project: Perspectives on Antarctic conservation.

I have read and understood the description of the above-named project. On this basis I agree to participate as a respondent in the project, and I consent to publication of the results of the project with the understanding that anonymity will be preserved. I understand also that I may at any time withdraw from the project, including withdrawal of any information I have provided (by October 30, 2014).

I consent to the interview being (please select from the following as appropriate):

- ☐ Recorded on an audio device
- ☐ Recorded by hand written notes only

To accept these terms please write your name and date in the spaces provided below. To submit the information and confirm your consent, please click on the arrows >> at the bottom right corner of the screen.

Name (please enter your full name in the text box below):

Date (please enter today's date on the text box below)

Stakeholder Perspectives on Antarctic Conservation

Gabriela Gomez Fell (gomezg@lincoln.ac.nz),

Emma Stewart and Stephen Espiner

Faculty of Environment, Society & Design
Lincoln University, Christchurch, New Zealand

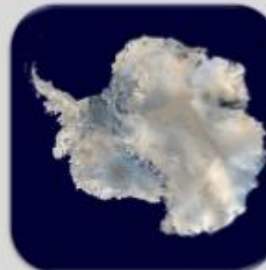
Photograph by Emma J. Stewart

The research revealed that, although stakeholders see the Antarctic Treaty System (ATS) as an exceptional system of collaborative governance of commons, where New Zealand is actively involved, it needs to be more effective, adaptable and able to respond to growing internal and external pressures and challenges if it is to continue protecting the Antarctic environment into the future.

"We need policy and science; a healthy and robust ATS that listens and is provided with good Antarctic science" (S6)

"NZ in particular is well connected because, not only have they been involved since the beginning (of the ATS) but they've had some really key individuals who have led a lot of the discussions" (G2)

"They've (NZ) got some rockstars... Some very clever people who have been interested in environmental issues and taken an interest in the Antarctic" (G2)



<https://commons.wikimedia.org>

"I think it's (the ATS) an idealisation, a model of how human society should operate and the issue is not with the system but with the countries and countries' agendas" (G5)

Global Commons

Many of the world's most pressing environmental issues are manifest in the global 'commons'. Interest in securing access to the global commons has never been greater, particularly from security, trade and critical resources perspectives.

Few places illustrate the complexities of a global commons better than Antarctica.

In this study two contrasting common pool resource frameworks are utilised. Garrett Hardin¹ claimed in 1968 that resources treated as commons are destined to be over-used - leading to an inevitable 'tragedy of the commons' if not privatised or placed under centralised government management. By contrast, Elinor Ostrom² (1990) believed that, under certain conditions, individual users do restrict their use of resources and share the benefits of 'the commons' through collaborative action for everyone's long-term benefit.

STAKEHOLDER PERSPECTIVES

Climate change: "the elephant in the room"

Although direct impacts on the Antarctic environment were seen as growing and diversifying, they were also perceived as minor in comparison to external pressures affecting Antarctica. Climate change and its effects on the Antarctic natural environment were identified by most interviewees as the biggest issue affecting Antarctica into the future. Although the ATS does not have a mandate over the regulation of CO2 emissions, interviewees believed the ATS policy makers must be involved in combating climate change.

Critical role played by New Zealand

New Zealand was regarded as a key player in Antarctic conservation within the ATS; leading discussions, providing good science and influencing policy. The involvement and influence of key individuals was repeatedly noted by interviewees. New Zealand was seen as a "green" country fostering Antarctic conservation and expected to bring ideas to the forum.

A strong and effective Antarctic Treaty System

The ATS was regarded by all interviewees as an outstanding piece of legislation, and as a true example of international collaboration which provides great tools for conservation. However, the very nature of this internationally managed commons governance system brings multiple challenges.

Approach

This study examined perspectives on Antarctic conservation using semi-structured interviews with 22 Antarctic stakeholders engaged in Antarctic matters through science, management, policy, industry (tourism and fishing), media, advocacy and education.

Stakeholder involvement in the research is gratefully acknowledged.



Lincoln University
Te Whare Wānanga o Aotearoa
ANTARCTICA - NEW ZEALAND

New Zealand's specialist land-based university

¹ Hardin, G. (1968). The tragedy of the commons. Science, 162(3859), 1243-1248.

² Ostrom, E. (1990). Governing the commons: The evolution of institutions for collective action. New York: Cambridge University Press.

Chapter 4 appendices

Appendix 4.1 Survey respondents' demographics

Survey respondents by age groups

	Frequencies	Percentages
18-30 years of age	9	12%
31-40 years of age	16	21%
41-50 years of age	17	22%
51-60 years of age	16	21%
61-70 years of age	14	18%
71-80 years of age	4	5%
81+ years of age	1	1%
<i>n=</i>	77	100%

Survey respondents' country of residence

Country of residence	Frequencies	Percentages
New Zealand	69	91%
Australia	3	4%
USA	2	3%
Norway	1	1%
United Kingdom	1	1%
<i>n=</i>	76	100%

Survey respondents' nationalities

Nationality	Frequencies	Percentages
New Zealander	50	67%
USA	5	7%
Australian	4	5%
British	3	4%
Canadian	3	4%
German	2	3%
Antarctican	1	1%
Austrian	1	1%
Danish	1	1%
Spanish	1	1%
<i>n=</i>	71	95%

Multiple nationalities	Frequencies	Percentages
British/USA	1	1%
New Zealander/British	2	3%
New Zealander/British/USA	1	1%
<i>n=</i>	4	5%

Survey respondents' years of experience on Antarctic matters

Years of experience in ranges	Frequencies	Percentages
1 to 5 years of experience	23	26%
6 to 10 years of experience	19	22%
11 to 15 years of experience	15	17%
16 to 20 years of experience	10	11%
21 to 25 years of experience	7	8%
26 to 30 years of experience	5	6%
31 to 35 years of experience	0	0%
36 to 40 years of experience	4	5%
41 to 45 years of experience	2	2%
46 to 50 years of experience	0	0%
51 to 55 years of experience	2	2%
<i>n=</i>	87	100%

