CLIMATE CHANGE AND NATIONAL SECURITY

ANALYSIS OF THE NEW ZEALAND DEFENCE WHITE PAPER 2016 AND THE EFFECT CLIMATE CHANGE WILL HAVE ON NEW ZEALAND'S NATIONAL SECURITY

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"FOR ALL THE IMMEDIATE CHALLENGES THAT WE GATHER TO ADDRESS THIS WEEK – TERRORISM, INSTABILITY, INEQUALITY, DISEASE – THERE'S ONE ISSUE THAT WILL DEFINE THE CONTOURS OF THIS CENTURY MORE DRAMATICALLY THAN ANY OTHER, AND THAT IS THE URGENT AND GROWING THREAT OF A CHANGING CLIMATE."

-BARACK OBAMA, 2014[1]

[1] This was at a speech Obama gave at the United Nations 2014 Climate Change Summit - (Obama, 2014)

Abstract

Climate change is going to be a driver of regional instability and conflict, and the New Zealand Government needs to take this into account when preparing its national security plan. The New Zealand Defence White Paper 2016 has omitted any mention of climate change and this thesis has addressed the ramifications of this, as well as providing policy recommendations where the Defence White Paper 2016 could be strengthened. There are five areas in which it can be strengthened: the strategic outlook, Antarctica, the South Pacific, Humanitarian Work, and a domestic focus. Through using the Copenhagen School of Security we can identify that by naming climate change as a threat to national security, it enables us to address these threats through a securitisation of climate change. This securitisation involves, but is not limited to, reducing carbon emissions, increasing humanitarian aid, and purchasing more off-shore patrol vessels.

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Lastly, I am heavily indebted to my supervisor Dr. Kate McMillan. Your words of encouragement and scholarly advice has been immensely helpful. Thank you.

Dedication

This body of work has a threefold dedication.

Firstly, to those who create and drive policy – this is dedicated to you. Climate change is changing the political arena so dramatically that New Zealand needs the most cutting edge and nuanced policy. I hope this can inform your work.

Secondly, this is dedicated to those in Parliament who make decisions about the direction of New Zealand. I hope that you read this and find it informative, and guides you to make proper and just decisions.

Thirdly, and lastly, this is dedicated to all Queer kids in high school who have no idea what you want to do in your life. You have no presupposed guides for what you must do. Embrace your Queerness and be free. There will always be friends in Academia.

Contents

List of Acronyms

ATS	Antarctic Treaty System
CSD	Climate-Sensitive Diseases
DCP 2016	Defence Capabilities Plan 2016
DWP 2016	Defence White Paper 2016
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organisation of the United Nations
GDP	Gross Domestic Product
ICC	International Criminal Court
IPCC	Intergovernmental Panel on Climate Change
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NZDF	New Zealand Defence Force
PPM	Parts per million
UK	The United Kingdom
US	The United States of America
WHO	World Health Organisation

Introduction

Climate change is a growing threat to national security and New Zealand's defence policy, namely the 2016 New Zealand Defence Force White Paper (DWP 2016), is not adequate in preparing for, nor dealing with, this growing threat. What would the New Zealand Defence White Paper 2016 look like if climate change were accurately represented in it? In answering this question, this thesis will explore how climate change threatens national security, as well as bringing together the most recent scientific data in relation to climate change. With this information in hand, this thesis will explore five areas of the New Zealand Government's 2016 Defence White Paper which lack any mention or planned action on climate change. These five areas are New Zealand's Strategic Outlook in 2040, Antarctica, The South Pacific, Humanitarian Work, and a Domestic Focus chapter. Each of the five will be explored in some depth: first by showing how climate change will impact on each area, then examining international comparisons, before concluding by making recommendations on what the government should do based on international best practice.

To start, however, this thesis will demonstrate why the topic of climate change is relevant to national security and deserving of academic investigation. It is pertinent to look internationally for examples of how other countries are integrating climate change into their defence policy so that we can see where New Zealand's is lacking. The remainder of this section provides selected international examples, and more examples will be brought into this thesis in later chapters.

Currently most of New Zealand's key allies and partners are putting climate change at the heart of their defence policy. An example of this is the 2016 United States of America

Department of Defence's departmental directive to all defence staff to put climate change adaptation and resilience at the forefront of all their strategic planning. This is in accordance with Executive Order 13653, issued by Barack Obama in 2013, which requires all "federal agencies to integrate considerations of the challenges posed by climate change effects into their programs, policies, rules and operations to ensure they continue to be effective, even as the climate changes" (US Environmental Protection Agency, 2013). When the world's largest military is prioritising climate change in their defence policy, and the New Zealand government is doing the opposite, this suggests a potential oversight on behalf of the New Zealand government.

Continuing to look abroad, the United Kingdom's 2015 Defence Review addresses climate change at some length. Former Prime Minister David Cameron addressed climate change in the opening statement of the 2016 Defence Review, saying "…Britain's safety and security depends not just on our own efforts, but on working hand in glove with our allies to deal with the common threats that face us all, from terrorism to climate change" (Her Majesty's Government, 2015, p. 6). The Defence Review also highlights climate change as being a factor for state insecurity, increasing resource scarcity, and posing a threat to the United Kingdom's overseas territory (Her Majesty's Government, 2015, pp. 17, 21, 25). These are some of the many examples of the references to climate change in the Defence Review.

Closer to home, the Australian Government has included climate change in their 2016 Defence White Paper, mentioning it eight times in a 191 page document. This is still more than the zero mentions of climate change in the 88 page New Zealand DWP 2016. In terms of substance, the 2016 Australian Defence White Paper highlights climate change in its executive summary, identifying it as something that will contribute to uneven progress in the South

Pacific which may lead to instability in some Pacific countries (Australian Government, 2016). It also identifies climate change as one of the 'Six Key Drivers' that will shape Australia's security environment to 2035 (Australian Government, 2016, p. 41). Furthermore, the Australian government has identified climate change as a precursor to state fragility which will put pressure on the defence estate as climate change has an increasing impact on sea level rise (Australian Government, 2016, pp. 48, 102).

It is evident that New Zealand's key international allies and partners are incorporating climate change into their high-level defence policy. Further evidence of the international defence response to climate change will be provided later in the 'Climate Change as a Threat to National Security' chapter.

Academic Restrictions and Limitations

Every year there are a myriad of government positions worldwide about defence issues, especially in the current era of increasing turmoil and precariousness: for example, the conflict around sovereignty in the South China Sea and the Syrian Civil War. Thus, for the purpose of fair comparison I will be restricting the scope of this thesis to only examine national strategic documents. In the New Zealand context this is the 2016 Defence White Paper, for Australia this is the 2016 Australian Defence White Paper, for Britain it is the 2016 Defence Review, for the United States of America this is their Quadrennial Defence Review.

Further to the restriction of scope, this thesis will primarily use the Copenhagen School of Security when undertaking analysis and policy recommendations. This thesis will explain what the Copenhagen School of Security is, and its use will be justified later in the 'Defence

White Paper 2016' chapter. However as a brief justification for the reader, the Copenhagen School of Security requires issues that cannot be solved through ordinary political channels to be reclassified as security issues and thus acted on in the appropriate way. Since the issue of climate change has not been securitised by the government, as evident in the 2016 Defence White Paper, application of the principles of the Copenhagen School of Security allow for perspective on how the issue should be securitised.

As a preface before looking into the scientific evidence of climate change, it is necessary to discuss the nature of the scientific evidence that I draw from in this thesis. While scientific consensus is by nature in flux, the academic interpretation of the scientific consensus is often proven to be robust, *if* the academic interpretation is based on the best possible scientific consensus. That is to say, if in 15 years climate change is somehow debunked as a hoax (as some climate change deniers would believe) the academic work which I have produced on this subject will withstand scrutiny because it is based on the best possible scientific consensus at the time of writing. Whilst acknowledging that this is a potential academic limitation on the findings of this thesis, it can be overcome if proper principles of inquiry are upheld, which this thesis will do.

As of 2005, the Intergovernmental Panel on Climate Change (IPCC), the National Academy of Sciences, The American Meteorological Society, the American Geophysical Union, the American Association for the Advancement of Science, as well as many others, had all issued statements validating the scientific veracity of climate change (Oreskes, 2004). As of 2015, 97% of climate scientists agree that climate change is happening, and that it is human-caused (van der Linden, Leiserowitz, Feinberg, & Maibach, 2015). This is a sufficient threshold

to say that climate change is happening, and to justify the subsequent academic analysis this thesis will undertake. Now, the science on climate change.

The Science behind Climate Change

Climate change, or anthropogenic climate change, is the phenomenon whereby normal climate patterns are disrupted and altered because of human impact on atmospheric conditions. To put it simply, human activity emits greenhouse gasses: namely water vapour (H_2O), carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) (National Aeronautics and Space Administration, 2010). Greenhouse gasses trap outgoing thermal infrared radiation which is emitted the surface of the earth - from objects, such as rocks, the air and oceans, etc. - which are naturally heated by the sun. Not only do these greenhouses gasses trap heat, they also generate additional thermal infrared radiation heat because the thermal infrared radiation emitted from the earth's surface heats the greenhouse gas molecules which starts a chemical reaction which in effect turns the molecules into tiny heat radiators (National Aeronautics and Space Administration, 2010).

While the greenhouse gas effect is natural, human behaviour is fundamentally changing the amount of greenhouse gasses in the atmosphere. Greenhouse gasses are produced organically and released into the atmosphere, but then are typically dispersed by carbon reservoirs and their associated biological processes - such as absorbed into oceans, the land absorbing carbon, and trees recycling carbon dioxide into oxygen. This has resulted in a natural equilibrium, whereby when greenhouses gasses are produced, they are recycled by biological processes. However, "anthropogenic greenhouse gas emissions alter this equilibrium since more greenhouses gasses are being emitted into the atmosphere than can be taken up by the oceans and land system" (Dawson & Spannagle, 2009, p. 208).

It is not just that human emissions alter the equilibrium, human society produces gasses which fundamentally alter the equilibrium. Synthetic gasses, such as

hydrofluorocarbons and sulphur hexafluoride, are not easily absorbed into the natural systems and radiate more heat than other gasses (Lallanilla, 2015). The primary reason for the increase in the atmospheric concentration of CO_2 and other greenhouse gasses is the increased fossil fuel use since the pre-industrial era, although land-use change is another significant contributor (IPCC, 2007). The National Aeronautics and Space Administration (NASA) have five 'vital signs' which they use to measure the effects of climate change, which I will briefly explore. They are Carbon Dioxide, Global Temperature, Arctic Sea Ice Minimum, Land Ice and Sea Level.

The first, CO_2 as measured in Parts per Million (PPM), is at an all-time high.[2] In December of 2016 there was approximately 405.25PPM of CO_2 in the atmosphere (NASA, 2016a). This is slightly down from the all-time high in June 2016 of 407.42PPM. While the December figure indicates a slight decrease this is due a natural phenomenon; in the middle of the year there is more carbon in the atmosphere than at the beginning and end of the year (National Centers for Environmental Information, 2016). This can be explained by the role that vegetation plays in the broader carbon cycle. When leaves and other vegetation die in the northern winter, there is not enough sunlight for them to start to decompose and release the CO_2 that is stored within them. When the sunlight starts again in May and June the vegetation starts to rot and releases substantial amounts of CO_2. This cycle is not counterbalanced by the fact that both hemispheres get winters as there is more vegetation in the northern hemisphere than in the southern hemisphere.

To give some historical context, in June of 1958 there was 317.50PPM of CO_2 in the atmosphere – this is an increase of 89.92PPM of CO_2 in 58 years. Graph A in the appendix

[2] That is parts of carbon dioxide per million molecules of dried air, with the water vapour removed.

illustrates the amount of carbon dioxide in the atmosphere, starting from 400,000 years ago. There is a sharp increase in the amount CO_2 during and after the era of industrialisation.

The next vital sign that NASA uses is global temperature. On the 19th January 2017 NASA released a press statement saying that 2016 was the warmest year in 136 years (NASA, 2017). NASA write, "In 2016, surface temperatures on Earth were the warmest that they have been since modern recordkeeping began in 1880," and continue on to say that "Globally-averaged temperatures in 2016 were 0.99 degrees Celsius (1.78 degrees Fahrenheit) warmer than the mid-20th century mean" (NASA, 2017). See Graph B in the appendix for a visual representation of the increase in the global temperature.

The next two vital signs measured are the Arctic sea ice minimum and the amount of land ice that exists, which go hand-in-hand. Arctic ice levels are a good measure of climate change, because as the United States Environmental Protection Agency states on their website, "sea ice is light-colored, [so] it reflects more sunlight (solar energy) back to space than liquid water, thereby playing an important role in maintaining the Earth's energy balance and helping to keep polar regions cool" (United States Environmental Protection Agency, 2016). When this sea ice decreases, "the Arctic region's cooling effect is reduced, and this may initiate a 'feedback loop' whereby ocean warming caused by more absorption of solar energy leads to an even greater loss of sea ice and further warming" (United States Environmental Protection Agency, 2016). Arctic sea ice reaches its minimum every September, and is now "declining at a rate of 13.4 percent per decade, relative to the 1981 to 2010 average" (NASA, 2016b). See Graph C in the appendix for a visual representation of this.

Land ice is also disappearing at an increasingly fast rate. NASA's satellites show that the Greenland ice sheet has been losing an estimated 287 gigatonnes of mass per year since 2002, whilst Antarctica has been losing an estimated 134 gigatonnes per year since 2002. Visual representations of the amount of ice melting on both the Greenland ice sheet and the Antarctic ice sheet can be found in the appendix, labelled as Graph D and Graph E, respectively. This mass melting of ice is interconnected with the last of NASA's vital signs, sea level rise. Since January 1993, NASA's sea level observations show that the average sea height has increased by 86.2mm (NASA, 2016d). Graph F in the appendix illustrates this increase. The rise in sea level is due both to the aforementioned ice melting, as well as the molecular expansion of sea water as it heats up.

Now that the physical science basis has been established, we can move on to contextualise the climate change situation in New Zealand, to show *why* it matters that the New Zealand 2016 Defence Force White Paper does not address climate change.

Climate Change in New Zealand

In 2014 the Intergovernmental Panel on Climate Change (IPCC) released a report titled *Climate Change 2014: Impacts, Adaptation, and Vulnerability*[3] which details the effects of climate change on New Zealand. This report said that in New Zealand there has been a 0.09°C ± 0.03°C increase in mean air temperature per decade since 1909 and that this trend will continue – this is nearly a 1°C rise in little over one hundred years (IPCC, 2014, p. 1380). The IPCC also reported that the average rate of relative sea level rise was 1.7 ± 0.1mm per year

[3] This is the Fifth IPCC Assessment Report, however was titled: 'Climate Change 2014: Impacts Adaptation, and Vulnerability.'

over the 1990-2009 period (IPCC, 2014, p. 1381). The report has dire predictions for the future, including an increase in days that have 'very high' and 'extreme' fire danger warnings in some locations in New Zealand by up to 400% by 2040, and up to 700% by 2090 (New Zealand Climate Change Centre, 2014, p. 1). The time that Eastern and Northern New Zealand spends in drought is expected to double or triple by 2040, whilst other areas (such as the West Coast of the South Island) will see a rise in extreme rainfalls (New Zealand Climate Change Centre, 2014, p. 1).

Further to the 2014 IPCC estimate, the National Centers for Environmental Information (NCEI) detail just how New Zealand has been affected by climate change in their annual *State of the Climate* report. According to NIWA[4] data, which the United-States based NCEI use, 2015 was the 27th consecutive warmest year for New Zealand in the 107 year record (National Centers for Environmental Information, 2015, pp. 224-225). In the most recent NCEI update, however, January-August of 2016 was the hottest eight month period in the 107 years since the records began. In the 2015 report, the NCEI also reported that the rainfall rates in New Zealand were below normal, with only 50-79% of the annual normal rainfall occurring (National Centers for Environmental Information, 2015).[5]

The rate that the global climate changes is expected to increase as the world population and development increases. The global population has increased from an estimated one billion people at the start of the Industrial Revolution in the late eighteenth century to 2.5 billion people in 1950 and in 2008 was sitting at around 6.7 billion (Barnett,

[4] NIWA is the official name, however NIWA is the National Institute of Water and Atmospheric Research – a New Zealand Crown Research Institute.