Survey respondents' highest achieved qualifications

		Frequencies	Percentages
1	High school diploma	9	10%
2	Undergraduate degree	9	10%
3	Post graduate diploma/certificate	7	8%
4	Master's degree	20	22%
5	Doctorate	44	48%
6	Technical qualifications	3	3%
	<i>n=</i>	92	100%

Chapter 5 appendices

Appendix 5.1 Interviewees' connections with Antarctica

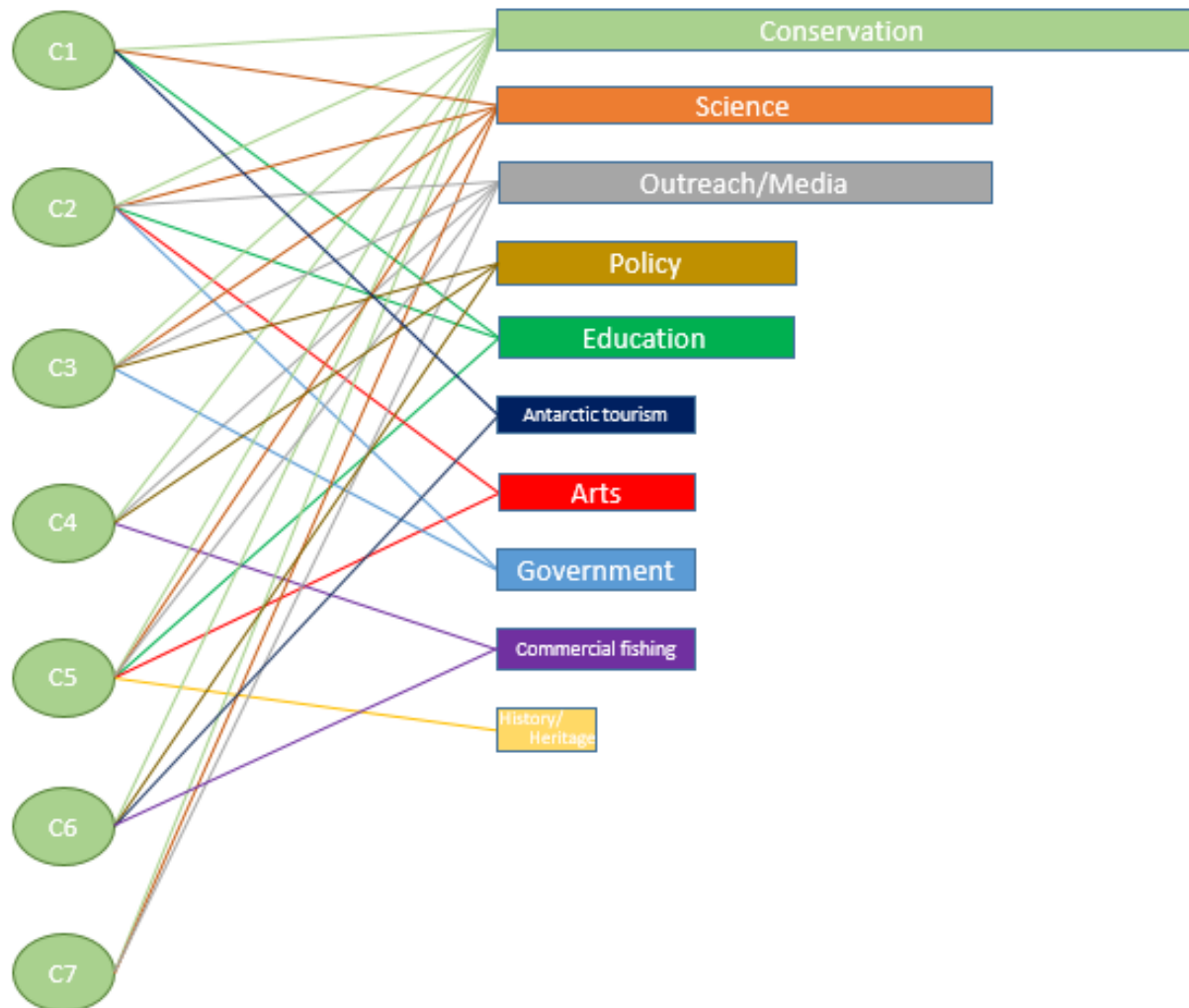


Figure 5.3 Conservation stakeholder interviewees' Antarctic connections

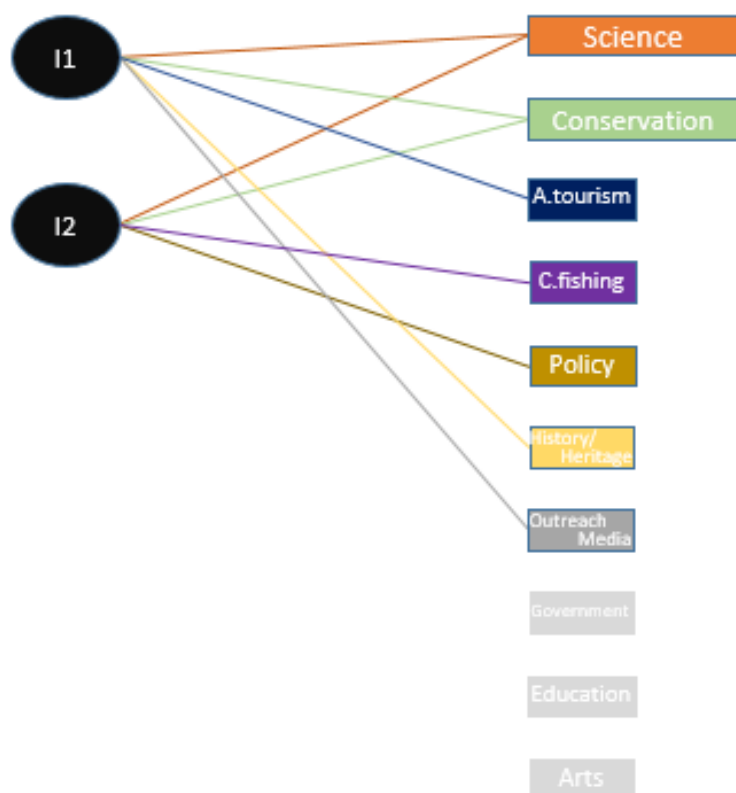


Figure 5.4 Commercial industry stakeholder interviewees' Antarctic connections

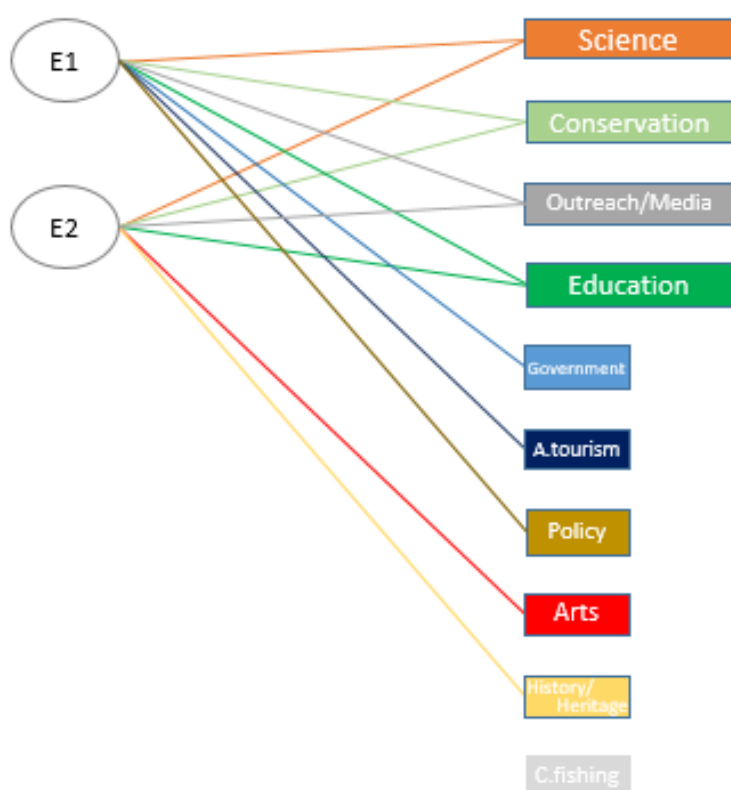


Figure 5.5 International stakeholder interviewees' Antarctic connections

Chapter 6 appendices

Appendix 6.1 Strengths and weaknesses of the ATS as identified by interviewees

Table 6.1 Strengths and weaknesses of the ATS as identified by interviewees

Strengths	Reference	Weaknesses	Reference
Devotes Antarctica to peace	C1, C4, I2, S1, S3, S5	Applies only to signatory states	C1, E2, G1, I1, I2, S4, S5
Devotes Antarctica to science	C4, E1, G4, G5, I2, S1, S2, S3, S5	Is implemented through national legislation	E1, G3, G4
Demilitarises the Antarctic	C3, C4, G5	Has no mechanisms to enforce rules and regulations	G1
It is a nuclear free area	C4	Lacks regulations on tourism	C1, C3, C7, I2
Enforces a mining ban	C3, C4, C5, C7, S2, S3, S6	Does not represent everyone on earth	E1