[5] The ongoing trend of drought around most of the country, in particular the Canterbury Plains has been well documented. I would refer the reader to a google search for relevant news story.

2010, p. 123). At the time of writing, the United States Census Bureau estimated that that there are 7,350,034,444 people on the planet (United States Census Bureau, 2016).[6] This growing population, and an apparent unwillingness at a domestic or international level to combat climate change, has secured the current climate change trajectory.

[6] This was taken on the 4th November, 2016.

Climate Change as a Threat to National Security

This chapter will investigate the links between a changing climate and national security. In doing so, this chapter will look at some of the challenges it has already created as well canvassing some of the international responses to climate change, as touched upon in the introduction.

Before moving ahead to identify how climate change will pose a threat to national security, it is necessary to define national security. National security is an essentially contested definition. For example, Premaratne's (2016) defines national security as the "safeguarding [of] the sovereignty, territorial integrity, citizenry and socioeconomic functionality of a nation from an aggressor intent on undermining a particular valued aspect of a nation through violent or unjust means" (Premaratne, 2016, p. 1). However this definition is not appropriate for the threat of climate change as it talks of an aggressor intent on undermining valued aspects of the nation. Climate change is a non-state, nonagentive, scientific process and thus has no inherent intentions, therefore Premaratne's definition is obsolete for this thesis.

Harold Brown, former United States Secretary of Defence, provides a more suitable definition in his 1983 book *Thinking About National Security: Defense and Foreign Policy in a Dangerous World*. Brown writes that national security "is the ability to preserve the nation's physical integrity and territory; to maintain its economic relations with the rest of the world on reasonable terms; to protect [the state's] nature, institutions, and governance from disruption from outside, and to control its borders" (Brown H. , 1983, p. 4). As Brown's definition focuses on the state and the associated challenges in relation to the state, and not

on those that can challenge the state as Premaratne does, it is more suitable for the intentions of this thesis. Therefore, to show the reader that climate change poses a threat to national security, climate change must be proved to meet the criteria that Brown lays out. This thesis will now detail how climate change poses a threat to national security.

Climate Change and Forced Migration

Climate change is, and will continue to be, a driver of internal and external forced migration which threatens state security in a myriad of ways.[7] Sea level rise can be anticipated as a major contributor to the displacement of people. An estimated 2.33 billion people, one third of the world's total population, live within 60 kilometres of a coastline (Campbell & Parthemore, p. 14). Whilst predictions for the amount of sea level rise vary, in IPCCs fifth assessment report they predict that at a minimum sea levels will rise by a third of a metre by 2200, and in the worst case will rise by in excess of two metres (IPCC, 2014, p. 369).[8] A recent World Bank report calculated that hundreds of millions of people, many of whom living in developing countries, will have to leave their homes because of sea level rise (Campbell & Parthemore, 2008, p. 14).

In Asia, many populated cities are located on the coast – including Shanghai, Tianjin, Guangzhou, Hong Kong, Tokyo, Jakarta, Manila, Bangkok, Singapore, Bangladesh, Mumbai and Dhaka (Dupon & Pearman, 2006, p. 48). These are some of the most populated cities in

[7] I'm thankful for my supervisor Dr Kate McMillan for her feedback on the topic of forced migration and climate change refugees. Whilst my initial drafts had used the term climate change refugees in a loose manner, I have opted instead for forced migrants or forced migration. This is because refugees cannot currently seek asylum because of the effects climate change, thus until climate change is legally and internationally recognised as a legitimate reason for asylum, the term forced climate migrants is appropriate.

[8] The IPCC predict that in the long term, sea level rise by 2500 will be in between 0.5 metres and potentially in excess of 6 metres. (IPCC, 2014, p. 369)

the world, all of which will face forced displacement of a large number people if sea levels rise as they are expected to. In North America a 1 metre sea level rise, which is line with the IPCC prediction, would mean that 640,000km^2 of land would be underwater and would affect the populated areas of the Gulf Coast and Florida (Dawson & Spannagle, 2009, p. 107). Likewise in Europe, 20 million people will be affected over the 140,000km^2 area that will be flooded in the event of a 1 metre sea level rise (Dawson & Spannagle, 2009, p. 107).

It can be expected that New Zealand will see an increase in numbers of people seeking asylum because of sea level rise, especially given New Zealand's proximity to many low lying Pacific Islands. Kiribati, with a population of 106,000, is group of low lying coral atolls which are threatened by sea level rise. Alan Dupont and Graeme Pearman detail how Kiribati will be hit by sea level rise in their book *Heating up the Planet*: "periodic storm surges could well inundate up to 80% of the land area of North Tarawa and 54% of South Tarawa [which are the two main islands of Kiribati] by 2050 with economic costs expected to range between 10% and 30% of GDP in any given year" (Dupon & Pearman, 2006, p. 46). Putting aside the economic cost of this, the people of Kiribati will need somewhere to live if their country is experiencing regular storm surges, or is perpetually under water.

New Zealand has already experienced its first official climate change refugee from Kiribati who unsuccessfully sought asylum status. Ioane Teitiota was deported in September 2015 for overstaying his visa. Teitiota claimed that he was a climate refugee, however the Waitakere District Court ruled that he was staying here illegally and must be deported (Dastgheib, 2015). With the current trend of sea level rise, it is not controversial to claim that New Zealand will see more people, especially from the Pacific Islands, seeking refuge due to climate change. From a security perspective, there is a tension between the illegal migration

of people to New Zealand and the subsequent pressures it puts on the state, versus our humanitarian obligations.

Aside from sea level rise, the changes in weather patterns driven by climate change will also be a driver of forced migration. Whilst there are many methodological challenges in quantifying the amount of people that will be forced to move because of the effects of climate change, estimates vary from 212 million – 250 million climate refuges by 2050 (Biermann & Boas, 2010, pp. 67-68). This mass migration will be facilitated not only by sea level rise, but by the increase in the occurrence and intensity of climate events, such as storms, droughts and floods. In addition to these climate events, "climate processes" will also force people off their land. These processes include desertification, water scarcity and salinisation of agricultural land (Farquhar, 2015, p. 30).

Considering Brown's definition of national security given earlier, forced migrants pose a threat to national security in three ways: a threat to a state's sovereignty, to its borders, and to its institutions.[9] A mass migration of people could trigger a crisis of sovereignty in the host state. By this I mean the rapid influx of people of different nationalities and identities could create a crisis of identities and challenge "societal sovereignty" (Rudolph, 2006, p. 26). Christopher Rudolph writes extensively on this in his book *National Security and Immigration*, in which he claims that mass migration may "fundamentally challenge a polity's conception of national identity and long-held beliefs regarding the traditional bases of socio-political community" (Rudolph, 2006, p. 26). Rudolph then goes on to say that a sudden demographic shift may create such severe tensions between citizens of a country, and in a worst case

[9] I am of the opinion that migration should be encouraged and facilitated in a way that respects the fundamentals of human dignity and is in line with international law. However, this essay has a security focus, and as such migration should have a thorough security analysis.

situation may result in a civil war. Whilst the civil war claim may be vastly over estimated, at least in developed states with a functioning government and strong rule of law, there is substantial merit in the idea that migration causes tension between demographic groups which may challenge societal sovereignty.[10]

We have already seen this tension erupt. Since the United Kingdom decided to leave the European Union in the "Brexit" vote there have been a substantial increase in the number and frequency of hate crimes reported. Immediately after the June referendum the police reported a 46% spike in reports of hate crime on the year prior, and then the week after that there was a 58% increase in reports of hate crime on the year prior (Travis, 2016). The European Union and its principles of free movement of people, as well as the large number of immigrants coming into the United Kingdom was a driver of the decision for the British public to vote to leave (Arnorsson & Zoega, 2016). If the expected 250 million climate refugees were to eventuate, it is possible that we would see the same hostility and degradation of society as we have seen in this British case, but on a much larger scale. This would constitute a threat to societal sovereignty and thus a threat to national security.