Has visionary conservation policies	C1, C4, G2, S2	Is a bureaucratic system	C6, G1, S5
Agreements are future focused	C1, C4, G2, S2, S5	Is slow to react	C4, C6, C7, E1, G1, G2, G4, G5, I2, I1, S1, S2, S3, S5, S6
Holds regular meetings between signatory states	C6, G4	Is a political system with issues inherent to it	C1, C2, C3, C4, C5, C6, E1, E2, G3, G4, G5, I1, S2, S4, S6
Has a high level of cooperation between states	C1, G4, S1, S2	Has many issues related to geopolitics	C2, E1, G4, I1, S3
Fosters collaboration	C3, E2, G2, G3, S2	Signatory states have diverse interests on Antarctica	C1, C2, C4, E1, G3, G4, I1, S3
Creates dialogue between states	C1, C4, C5, C6, E2, G1, G2, S1, S2, S3, S4, S5	Signatory states do not share the same conservation values	C1, C3, E1, G3, G4, S3, S4, S5
Places territorial claims on hold	C3, C4, E2, G3, G5, I2, S1, S3, S4, S5, S6	Growing number of signatory states are bringing an increasing diversity of value systems	C1, C3, C6, E1, G1, G3, G4, S3, S4
Is inclusive	G2, G5	Signatory states do not share a common native language which can lead to inaccurate translations and misinterpretation of policies	C1, C3, G2, G3, G4, S3
Is multinational	C5, G4, I2	In the ATS science is used as a way to exert presence in Antarctica by some states	C1, C3, E2, G1, I1
Is open for countries to join	C3, E1, G1, G2, G5, I2, S3, S4, S5	In the ATS conservation is used to assert territorial claims by some states	S1, S2