Mass migration, fuelled by climate change, will also put stress on the ability for states to effectively manage their borders. New Zealand currently only accepts 750 refugees per year as part of its international obligations. If New Zealand were to accept more refugees, it would put institutional pressures on the screening and resettling process. And this is only for

[10] This was written before President Trump had taken office, and subsequently before his decisive executive orders regarding migration from Muslim countries. The effect of these, not even one week after his inauguration has resulted in civil unrest across the country. Later revisions of this thesis, and any work done built on this may have to relook at this section.
Societal sovereignty is a difficult concept to define – in its essence, societal sovereignty is the common identity a polity may share, and the comfort they get in doing so.

the refugees who seek asylum in New Zealand through institutional channels. If New Zealand were to consider refugees who sought asylum through non-institutional channels, such as via boat, this would provide a further challenge to New Zealand's borders.[11]

An example of this is a 2013 case in which a boat was intercepted by the Australian Customs Department with a sign saying "We want to go New Zealand" (Amnesty International New Zealand, 2013). On this boat were 66 people from Sri Lanka, fleeing the civil war and wanting to start a new life in New Zealand. Whilst New Zealand is far away from many of the countries that will experience forced migration because of the effects of climate change, New Zealand can expect to see more refugees seeking asylum in these non-institutional ways.[12] Concerns around the safety of refugees then run parallel with this issue – what obligations does New Zealand have to rescue those who are seeking asylum in New Zealand if, say, their boat starts to sink? Recently, numerous refugees have died after their boats sank trying to cross the Mediterranean Sea. In 2015, 3,625 people were reported missing or dead after trying to make the crossing from Africa and the Middle East to Europe (Al Jazeera, 2015).

Considerations of these asylum seekers will challenge the security dynamic here in New Zealand as the defence capabilities of New Zealand are not sufficient to deal with this kind of threat. Not only is New Zealand severely limited with by how many naval ships we possess, and further, the fact that the New Zealand Defence Force has never had to save a mass drowning of migrants means that New Zealand is very underprepared for this likely event. This is the second aspect of how mass migration may challenge New Zealand's national

[11] This thesis has avoided wording forms of asylum as legitimate and illegitimate. I am of the opinion that any seeking of asylum is legitimate, however there is a distinguishable difference between institutional ways of seeking asylum and non-institutional ways of seeking asylum.

[12] Especially when we consider New Zealand's international reputation of having a high standard of living, a stable democracy, and being relatively transparent.

security. The third aspect which I will now discuss is how these climate refugees will pose a threat to national security through putting immense pressure on the state and its institutions.

With the increase in mass migration, and those seeking asylum because of climate-change related factors, comes the increased risk of the spread of diseases. As refugee camps often have primitive facilities and infrastructure, and with many different people from different regions coming into contact with each other, there is a very real threat to state security if there was to be an outbreak of infectious diseases (Wirtz, 2002, p. 322). Infectious diseases strain the resources of a state as the health system moves to both minimise the risk, and to heal those who are ill. To summarise, "Disease can affect individuals and also weaken public confidence in a government's ability to respond; they have an adverse economic impact, undermine a state's social order, catalyze regional instability, and pose a strategic threat through bioterrorism or biowarfare" (Cecchine & Moore, 2006, p. 17). Whilst it is unlikely that New Zealand will have to set up refugee camps, if New Zealand were to experience a large influx of refugees these considerations around public health will still exist, just perhaps on a slightly smaller scare.

This is just one example of how the influx of climate refugees may threaten a state's institutions, and by extension challenge a state's national security. Ben Cramer writes that the accessibility to food in the regions where climate refugees relocate to will be an issue in the future (Cramer, 2012, p. 479). McGregor says that access to food is determined by the seasonality of food production, citing the situation in Western Sudan 1984-1985 when refugees could not get food because of a pre-existing famine. The very nature of climate change is that food patterns will be changed, thus creating a 'perfect storm' where areas that climate refugees move to may not have the normal amounts of food (McGregor, 1994, p.

124). This will increase pressure on the host country to feed them and, with the earlier consideration of a breakdown in civil society in mind, may constitute a threat to national security.

In summary, Michalowski and Kramer state that forced migrants will constitute a threat to national security: "Massive social upheavals, class conflict, and pandemics caused by climate change will stress social institutions, create ideological turmoil and generate political crises" (Michalowski & Kramer, 2012, p. 75).

Conflict Over Resources

Climate change will further threaten national security due to it functioning as a driver of intensifying conflict over resources. Water, air, food, minerals, energy resources and land are all resources which Prabhakaran Paleri claims will be potential sources of conflict in the future (Paleri, 2008, pp. 182-185). We have seen conflicts over water in the past: during World War II dams were bombed and the same happened in the Korean War on the Yalu River. More recently, water schemes were targeted by the United States in their 1991 invasion of Iraq, and in the 1993 Yugoslavian civil war the largest dam in Yugoslavia was a target (Paleri, 2008, p. 182). There are also contemporary disputes over large bodies of fresh water. To name two, there is a dispute over the Nile Waters between Egypt, Sudan, Ethiopia, Uganda, Rwanda, Kenya, Tanzania, Zaire and Burundi, and there is a conflict over the Euphrates waters between Turkey, Jordan, Syria, Iraq, and Iran.[13]

[13] For a full list, see Paleria (2008), page 182.

Currently there are approximately two billion people who live in areas that are experiencing water stress, but this may balloon to 4-5 billion by 2050 (Dawson & Spannagle, 2009, pp. 396-397).[14] Water scarcity will be driven by increased populations, shrinking glaciers, changing weather patterns, and an increase in urbanised living which requires more water. Consider the Nile example mentioned earlier: nine countries have varying levels of claims over the Nile waters, and yet the Nile flow could be reduced by 50%-75% by 2100. We have already seen micro-tensions between states over the dwindling Nile and both Ethiopia and Egypt have threatened to oppose states that interfere in their supply of the Nile (Campbell, et al., 2007, p. 76). In 2012 a document from Stratfor, a security contract company based in Texas, was released by WikiLeaks claiming that Egypt and Sudan were planning to build an airstrip in which they could send aircraft to bomb a newly built Ethiopian dam (Carlson, 2013). Whilst both countries denied that such plans exist, it suggests just how real this threat over water is.

We can deduce that with the increase in water scarcity driven by climate change, the history of conflict over water, and current disputes over water, the threat of a conflict over water is a very real one. This threat is exponentially increased when one considers that it is occurring in a very complex geo-political region, with many pre-existing historical, material, religious, and ethnic conflicts between the involved states. Considering again Brown's definition of national security, that the state maintains the "ability to preserve the nation's physical integrity and territory; to maintain its economic relations with the rest of the world on reasonable terms; to protect [the state's] nature, institutions, and governance from

[14] Water stress, as defined by Dawson and Spannagle, is "expressed in terms of *availability* of water per person, *access* to safe water, or *exposure* to risks (flood, drought, and health effects). Generally, if water extraction exceeds 20% of available of flows, then an area is considered to be stressed (Emphasis included in original. Dawson & Spannagle, 2009, p. 396).

disruption from outside, and to control its borders" (Brown H. , 1983, p. 4), we can see how climate change related water-scarcity may pose a threat to national security.

A similar threat to national security which climate change will exacerbate is a state's access to food. The issue of food security is inextricably linked to that of water security (water being a necessity for food to grow), but the significance of food security requires its own section. Considering a state's ability to ensure that its population is fed, and its ability to grow food, falls under the state's ability to protect its nature, institutions, and governance from outside. The Food and Agriculture Organisation of the United Nations (FAO) defines food security in the 1996 Rome Declaration of World Food Security as:

(i) "The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports;

(ii) Access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet;

(iii) Utilization of food through adequate diet, clean water, sanitation, and health care to reach a state of nutritional well-being, where all physiological needs are met; and

(iv) Stability, because to be food secure, a population, household or individual must have access to adequate food at all times" (von Braun & Wheeler, 2013, p. 509).

Currently the FAO estimates that two billion people are living in food insecurity, with most of this population centred in South Asia and sub-Saharan Africa (von Braun & Wheeler,

2013, p. 509).[15] Food insecurity has been decreasing globally, for example between 1970 and 2004 the percentage of the population who experienced food insecurity in East and Southeast Asia fell from 40%-45% to near 10%. (Lobell & Burke, 2010, p. 16). However climate change may substantially slow, stop, or even *reverse* this progress.

Climate change will impact food security through the alteration of weather patterns and the temperature increase, and the subsequent run-on effects they have for agricultural output. For example, the FAO have said that the increase in global temperatures will impact food production, storage and consumption in three ways:

(i) "Producing food:
   a. Immediate crop and livestock losses due to heat and water stress;
   b. Lower yields from diary animals;
   c. Reduced labour productivity due to heat stress.

(ii) Storage and processing of food:
   a. Upgrade in cooling and storage facilities required to maintain food quality at higher temperatures;
   b. Increasing energy requirements for cooling.

(iii) Consuming food:
   a. Higher intake of liquids;

[15] To be food insecure, means an individual does not meet one or more of the above Food and Agriculture Organisation of the United Nations criteria.
There are some crucial limitations to this estimation, namely that these estimates only capture the long-term trends and not the short-term trends which can be seen to be more reflective of climate variation. For further information about some of these limitations I would point you to page 509 of *Climate Change impacts on Global Food Security by* Tim Wheeler and Joachim Von Braun in *Science*. More information on this article can be found in the attached bibliography. For further discussion around the limitations of estimating the global hungry I would recommend reading the Chapter *Climate Effects on Food Security: An Overview* by Marshall Burke and David Lobell.

b. Lower intake of cooked food;
c. Perishable products have shorter shelf life" (Food and Agriculture Organization of the United Nations, 2008, p. 15).[16]

To contextualise this, by 2050 several agricultural outputs will have decreased because of climate change - across Africa and South Asia the average crop yield will decrease by 8% on current levels, all factors remaining steady (von Braun & Wheeler, 2013, p. 511). Across Africa, there will be a predicted 10% decrease in millet production, a 17% decrease in wheat and, 5% in maize. In South Asia there will a predicted 16% decrease in the production of maize and an 11% decrease in sorghum (von Braun & Wheeler, 2013, p. 511)

Von Braun and Wheeler sum up the effects of climate change on food security: "Agriculture is inherently sensitive to climate variation and change, as a result of either natural causes or human activities. Climate change caused by emissions of greenhouse gasses is expected to directly influence crop production systems for food, feed, or fodder. To affect livestock health, and to alter the pattern and balance of trade of food and food products" (von Braun & Wheeler, 2013, p. 510).Food security and its parameters have been established, and the impact climate change will have on food security has been discussed. It is pertinent to now discuss why a threat to food security is a threat to national security.

Food is a necessity to life, and when a population does not get food they put pressure on the government via the form of rioting or public protests. Paleri puts this best: "The French Revolution that led to peoples' rule bred from a lack of bread, among others... Naxalist

[16] As this thesis is considerably constrained by word count, I have chosen to omit some of the impacts that the FAO have listed under the rise in global mean temperatures. For the full list please see source.
This list is one of six that the FAO have prepared in their 2008 framework document, but again in the interests of the word count I have decided to also omit these. For the full list please see source.

violence in India originated from agricultural fields… Food riots continued in many parts of [post-WWII] Germany even after prices were stabilised. Food scarcity could ignite violence and other patterns of intense behaviour in a restless community" (Paleri, 2008, p. 301). Paleri ends this passage with the quote: "A government will lose an election in a democracy if food is pricey."

History, however, has shown that when food insecurity is combined with a restless population governments do not just lose elections, they often lose control. This is how food insecurity constitutes a threat to national security. Whilst New Zealand does not have an agitated or restless population, many other countries do which could spark, or worsen, existing tensions.[17] The parameters of national security that this thesis is working within mean that if there is a threat of a government losing control, or being unable to do the things that it is required to do (such as maintain international relations, physical and territorial integrity, etc.), then it is a threat to national security.

Economy, National Security and Climate Change

This section will look at the impact climate change will have on New Zealand's economy, and how these effects may, in turn, affect national security.

The New Zealand economy is built on exports.[18] For example, in June 2016 New Zealand's Gross Domestic Product (GDP) was $251.76 billion, and of that $70 billion was made

[17] This may be something that the New Zealand government needs to watch. Growing poverty rates in New Zealand coupled with rising food prices may exacerbate political tension.

[18] Former Prime Minister Robert Muldoon once said that New Zealand's "foreign policy is trade policy" and this rings just as true today as it did in the 1980s (Green, 2012). Thus any impact on our trade will impact equally on our foreign policy as well as our economy, doing a double blow to New Zealand's national security.

up entirely of exports – about one third (New Zealand Trade and Enterprise, 2016). Three of the four top export commodities are going to be adversely impacted by climate change: Milk powder, butter and cheese, valued at $11 billion; Meat and edible offal, valued at $6 billion; and logs, wood and wood articles, valued at $3.8 billion (New Zealand Trade and Enterprise, 2016).

The agricultural sector in New Zealand, which makes up a large part of the New Zealand economy and exports, is sensitive to the impacts of climate change. For instance, the production of milk and its associated products will be heavily impacted on by the changing weather. The new weather system for New Zealand will fundamentally change the way people can farm – there will be less land for livestock to graze, and subsequently farmers will not be able to produce as much goods. For example, beef and dairy is a very water intensive industry and with the new weather patterns may not be sustainable.[19]

The 2007-2008 drought on the East Coast of New Zealand cost an estimated $2.8 billion in lost production. Such droughts are likely to be more frequent and more severe, so it is reasonable to predict that this will have a substantial financial impact, and could force the New Zealand economy to reshape. International examples also inform this prediction. In 2003 a Europe-wide heat wave resulted in the maize yields falling by 30% more or more in Italy and France (New Zealand Agricultural Greenhouse Gas Research Centre, 2014).

New Zealand's forestry industry will also be affected by climate change, in a two pronged manner. First, there is wide and conclusive evidence that effective use of forestry can delay and mitigate the effects of climate change, as trees sequester carbon out of the air

[19] The Water Footprint Network estimates that it takes 15,400 litres of water to produce one kilogram of beef. Similarly, milk is very water intensive – it takes 1020 litres of water per litre of milk. Conversely potato, a wildly popular crop takes 290 litres of water per kilogram to produce.

and store it in biological matter (England Forestry Commission, 2016). Forests are, therefore, one way to combat the soaring rates of carbon dioxide in the atmosphere. Because of this ability, there may be public or political pressure on the forestry sector to cease or minimise production, therefore having the potential ability to adversely affect sales and profitably.[20]

The second way in which climate change will impact on the forestry industry is through the change in weather patterns. Whilst drier, warmer, weather is likely to impact positively for the growth of the trees, it is "also likely to affect many abiotic and biotic factors, which may in turn affect plantation growth and productivity," and the main factors that Watt, et all, identified in their report *The Effect of Climate Change on New Zealand's Planted Forests: Impacts, Risks and Opportunities* "include weeds, insects, pathogens and the risks from wind and fire" (Watt, et al., 2008, p. v).

To conclude this chapter, as the previous sections have shown, climate change will impact on the national security of not just New Zealand, but of the wider world. Because of the complex and intertwined nature of climate change and national security, this thesis has not been able to fully explore the many, many issues that have and will arise. However the treatment that has been given above in explaining the link between climate change and national security gives sufficient ground to explore how the New Zealand Government's response to climate change in the 2016 Defence White Paper could be strengthened.

[20] We have seen international examples of this, perhaps most notable is the call for a cease in logging in Brazil to protect the Amazonian Rainforest – one of the largest carbon sinks in the world. Other examples include logging in Papua New Guinea, and here in New Zealand, with Greenpeace leading many calls against conversion of forest to agricultural land.

New Zealand Defence White Paper 2016

This chapter will look at the both the New Zealand Defence White Paper 2016 (DWP 2016), as well as the New Zealand Government Defence Capability Plan 2016 (DCP 2016). Further to these examinations of New Zealand Defence Force plans this chapter will investigate how, by applying the Copenhagen School of Security to them, we can see the importance of naming threats and how the DWP 2016 would be strengthened by talking about climate change.