Has evolved to address issues and threats	C5, E1, G1, G2, I2, S3, S5	Growing number of acceding states makes it harder to reach consensus	C3, C4, G5, I1, S1, S2
Has successfully managed the Antarctic environment	C2, E2, G1, G4, S5	Original signatory states are seen as separate from “newly” acceding states	G4, S3, S4
Has been long lasting	C4, S1, S3	Consensus decision making progress is a weakness of the system	C3, C4, C6, C7, E1, G1, G2, G3, G4, G5, I1, I2, S1, S2, S3, S6
Has no end date	S3	Signatory states have a high turnover of diplomats dealing with Antarctic affairs	G2, I1, S2
Has a consensus decision making system which holds a number of positive features	E1, I1, S1, S2, S5, S6	Diplomats lack connection to Antarctica	C1, C6, I1
Has a high level of diplomacy	C3, C6, G5, I1, S2, S6	Diplomats lack depth of knowledge on Antarctic matters	S1, S6
Has evolved to include many agreements protecting the Antarctic	C5, E1, G1, G2, I2, S3, S5		
Bases policy on scientific advice	G4, I2, S2		
Is respected internationally	C1		

References

- Agrawal, A. (2014). Studying the commons, governing common-pool resource outcomes: Some concluding thoughts. *Environmental Science & Policy*, 36(0), 86-91. doi:<http://dx.doi.org/10.1016/j.envsci.2013.08.012>
- Ainley, D., & Brooks, C. M. (2013). Exploiting the Southern Ocean: Rational Use or Reversion to Tragedy of the Commons? In D. Liggett & A. D. Hemmings (Eds.), *Exploring Antarctic Values* (pp. 143-154). Christchurch: Gateway Antarctica Special Publication.
- Ali, S. H. (2007). *Peace parks: conservation and conflict resolution*. Cambridge, MA: The MIT Press.
- Antarctic and Southern Ocean Coalition. (2012). *Antarctic Ocean Legacy: A Vision for Circumpolar Protection*. Paper presented at the meeting of the Antarctic Treaty Consultative Meeting XXXV, Hobart 2012. Retrieved from http://www.asoc.org/storage/documents/Meetings/ATCM/XXXV/Antarctic_Ocean_Legacy-A_Vision_for_Circumpolar_Protection.pdf
- Antarctic Ocean Alliance. (2012). *Antarctic Ocean legacy: a vision for circumpolar protection*. Wellington, New Zealand: Antarctic Ocean Alliance. Retrieved from <http://www.antarcticocean.org/wp-content/uploads/2013/03/11241-AOA-Circumpolar-Report-FINAL.pdf>
- Antarctic Treaty Secretariat. (2011). *The Antarctic Treaty*. Retrieved August, 2012, from <http://www.ats.aq/e/ats.htm>
- Antarctic Treaty Secretariat. (2014). *Antarctic Treaty Parties*. Retrieved April, 2014, from http://www.ats.aq/devAS/ats_parties.aspx?lang=e
- Antarctic Treaty Secretariat. (2016). *Parties*. Retrieved 16 September 2016, from http://www.ats.aq/devas/ats_parties.aspx?lang=e
- Antarctica New Zealand. (2014). *About us*. Retrieved April, 2014, from <http://antarcticanz.govt.nz/about-us>
- Araral, E. (2014). Ostrom, Hardin and the commons: A critical appreciation and a revisionist view. *Environmental Science & Policy*, 36(0), 11-23. doi:<http://dx.doi.org/10.1016/j.envsci.2013.07.011>
- Babbie, E. (2004). *The Practice of Social Research* (10th Edition ed.). Belmont, CA: Wadsworth/Thomson Learning.
- Bargagli, R. (2005). *Antarctic ecosystems: environmental contamination, climate change, and human impact* (Vol. 175). New York: Springer.
- Beck, P. J. (1984). The United Nations and Antarctica. *Polar Record*, 22(137), 137-144. doi:<http://dx.doi.org/10.1017/S0032247400005076>
- Beck, P. J. (2006). The United Nations and Antarctica, 2005: the end of the 'Question of Antarctica'? *Polar Record*, 42(03), 217-227. doi:<http://dx.doi.org/10.1017/S003224740600533X>
- Blay, S. K. N. (1992). New trends in the protection of the Antarctic environment: the 1991 Madrid Protocol. *The American Journal of International Law*, 86(2), 377-399. doi:10.2307/2203243

- Brady, A.-M. (2013a). China's Antarctic interests. In A.-M. Brady (Ed.), *The Emerging Politics of Antarctica*. Oxon: Routledge.
- Brady, A.-M. (2013b). New Zealand's Antarctica. In A.-M. Brady (Ed.), *The Emerging Politics of Antarctica*. Oxon: Routledge.
- Brandt, R. E., Warren, S. G., Worby, A. P., & Grenfell, T. C. (2005). Surface albedo of the Antarctic sea ice zone. *Journal of Climate*, 18(17), 3606-3622.
- Brewster, B., & Friends of the Earth. (1982). *Antarctica: wilderness at risk*. Wellington N.Z.: Reed.
- Brooks, C. M. (2013). Competing values on the Antarctic high seas: CCAMLR and the challenge of marine-protected areas. *The Polar Journal*, 3(2), 277-300.
doi:<http://dx.doi.org/10.1080/2154896X.2013.854597>
- Buck, S. J. (1998). *The global commons: an introduction*. Washington, DC: Island Press.
- CCAMLR. (2011). *Conservation Measure 91-04 (2011). General framework for the establishment of CCAMLR Marine Protected Areas* CCAMLR. Retrieved from <https://www.ccamlr.org/node/74905>
- CCAMLR. (2014). *CCAMLR - background information*. Retrieved April, 2014, from <http://www.ccamlr.org/en/organisation/ccamlr-background-information>
- CCAMLR. (2016, 28 October 2016). *CCAMLR to create world's largest Marine Protected Area* [Media release]. Retrieved from <https://www.ccamlr.org/en/organisation/ccamlr-create-worlds-largest-marine-protected-area>
- Chown, S. L., Lee, J. E., Hughes, K. A., Barnes, J., Barrett, P. J., Bergstrom, D. M., . . . Dyer, G. (2012). Challenges to the Future Conservation of the Antarctic. *Science*, 337(6091), 158-159.
doi:10.1126/science.1222821
- Chown, S. L., McGeoch, M. A., Bohec, C. L., Klaveren-Impagliazzo, C. V., Terauds, A., Whittington, J. D., . . . Stoett, P. (2015). *The Monaco assessment* Retrieved 10 Septiembre 2016, from http://www.scar.org/scar_media/documents/policyadvice/Monaco_Assessment_document_2015.pdf
- Consultative Parties to the Antarctic Treaty. (2016). *Santiago Declaration on the Twenty Fifth Anniversary of the signing of the Protocol on Environmental Protection to the Antarctic Treaty*. Santiago Retrieved from http://www.ats.aq/documents/ATCM39/ad/atcm39_ad003_e.pdf
- Convey, P., Hughes, K. A., & Tin, T. (2012). Continental governance and environmental management mechanisms under the Antarctic Treaty System: sufficient for the biodiversity challenges of this century? *Biodiversity*, 13(3-4), 234-248.
doi:<http://dx.doi.org/10.1080/14888386.2012.703551>
- Creswell, J. W., & Clark, V. L. P. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks: SAGE Publications, Inc.
- Curry, J. A., Schramm, J. L., & Ebert, E. E. (1995). Sea ice-albedo climate feedback mechanism. *Journal of Climate*, 8(2), 240-247.