The DCP 2016 was published in November 2016, five months after the DWP 2016 was released. The DWP 2016 is the strategic document, whilst the DCP 2016 is the procurement and logistics document, which lays out funding priorities and how it will achieve the strategic goals. For the purpose of this thesis the DWP 2016 is in need of more attention, as the strategic direction dictates the procurement and logistical process, and not vice versa. However after offering background information about the DWP 2016, this thesis will also offer information around the DCP 2016 as it gets brought in when making policy recommendations later in this thesis.

Defence White Paper

The New Zealand Defence White Paper 2016 was released in June of 2016 to much fanfare. Some of the highlights that the media picked up on include a $20 billion increase in funding for new capital investments, greater cyber capabilities, and increased military presence in the South Ocean and Antarctica (Davison I. , 2016). The purpose of the Defence White Paper, as outlined in the Executive Summary, is to inform the public of the "Government's defence

policy objectives, and how the Defence Force will be structured and equipped to deliver on these objectives out to 2030 and beyond" (New Zealand Government, 2016a, p. 9).

The Defence White Paper 2016 comes six years after its predecessor, the Defence White Paper 2010, which itself was the first in over ten years. During the Helen Clark years, from 1999-2008, the Defence White Paper was held in abeyance, which Michael Kedzlie[21] says was to give the Department of Cabinet and Prime Minister more control over the defence portfolio (Kedzlie, 2016).[22] The 1997 Defence White Paper laid out a plan to re-connect with Australia, and to maintain a moderate combat ability across all services, however the New Zealand Defence Force was fiscally constrained by the budget they were given and thus unable to do so. The 1997 Defence White Paper was limited because of the lack of funding allocated in the 1991 Defence White Paper and that there was a roll on effect. Kedzlie writes that "Treasury dominating public policy, saw the defence budget slashed and capabilities reduced" (Kedzlie, 2016).

The Defence White Paper 2016 is a weighty document, with 88 pages over ten chapters. The following five areas in which this thesis will investigate are key themes and chapters in which it would have been in New Zealand's strategic interests to include climate change, but has not mentioned it. In doing so, this thesis will seek to strengthen these areas that the Defence White Paper 2016 has omitted.

[21] Michael Kedzlie works for, and is an academic at, the International Academic Forum.
[22] Certainly, by not laying out the plans in a public forum as the previous two Defence White Papers have done allows for a certain *political flexibility* for the portfolio.

New Zealand Government Defence Capabilities Plan 2016

The New Zealand Government Defence Capabilities Plan 2016 was released in November 2016, too little or no fanfare and attention in the media. The DCP 2016 is 86 pages long, similar in size when compared to the 88 pages of the DWP 2016, which are spread out over seven chapters. Amongst these seven chapters, there is no mention of climate change. Considering that the DCP 2016 deals with how the New Zealand Government will achieve their goals as outlined in the DWP 2016, and since climate change is (briefly) mentioned in the latter document, then this could be an oversight.

In the following chapters, this thesis will identify key areas within the Defence White Paper 2016 where climate change will have a substantial impact. This thesis will then suggest ways in which the New Zealand Government can strengthen the DWP 2016 by proposing some alternative policy measures. These alternatives will take into account what our international counterparts have included in their national defence planning documents. These recommendations will be rooted within the Copenhagen School of Security. In naming climate change as a security threat it will enable the Defence White Paper to have appropriate action.

Copenhagen School of Security

The Copenhagen School of Security is a vein of critical strategic studies, which at its core is a constructivist approach to security issues. The three main tenets of the Copenhagen School of Security are securitisation, security sectors, and regional security complexes - the tenet of securitisation is the most relevant to this thesis (Paulauskas, 2006, p. 223). The Copenhagen

School of Security rests on the basis that security is a speech-act. This is the act of labelling a threat to the state (which cannot be resolved through normal political means) as a security issue, which then requires extraordinary measures to resolve it (Paulauskas, 2006, p. 223). A threat which requires extraordinary measures to resolve it is called an existential threat to the state (Peoples & Vaughan-Williams, 2010, p. 77). Extraordinary measures, in this context, are a military response. In short, by labelling something a security issue it becomes one – this is the speech-act dichotomy that lies at the heart of the Copenhagen School of Security (Šulović, 2010, p. 3). Extraordinary measures are in effect a *securitisation* of the issue.[23]

It is perhaps beneficial to reconceptualise the act of securitisation. Consider a spectrum: at one end there is a non-politicised issue, then a politicised issued (which is when the issue is part of a public policy debate), and lastly there is securitisation (that is when the issue is thought to be an existential threat to the state, which then justifies a response that goes beyond normal politics) (Peoples & Vaughan-Williams, 2010, p. 77). By labelling something a security issue (the speech-act), the policy debate is shifted down the spectrum away from non-politicised to securitisation, thus invoking the ability for extraordinary measures.

To contextualise in the subject of this thesis, if climate change were to be securitised by the government then extraordinary measures could be put into action. I will explore and recommend hypothetical extraordinary measures in the five chapters following this one. To show that climate change needs to be securitised, there needs to be a risk to national security - this is what I will now proceed to show.

[23] This is heavily condensed representation of the Copenhagen School of Security, for a more full definition and explanation of the school I recommend the reader consult *The Routledge Handbook of Security Studies* (2010), Chapter 5; *Constructivism and securitization studies*.

Climate change will provide challenges to state and national security not only in ways that are in evident now, but in ways in which we cannot currently predict. Consider, during the Cold War period, when the global security community was formulating nuclear deterrence strategies and simulating game theories of just how many people would die as a result of nuclear weapons, they would not have considered climate change to be a pressing security issue. Just as governments of the past were blinded by their historical situation, we too cannot know the full implications of climate change on security. As the science progresses, and as the rate which the climate changes increases and the associated effects intensify, new and more threatening challenges will arise. This thesis will not speculate on these, but instead will focus on what we have already seen, and what we continue to see.

A: New Zealand's Strategic Outlook to 2040

This thesis will first examine the 'New Zealand's Strategic Outlook to 2040' chapter within the Defence White Paper 2016.[24] The chapter is split into two sections: the first half looks at "the overarching features of the international security environment," and then moves on to examine specific trends in the national security sphere (New Zealand Government, 2016a, p. 25).

The overarching security context that the first half of the 'New Zealand's Strategic Outlook to 2040' chapter delves into is an evaluation of the current state of world security and regional geo-politics. The chapter opens with a paragraph about how the characteristics of conflict are changing and suggests that while the amount of conflict in the world remains steady, there has been a shift away from inter-state warfare towards intra-state warfare (New Zealand Government, 2016a, p. 25). It then touches on the rise of Asia, especially the economic powerhouse of China, before detailing how terrorism is still a global threat.

The next half of the chapter addresses certain geopolitical trends that are developing globally. It opens by saying that the "relative geographic distance from other countries [that New Zealand has] no longer affords the protection it once did" (New Zealand Government, 2016a, p. 28). It then also talks of the importance of New Zealand's Exclusive Economic Zone[25] and how it may come under pressure from illegal fishing, on a similar vein is the increase in cruise ship activity and the need for the Defence Force to be able to aid in search and rescue events if they should occur (New Zealand Government, 2016a, p. 29). It also highlights that Antarctica is gaining international interest, that both the frequency and intensity of natural

[24] Page 25-35 in the Defence White Paper 2016.
[25] Henceforth, the Exclusive Economic Zone will be shortened to EEZ.

disasters is likely to increase, and that New Zealand has a commitment to a rules-based-order, amongst other things (New Zealand Government, 2016a, pp. 29-30). Of particular interest to this thesis is areas in which the DWP 2016 can be strengthened. These are: terrorism, resource competition, and extreme weather events. These three sections are ones in which climate change will impact on the most, and thus are deserving of academic analysis.

Problems with the Strategic Outlook to 2040

The terrorism section, points 3.8-3.10 on page 26 of the DWP 2016, states that terrorism will "remain an enduring threat to states beyond 2020" and that terrorism will continue to influence "state decision-making domestically, with respect to the protection from, and response to, potential attacks, and in relation to international counter-terrorism efforts" (New Zealand Government, 2016a, p. 26). Further, the DWP 2016 states that post 9/11 the amount of counter-terror activities around the globe have increased at an unprecedented level, but the breakdown in state control in the Middle East will be an ongoing concern.