- Department of Conservation. (2014). *New Zealand and Antarctica*. Retrieved April, 2014, from <http://www.doc.govt.nz/about-doc/role/international/antarctica-treaty-system/nz-and-antarctica/>
- Dietz, T., Dolšák, N., Ostrom, E., & Stern, P. C. (2002). The Drama of the Commons. In E. Ostrom, T. Dietz, N. Dolsak, P. C. Stern, S. Stonich & E. U. Weber (Eds.), *The drama of the commons*. Washington: National Academies Press.
- Dietz, T., Ostrom, E., & Stern, P. C. (2003). The struggle to govern the commons. *Science*, 302(5652), 1907-1912. doi:10.1126/science.1091015
- Dodds, K. (2009). Settling and unsettling Antarctica. *Signs*, 34(3), 505-509. doi:10.1086/593340
- Dodds, K. (2010). Governing Antarctica: Contemporary challenges and the enduring legacy of the 1959 Antarctic Treaty. *Global Policy*, 1(1), 108-115. doi:10.1111/j.1758-5899.2009.00006.x
- Dolšák, N., & Ostrom, E. (2003). *The commons in the new millennium: challenges and adaptation*. Cambridge MA: MIT Press.
- Falk, R. (2000). Humane governance for the world: reviving the quest. *Review of International Political Economy*, 7(2), 317-334. doi:<http://dx.doi.org/10.1080/096922900346992>
- French, D. (1999). Sustainable development and the 1991 Madrid protocol to the 1959 Antarctic treaty: The primacy of protection in a particularly sensitive environment. *Journal of International Wildlife Law and Policy*, 2(3), 291-317. doi:<http://dx.doi.org/10.1080/13880299909353935>
- Friedheim, R., & Akaha, T. (1989). Antarctic Resources and International Law: Japan, the United States, and the Future of Antarctica. *Ecology LQ*, 16, 119. doi:<http://dx.doi.org/doi:10.15779/Z38SR8M>
- Grant, S. M., Convey, P., Hughes, K. A., Phillips, R. A., & Trathan, P. N. (2012). Conservation and management of Antarctic ecosystems. . In A. D. Rogers, N. M. Johnston, E. J. Murphy & A. Clarke (Eds.), *Antarctic ecosystems: an extreme environment in a changing world*. Oxford: John Wiley & Sons.
- Grant, S. M., Hill, S. L., Trathan, P. N., & Murphy, E. J. (2013). Ecosystem services of the Southern Ocean: trade-offs in decision-making. *Antarctic Science*, 25(5), 603-617. doi:10.1017/S0954102013000308
- Grimble, R., & Chan, M.-K. (1995). Stakeholder analysis for natural resource management in developing countries. *Natural Resources Forum*, 19(2), 113-124. doi:10.1111/j.1477-8947.1995.tb00599.x
- Grimble, R., & Wellard, K. (1997). Stakeholder methodologies in natural resource management: a review of principles, contexts, experiences and opportunities. *Agricultural systems*, 55(2), 173-193. doi:10.1016/S0308-521X(97)00006-1
- Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field methods*, 18(1), 59-82. doi:10.1177/1525822X05279903
- Haase, D., Lamers, M., & Amelung, B. (2009). Heading into uncharted territory? Exploring the institutional robustness of self-regulation in the Antarctic tourism sector. *Journal of Sustainable Tourism*, 17(4), 411-430. doi:<http://dx.doi.org/10.1080/09669580802495717>