While these observations about terrorism are valid, without looking at aggravating factors such as climate change they are not complete. The links between climate change and terrorism are salient. In late 2015 William Nye, aka ' Bill Nye the Science Guy,' did an interview with the Huffington Post where he linked the Parisian Terror attack of 2015 to climate change (Mellino, 2015). Nye's argument was this: climatic variance in Syria has resulted in a transient population who could no longer work in their local communities and move to bigger cities. In these bigger cities there was not enough employment opportunities, and this coupled with the ongoing war and religious tensions created a perfect situation where people could be

converted to radical Islam more easily because they were sufficiently marginalised (Mellino, 2015).

Another aspect of the link between terrorism and climate change is the possibility of a rise in ecoterrorism. In 2002 the then-executive assistant director of the Counterterrorism/Counterintelligence Division of the United States' Federal Bureau of Investigation Dale Watson testified at the Senate Select Committee on Intelligence that: "During the past decade we have witnessed dramatic changes in the nature of the terrorist threat… During the past several years, special interest extremism—as characterized by the Animal Liberation Front (ALF) and the Earth Liberation Front (ELF)—has emerged as a serious terrorist threat" (Hirsch-Hoefler & Mudde, 2014, p. 586)

Hirsch-Hoefler and Mudde explore the nature of ecoterrorism in their article *"Ecoterrorism": Terrorist Threat or Political Ploy?* Hirsch-Hoefler and Mudde conclude that radicals exist within every social movement and that environmental movements do not have a disproportionate amount of radicals in them (Hirsch-Hoefler & Mudde, 2014, p. 598). However as the outlook for climate change worsens it is possible that citizens may become more despondent and radical. In New Zealand, a government Member of Parliament went on record saying that if protestors were to block ships access into New Zealand or ports (namely warships but the legislation could be applied to deep sea oil exploration ships), then it should classified as an act of terrorism (Collins, 2016). This was said during the Maritime Crime Amendment Bill select committee process, which is looking to criminalise acts of civil disobedience at sea.[26]

[26] The irony in this is that the Strategic Outlook to 2040 does not link climate change to terrorism and yet Parliament, by making civil disobedience at sea a terror act, has already linked the two.

With these two points about terrorism and climate change in mind, it is important to consider climate change as a threat multiplier in terms of terrorism.

Resource competition, listed as point 3.11-3.13 in the DWP 2016 (p. 26) is another example of a relevant area for the Defence White Paper 2016 where climate change was omitted. The DWP 2016 talks of wealth inequality, population increase, and resource scarcity as factors which has the potential to threaten state security. However, as this thesis has earlier demonstrated, climate change is going to be a significant driver of resource competition.

Another example of the Strategic Outlook to 2040 not incorporating climate change considerations is points 3.26 and 3.27 on page 29 of the DWP 2016, which says that natural disasters are likely to increase in frequency and intensity. This is true and, as I have illustrated will continue to increase in frequency and intensity to 2040 and longer. However climate change is not listed as a driver of such a trend. The DWP 2016 lists all of the climatic effects of climate change - such as drought, flooding, rising sea levels, etc. – but it does not mention climate change. It may seem unimportant to not name the cause of the problem as it is the effects of climate change which poses a threat to national security and not the absence of naming it, however it is endemic of the wider issue of the Defence White Paper 2016: simply put, climate change is missing.

The importance of a comprehensive strategic outlook

The exclusion of climate change in the Strategic Outlook is of significant importance. The Strategic Outlook of a nation serves as a way to communicate, or signal, both their perception

of the world and how they will act (or react). The importance of clear and open communication in the realm of international relations cannot be underplayed. For allies, communicating your abilities is necessary to ensure there is trust amongst those party to the alliance. For adversaries, communicating your abilities serves as a deterrence.

For allies of New Zealand the neglect of climate change in the Defence White Paper 2016 may signal that New Zealand does not think that climate change is a sufficient threat, worthy of policy attention. Considering then that our key military allies – the United Kingdom, the United States of America, Australia, etc., - have all included climate change in their strategic outlooks, there must be a level of uncertainty in this regard. For the adversaries of New Zealand, the neglect of climate change in the Strategic Outlook to 2040 may signal to them that New Zealand does not take climate change seriously, and thus opens a potential weakness.

To further contextualise the importance of signalling, consider Donald Trump's signalling on the North Atlantic Treaty Organisation (NATO) prior to his inauguration. In an interview in July 2016 Trump said that unless NATO members increase their military budgets then NATO members may no longer expect the same level of protection that they have been afforded by US troops in the past (Trump, 2016). Trump winning the Presidential election prompted the NATO secretary-general to write an article in the *Observer* reminding America just how important NATO is to them (Shuster, 2016). The result of Trump signalling that the United States may leave has many speculating that this will result in NATO countries boosting their military spending to their self-imposed target of 2% of their respective budgets (Lazar, 2016). This is an example of successful signalling by Trump. By clearly vocalising his demands, it will likely result in him getting his way.

Regardless of ally or adversary, having an open and comprehensive strategic outlook and then sticking to it builds trust. Trust in the reputation of a state's ability to manage its international affairs, to stick to their word, etc. As Andrew Kydd writes in *Trust and Mistrust in International Relations*: "Trust is a central issue in international relations … When states can trust each other, they can live at peace, provided that they are security seekers, uninterested in expansion for its own sake. States that are security seekers therefore pay close attention to the motivations of others, attempting to determine who is a fellow security seeker and who is more inherently aggressive" (Kydd, 2005, p. 3).

What then is New Zealand to do? Simply by referring about climate change in a direct way would go some way in showing our allies that New Zealand understands the important challenge that climate change poses to national security. It would further enhance our reputation, and create a further level of trust between ourselves and our international counterparts.

B: Antarctica

The Defence White Paper 2016 and Antarctica

Antarctica plays a central role in the Defence White Paper 2016. It is mentioned in the Prime Ministerial Foreword: "The protection of Southern Ocean resources and supporting our civilian presence in Antarctica also feature more prominently in this White Paper than in the past" (New Zealand Government, 2016a, p. 5). In the 'Strategic Outlook to 2040' chapter in the DWP 2016 supporting the civilian presence of Antarctica is listed as a principle role of the defence force. In addition to this, the government has reasserted its need to protect the sovereignty of the Ross Dependency of Antarctica, and further, some of the $20 billion increase in funding will go towards capabilities in Antarctica and the Southern Ocean (New Zealand Government, 2016a, pp. 11, 19, 49).[27-28]

There is, however, no mention of the complex and important relationship between climate change and Antarctica. Considering the strategic importance that the New Zealand government is putting on Antarctica, evident through the emphasis that has been placed on it through the Defence White Paper 2016, it is a severe oversight to not mention or take into account the relationship between climate change and Antarctica.

The historical nature of the relationship between New Zealand and Antarctica contributed to its inclusion in the Defence White Paper 2016, and it is because of this relationship that Antarctica demands a more comprehensive treatment which includes

[27] Antarctica is mentioned 29 times in the Defence White Paper 2016, the Ross Dependency (which is the New Zealand base in Antarctica) is mentioned six times, and the Southern Ocean is mentioned 19 times. This is a big emphasis on Antarctica and its surrounding environment

[28] The difference between the Defence White Paper 2016 and its predecessor the Defence White paper 2010 is stark. Antarctica is only mentioned a handful of times, and it doesn't have a pride of place as it does in the DWP 2016. Numerically, Antarctica is only mentioned five times in the DWP 2010.

incorporation of climate change. New Zealand's relationship with Antarctica has anthropological, geological, and geographical links. Perhaps a reminder of these strong links, and moreover a reminder of climate change, is the phenomenon of large icebergs breaking off from Antarctica and floating along the coast of New Zealand - as occurred in 2006 and again in 2009 when an iceberg, over one kilometre in length, floated up eastern coast of New Zealand (Brady, 2011). Historically, New Zealand has been the base for many of the early exploratory trips to Antarctica – Ernest Shackleton (UK), Richard E Byrd (US) and Sir Edmund Hillary all used New Zealand as a base and most of their crews were comprised of New Zealanders (Brady, 2011). The 1979 Erebus disaster further cemented the close link between New Zealand and Antarctica. With 237 passengers and 20 crew dead, this was New Zealand's largest ever air accident and subsequent investigations generated great public interest in the accident (Brady, 2011). These links between Antarctica and New Zealand are a good starting point to analyse the issue of climate change, Antarctica, and national security.