- Haase, D., Storey, B., McIntosh, A., Carr, A., & Gilbert, N. (2007). Stakeholder Perspectives on Regulatory Aspects of Antarctic Tourism. *Tourism in Marine Environments*, 4(2), 167-183. doi: <http://dx.doi.org/10.3727/154427307784771959>
- Hamzah, B. A. (2010). Malaysia and the Southern Ocean: revisiting the question of Antarctica. *Ocean Development and International Law*, 41(2), 186-195. doi: <http://dx.doi.org/10.1080/00908321003733147>
- Hansom, J. D., & Gordon, J. E. (1998). *Antarctic environments and resources: a geographical perspective*. Harlow: Addison Wesley Longman.
- Hardin, G. (1968). The tragedy of the commons. *science*, 162(3859), 1243-1248. doi: <http://dx.doi.org/10.1080/19390450903037302>
- Hemmings, A. D. (2012). Considerable values in Antarctica. *The Polar Journal*, 2(1), 139-156. doi: <http://dx.doi.org/10.1080/2154896X.2012.679565>
- Hemmings, A. D., & Kriwoken, L. K. (2010). High level Antarctic EIA under the Madrid Protocol: state practice and the effectiveness of the Comprehensive Environmental Evaluation process. *International Environmental Agreements: Politics, Law and Economics*, 10(3), 187-208. doi:10.1007/s10784-010-9119-5
- Hoyt, E. (2011). *Marine protected areas for whales, dolphins, and porpoises: a world handbook for cetacean habitat conservation* (Second ed.). New York: Earthscan.
- Hughes, K. A. (2010). How committed are we to monitoring human impacts in Antarctica? *Environmental Research Letters*, 5(4). doi: <http://dx.doi.org/10.1088/1748-9326/5/4/041001>
- IAATO. (2016a). *Antarctic Tourism Figures Released as IAATO's 25th Anniversary Meeting Begins*. Retrieved from <http://iaato.org/documents/10157/1278700/News+Release+IAATO+2016+opens++Final.pdf/f48971b5-3e58-4ec1-a0e2-e37eb5d59263>
- IAATO. (2016b). *Antarctica Tourism Fact Sheet 2016-2017*. Newport, Rhode Island: IATTO. Retrieved from <http://iaato.org/documents/10157/25111/IAATO+Fact+Sheet+2016-17.pdf/718a90a9-ba04-4890-826b-d63b269dce52>
- IMO. (2016). *Shipping in polar waters. Adoption of an international code of safety for ships operating in polar waters (Polar Code)*. Retrieved 25 October 2016, from <http://www.imo.org/en/mediacentre/hottopics/polar/pages/default.aspx>
- IUCN. (1991). *A strategy for Antarctic conservation*. Gland, Switzerland: IUCN.
- IUCN. (2016). *Motions*. Retrieved 13 September 2016, from <https://portals.iucn.org/congress/assembly/motions>
- Jabour, J. (2014). Strategic management and regulation of Antarctic tourism. In T. Tin, D. Liggett, P. T. Maher & M. Lamers (Eds.), *Antarctic Futures: Human Engagement with the Antarctic Environment* (pp. 273-286). Dordrecht: Springer Netherlands.
- Jawadekar, N. (2008). *Global commons management and governance*. New Delhi: SBS.
- Johnston, S. (1999). Principles of international environmental law. In T. M. Swanson & S. Johnston (Eds.), *Global environmental problems and international environmental agreements: the economics of international institution building*. Northampton, MA: E. Elgar.

- Joughin, I., & Alley, R. B. (2011). Stability of the West Antarctic ice sheet in a warming world. *Nature Geoscience*, 4(8), 506-513. doi:10.1038/ngeo1194
- Joyner, C. C. (1998). *Governing the frozen commons: The Antarctic regime and environmental protection*. Columbia, SC: University of South Carolina Press
- Kennicutt, M., Chown, S., Cassano, J., Liggett, D., Massom, R., Peck, L., . . . Wilson, T. (2014). Polar research: Six priorities for Antarctic science. *Nature*, 512(7512), 23. doi:<http://arrow.monash.edu.au/hdl/1959.1/1098917>
- Kennicutt, M. C., Chown, S. L., Cassano, J. J., Liggett, D., Peck, L. S., Massom, R., . . . Sutherland, W. J. (2014). A roadmap for Antarctic and Southern Ocean science for the next two decades and beyond. *Antarctic Science*, 27(1), 3-18. doi:10.1017/S0954102014000674
- Lamers, M., Haase, D., & Amelung, B. (2008). Facing the elements: analysing trends in Antarctic tourism. *Tourism Review*, 63(1), 15-27. doi:<http://dx.doi.org/10.1108/16605370810861017>
- Lamers, M., Liggett, D., & Amelung, B. (2012). Perspective: Strategic challenges of tourism development and governance in Antarctica: taking stock and moving forward. *Polar Research*, 31. doi:10.3402/polar.v31i0.17219
- Liggett, D., Lamers, M., Tin, T., & Maher, P. T. (2014). Conclusion: Multiple Dimensions of Human Engagement with the Antarctic Environment. In T. Tin, D. Liggett, P. T. Maher & M. Lamers (Eds.), *Antarctic Futures: Human Engagement with the Antarctic Environment* (pp. 335-351). Dordrecht: Springer Netherlands.
- Liggett, D., McIntosh, A., Thompson, A., Gilbert, N., & Storey, B. (2011). From frozen continent to tourism hotspot? Five decades of Antarctic tourism development and management, and a glimpse into the future. *Tourism Management*, 32(2), 357-366. doi:<http://dx.doi.org/10.1016/j.tourman.2010.03.005>
- Lofland, J., Snow, D., Anderson, L., & Lofland, L. H. (2006). *Analyzing social settings*. Belmont, CA: Wadsworth, Cengage Learning.
- Masson-Delmotte, V. (2013). Ice with everything. In D. W. H. Walton (Ed.), *Antarctica: global science from a frozen continent*: Cambridge University Press.
- Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts. *The Academy of Management Review*, 22(4), 853-886. doi:10.2307/259247
- Morse, J. M., & Niehaus, L. (2009). *Mixed method design: Principles and procedures* (Vol. 4). Walnut Creek: Left Coast Press, Inc.
- Neufeld, E., O'Reilly, J., Summerson, R., & Tin, T. (2014). Valuing Antarctica: emerging views from international studies. In T. Tin, D. Liggett, P. T. Maher & M. Lamers (Eds.), *Antarctic Futures: Human Engagement with the Antarctic Environment* (pp. 233-252). Dordrecht: Springer Netherlands.
- New Zealand Ministry of Foreign Affairs & Trade. (2014). *Antarctica and the Southern Ocean*. Retrieved April, 2014, from <https://www.mfat.govt.nz/en/environment/antarctica/>
- Olson, M. (1965). *The logic of collective action*. Cambridge, MA: Harvard University Press.

- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. New York, NY: Cambridge University Press.
- Ostrom, E. (1992). The Rudiments of a Theory of the Origins, Survival, and Performace of Common-Property Institutions. In D. W. Bromley (Ed.), *Making the commons work: Theory, practice, and policy* (pp. 293-318). San Francisco, CA: Institute for Contemporary Studies.
- Ostrom, E. (2005). *Understanding institutional diversity*. Princeton, NJ: Princeton Univeristy Press.
- Ostrom, E., Burger, J., Field, C. B., Norgaard, R. B., & Policansky, D. (1999). Revisiting the commons: local lessons, global challenges. *Science*, 284(5412), 278-282.
doi:10.1126/science.284.5412.278
- Ostrom, E., & Ostrom, V. (1977). Public goods and public choices. In E. S. Savas (Ed.), *Alternatives for Delivering Public Services: Toward Improved Performance*. (pp. 7-49). Boulder, CO: Westview Press.
- Ostrom, V., & Ostrom, E. (1999). Public goods and public choices. In M. D. McGinnis (Ed.), *Polycentricity and Local Public Economies: Readings from the Workshop in Political Theory and Policy Analysis* (pp. 75-105): University of Michigan Press.
- Oxman, B. H. (1986). Antarctica and the New Law of the Sea. *Cornell Int'l LJ*, 19, 211.
- Parnell, J. (2007). *A stakeholder analysis of Macquarie Island. Identifying opportunities and constraints, and facing the future*. Univeristy of Tasmania, Tasmania.
- Polk, W. A. (1998). Welcome to the Hotel Antarctica: The EPA's interim rule on Environmental impact assessment of tourism in Antarctica. *Emory Int'l L. Rev.*, 12, 1395-1442.
- Pope Francis. (2015). *Laudato si'*. Vatican City: Roman Catholic Church. Retrieved from http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html
- Poteete, A. R., Janssen, M. A., & Ostrom, E. (2010). *Working together: collective action, the commons, and multiple methods in practice*. Princeton, NJ: Princeton University Press.
- Prell, C., Hubacek, K., & Reed, M. (2009). Stakeholder analysis and social network analysis in natural resource management. *Society and Natural Resources*, 22(6), 501-518.
doi:<http://dx.doi.org/10.1080/08941920802199202>
- Protocol on Environmental Protection to the Antarctic Treaty. (1991). *Protocol on Environmental Protection to the Antarctic Treaty*. Madrid. Retrieved from http://www.ats.aq/documents/recatt/Att006_e.pdf
- Reed, M. S., Graves, A., Dandy, N., Posthumus, H., Hubacek, K., Morris, J., . . . Stringer, L. C. (2009). Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of environmental management*, 90(5), 1933-1949.
doi:<http://dx.doi.org/10.1016/j.jenvman.2009.01.001>
- Rodger, A. (2013). Antarctica: a global change perspective. In D. W. H. Walton (Ed.), *Antarctica: global science from a frozen continent*: Cambridge University Press.
- Rogers, A. D. (2012). Evolution and biodiversity of Antarctic organisms. A molecular perspective. . In A. D. Rogers, N. M. Johnston, E. J. Murphy & A. Clarke (Eds.), *Antarctic ecosystems: an extreme environment in a changing world*. Oxford: John Wiley & Sons.

- Rogers, A. D., Johnston, N. M., Murphy, E. J., & Clarke, A. (2012). *Antarctic ecosystems: an extreme environment in a changing world*. Oxford: John Wiley & Sons.
- Rolston III, H. (2002). Environmental ethics in Antarctica [Article]. *Environmental Ethics*, 24(2), 115-134. doi:10.5840/enviroethics200224226
- Rose, G., & Milligan, B. (2010). Law for the management of antarctic marine living resources: From normative conflicts towards integrated governance? *Yearbook of International Environmental Law*, 20(1), 41-87. doi:10.1093/yiel/20.1.41
- Rosenzweig, C., Iglesias, A., Yang, X., Epstein, P. R., & Chivian, E. (2001). Climate change and extreme weather events; implications for food production, plant diseases, and pests. *Global change & human health*, 2(2), 90-104. doi:10.1023/A:1015086831467
- Saul, B., & Stephen, T. (2015). *Antarctica in international law*. Oxford: Hart Publishing.
- Scientific Committee on Antarctic Research. (2016a). *The international Council for Science SCAR bulletin No. 196 Report of the SCAR Delegation to XXXIX ATCM and CEP XIX Scott Polar Research Institute*, Cambridge, U.K.: Scientific Committee on Antarctic Research.
- Scientific Committee on Antarctic Research. (2016b). *The Monaco assessment*. Retrieved 10 September 2016, from <http://www.scar.org/otherorganisations/monaco-assessment>
- Secretariat of the Antarctic Treaty. (2011). *Science and Operations*. Retrieved 21 September 2016, from http://www.ats.aq/e/ats_science.htm
- Secretariat of the Antarctic Treaty. (2016). *Outcomes of the XXXIX Antarctic Treaty Consultative Meeting* [Communique]. Retrieved from http://www.ats.aq/devPH/noticia_completa.aspx?IdNews=134&lang=e
- Shaw, J. D., Terauds, A., Riddle, M. J., Possingham, H. P., & Chown, S. L. (2014). Antarctica's protected areas are inadequate, unrepresentative, and at risk. *PLoS Biol*, 12(6), e1001888. doi:<http://dx.doi.org/10.1371/journal.pbio.1001888>
- Sheehan, K. B. (2001). E-mail Survey Response Rates: A Review. *Journal of Computer-Mediated Communication*, 6(2), 0-0. doi:10.1111/j.1083-6101.2001.tb00117.x
- Simon, M. M. (1999). The Arctic and the Antarctic: Heritage of humanity. In A. G. Lewkowicz (Ed.), *Poles Apart: A Study in Contrasts*. Ottawa: University of Ottawa Press.
- Sovacool, K. E. (2008). *A Stakeholder Analysis of the Creation of High Seas Marine Protected Areas within the Antarctic Treaty System*. Virginia Polytechnic Institute and State University.
- Stern, P. C. (2011). Design principles for global commons: natural resources and emerging technologies. *International Journal of the Commons*, 5(2). doi:<http://doi.org/10.18352/ijc.305>
- Stern, P. C., Dietz, T., Dolšák, N., Ostrom, E., & Stonich, S. (2002). Knowledge and Questions after 15 Years of Research. In E. Ostrom, T. Dietz, N. Dolsak, P. C. Stern, S. Stonich & E. U. Weber (Eds.), *The drama of the commons*. Washington DC: National Academies Press.
- Stewart, E. J., & Draper, D. (2008). The sinking of the MS Explorer: implications for cruise tourism in Arctic Canada. *Arctic*, 61(2), 224-228.

- Stokke, O. S., & Vidas, D. (1996). *Governing the Antarctic: the effectiveness and legitimacy of the Antarctic Treaty system*. New York: Cambridge University Press.
- Suter, K. (1991). *Antarctica: private property or public heritage?* Atlantic Highlands, N.J.: Zed Books.
- Talley, L. D., Pickard, G. L., Emery, W. J., & Swift, J. H. (2011). *Descriptive physical oceanography: an introduction* (Sixth ed.). Burlington, MA: Academic Press.
- Terauds, A., Chown, S. L., Morgan, F., J Peat, H., Watts, D. J., Keys, H., . . . Bergstrom, D. M. (2012). Conservation biogeography of the Antarctic. *Diversity and Distributions*, 18(7), 726-741. doi:10.1111/j.1472-4642.2012.00925.x
- The Antarctic Treaty. (1959). *The Antarctic Treaty*. Washington, DC, USA: Antarctic Treaty Secretariat. Retrieved from http://www.ats.aq/documents/keydocs/vol_1/vol1_2_AT_Antarctic_Treaty_e.pdf
- Tin, T. (2013). Environmental advocacy in the Antarctic Treaty System – a personal view from the 2000s. *The Polar Journal*, 3(2), 415-430. doi:<http://dx.doi.org/10.1080/2154896X.2013.861264>
- Tin, T., Fleming, Z., Hughes, K. A., Ainley, D., Convey, P., Moreno, C., . . . Snape, I. (2009). Impacts of local human activities on the Antarctic environment. *Antarctic Science*, 21(01), 3-33. doi:<http://dx.doi.org/10.1017/S0954102009001722>
- Tin, T., & Hemmings, A. (2011). Challenges in protecting the wilderness of Antarctica. In A. Watson, J. Murrieta-Saldivar & B. McBride (Eds.), *Science and stewardship to protect and sustain wilderness values: Ninth World Wilderness Congress symposium* (pp. 147-152). Fort Collins, CO: Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Tin, T., Lamers, M., Liggett, D., Maher, P. T., & Hughes, K. A. (2014). Setting the scene: Human activities, environmental impacts and governance arrangements in Antarctica. In *Antarctic Futures: Human Engagement with the Antarctic Environment* (pp. 1-24). Dordrecht: Springer Netherlands.
- Tourangeau, R., Conrad, F., & Couper, M. (2013). *The science of web surveys*. New York: Oxford University Press.
- Trewby, M. (2002). *Antarctica: an encyclopedia from Abbott Ice Shelf to zooplankton*. Auckland, N.Z: David Bateman.
- United Nations Environmental Programme. (2005). *Reports of the UN Secretary-General* Retrieved 2016, from <http://www.unep.org/dewa/Assessments/Ecosystems/Antarctica/ReportsoftheUNSecretaryGeneral/tabid/6960/Default.aspx>
- United Nations Framework Convention on Climate Change. (2016a). *Landmark Climate Change Agreement to Enter into Force*. Retrieved 7 October 2016, from <http://newsroom.unfccc.int/unfccc-newsroom/landmark-climate-change-agreement-to-enter-into-force/>
- United Nations Framework Convention on Climate Change. (2016b). *The Paris Agreement*. Retrieved 7 October 2016, from http://unfccc.int/paris_agreement/items/9485.php
- United Nations System Task Team. (2013). *United Nations System Task Team on the Post-2015 UN Development Agenda. Global governance and governance of the global commons in the*

global partnership for development beyond 2015: United Nations Development Programme.
Retrieved from
http://www.un.org/en/development/desa/policy/untaskteam_undf/thinkpieces/24_thinkpiece_global_governance.pdf

- Van Selm, M., & Jankowski, N. W. (2006). Conducting online surveys. *Quality and Quantity*, 40(3), 435-456. doi:10.1007/s11135-005-8081-8
- Vidas, D. (1996). The Antarctic Treaty System and the law of the sea: a new dimension introduced by the Protocol. In O. S. Stokke & D. Vidas (Eds.), *Governing the Antarctic: the effectiveness and legitimacy of the Antarctic Treaty system*. New York: Cambridge University Press.
- Vogler, J. (1995). *The global commons: a regime analysis*. New York: J. Wiley & Sons.
- Vogler, J. (2000). *The global commons*. West Sussex: J. Wiley & Sons.
- Walton, D. W. (2013). *Antarctica: global science from a frozen continent*. New York: Cambridge University Press.
- Woehler, E. J., Ainley, D., & Jabour, J. (2014). Human impacts to Antarctic wildlife: predictions and speculations for 2060. In T. Tin, D. Liggett, P. T. Maher & M. Lamers (Eds.), *Antarctic Futures: Human Engagement with the Antarctic Environment* (pp. 27-60). Dordrecht: Springer Netherlands.
- World Commission on Environment and Development. (1987). *Our common future*. Oxford: Oxford University Press.