Effects of Climate Change on Antarctica

Antarctica is changing. The seas around Antarctica are getting warmer, and the ice shelfs are getting thinner. A 2013 study undertaken by Fernando Paolo, Helen Fricker and Laurie Padman concluded that "… Antarctic ice-shelf volume loss is accelerating. In the Amundsen Sea, some ice shelves buttressing regions of grounded ice that are prone to instability have experienced sustained rapid thinning for almost two decades" (Paolo, Fricker, & Padman, 2015, p. 330) The study warns that if the present rate of climate change is sustained then we can "…expect a drastic reduction in volume of the rapidly thinning ice shelves at decadal to

century time scales, resulting in grounding-line retreat and potential ice-shelf collapse" (Paolo, Fricker, & Padman, 2015, p. 330).

An interesting phenomenon happened to the Antarctic ice shelves in 2016. Ordinarily, during summers in Antarctica, the ice sheets will melt, and then in winter the ice sheets will refreeze. This is how it has been for the last forty years, since satellite observations began. However "[d]uring September and October 2016, in the hottest year on record globally and in New Zealand, both poles showed record low levels of sea ice, with millions of square kilometres of ice missing when compared with historic average values" (Meduna, 2017). Whilst this is not an immediate cause of alarm, it is a sign of an ongoing changing climate.

To put this scientific backdrop within a New Zealand strategic context, the Ross Ice Shelf, which makes up part of the New Zealand Ross Dependency, is at risk of complete destabilisation due to it melting 25 times faster than it was previously thought (Marsh, et al., 2016). The study that Marsh et al undertook was ground-breaking in that it found what was widely considered by the scientific community to be one of the most stable ice shelves in Antarctica is actually melting quicker than most. The ramifications of the destabilisation of the ice shelf are not inconsequential: New Zealand spends significant resources and capital maintaining its interests in the Ross Dependency and any change in the geographic environment may put this at risk, and will change the strategic environment in which we operate.[29]

[29] In the 2014/2015 financial year, the expenses for Antarctica New Zealand (a crown entity) were $18.928 million (New Zealand House of Representatives, 2016).

Strategic Importance of Antarctica

Any discussion of the strategic importance of Antarctica must start with the Antarctic Treaty System which dictates how states must act in regards to Antarctica. The ATS was originally signed in 1959 in Washington by twelve countries, but has since grown to 53 countries, with New Zealand being one of the original twelve (Secretariat of the Antarctic Treaty, n.d.).[30] The ATS secretariat has listed some of the most important provisions, which include: "Antarctica shall be used for peaceful purposes only," and "Freedom of scientific investigation in Antarctica and cooperation toward that end … shall continue" (Secretariat of the Antarctic Treaty, n.d.).

The ATS is important to understanding the strategic importance because it fundamentally shifts how states view and use Antarctica. For example, Article 7 of the ATS strictly forbids mining or drilling for minerals or oil by any states, but there are estimates of more than 200 billion barrels of oil located in Antarctica – more than either Kuwait or Abu Dhabi (Teller, 2014). As worldwide finite resources dwindle it is possible that we may see countries try to get around prohibitions of mining in Antarctica, or indeed ignore the ATS. In July 2013, Chinese President Xi Jinping spoke to the Politburo, saying "[China needs to] take advantage of ocean and polar resources" (Davison & Keyu, 2013). China is allocating sufficient budget to realise this political end – the Chinese budget for Antarctica has risen from US$20 million to US$50 million in twenty years (Huck, 2015).

[30] Whilst the ATS was signed in 1959, the strategic importance of Antarctica was brought, in part, into the contemporary international environment by the Falklands War and invasion of South Georgia. (Beck, 1986, pp. 3-4).

The growing Chinese interest in Antarctica should not be viewed in isolation. Indeed, it should be seen as a wider global shift towards Antarctica. The United States has the largest presence in Antarctica, with more than 3000 staff participating in three permanent bases which are supported by the United States' military, including a C-17 aircraft and ice breakers (Klotz, 2012). In a 6-year period between 2004 and 2010 the Republic of Korea increased its budget for polar research from US$10 million to US$50 million, which is reflective of the government's 'Global Korea' position on international affairs (Brady & Seungryeol, 2013, p. 75). Australia, which claims 42% of Antarctica as its own territory, has increased funding to its Antarctic division by more than AU$2 billion in the last year (Haward, Hall, & Kellow, 2007; Hunt, 2016).

A tension exists between Australia and Japan in regards to the whaling program Japan runs in the Antarctic Territory. In May 2010 Australia brought a case to the International Court of Justice, seeking to halt Japanese whaling in the Southern Ocean, which was successful (Joyner, 2013). Since then Japan has resumed its whaling program under scientific pretexts which has caused further international tension, with the then Australian Environment Minister Greg Hunt saying "We do not accept in any way, shape or form the concept of killing whales for so-called 'scientific research'" (Darby, 2015)

Policy Recommendations

Due to the current level of international attention, and the heightened understanding of the impact of climate change on the area, Antarctica offers a unique strategic challenge for the New Zealand government. There is an opportunity for New Zealand's government to lead in this sphere, and in doing so maintain and increase their geo-political sphere of influence, or

be overtaken by our allies. The analysis of the Defence White Paper 2016 below will highlight areas in which climate change considerations could have been implemented.

The acquisition program for Antarctica needs to have climate change in mind. Page 52 lays out some of the investment in the Antarctic program which includes, “Support New Zealand’s civilian presence in the Ross Dependency of Antarctica, and participate in whole of government efforts to monitor and respond to activity in the Southern Ocean by:

1) Supporting New Zealand’s Antarctic Programme and the Joint Logistics Pool including through a strategic airlift capability and ice-strengthened naval tanker; and
2) An enhanced ability to conduct sea patrols in the Southern Ocean with an ice-strengthened offshore patrol capability” (New Zealand Government, 2016a, p. 52).

Considering the strategic importance, international competition and climate change related factors, this acquisition program does not go far enough. For New Zealand to truly maintain a presence in the Antarctic region, as well an ability to uphold our claim to the Antarctic, the ability to enforce ICC rulings, and our ability to further our scientific mission, then a bigger funding program is needed. International examples have shown substantial investments, both in the military and scientific arms of international Antarctic involvement.

In terms of acquisition of new ice-strengthened ships, climate change and the realities of the melting South Pole arguably reduces the need for an ice-strengthened ship. Since the geographic composition of Antarctica is fundamentally changing, the acquisition process surrounding it also needs to change. This would need to be further investigated, but the New Zealand Defence Force and the Ministry of Defence have a history of bad judgements when

it comes to procurement and therefore should be extra careful when buying technology that may become obsolete.[31]

If the thaw of Antarctica takes longer than expected, or if climate changes in an unexpected way then there may be an opportunity for New Zealand to advance its international standing with the United States of America in so much that if New Zealand were to purchase more than one ice-capable ship, New Zealand could use it to assist the Americans with their Arctic and Antarctic missions, as they are severely lacking in such ships.[32] Doing so would not only boost New Zealand's reputation in the eyes of our allies, but also show a firm commitment to an international rules-based order, which is signalled in the Defence White Paper 2016 as a key element of New Zealand's defence strategy.

In the DWP 2016 there is a plan to ice-strengthen an off-shore patrol vessel to assist in the goal of maintaining New Zealand's sovereign territory in Antarctica and the Southern Ocean, as well as to assist the "fisheries inspections in the area, for example those undertaken by the Ministry for Primary Industries" (New Zealand Government, 2016a, p. 39). This new ship will join two existing ice-strengthened off-shore patrol vessels, HMNZS Otago and HMNZS Wellington. However, three boats will not be enough to meet the NZDF strategic goals as outlined in the DWP 2016, especially when factoring in the associated security challenges that climate change poses. Aside from the geographical limits of only having three boats monitoring an ocean that is 20 million kilometres^2, there is going to be increased pressure on

[31] See Bryce Edward's Political roundup: NZ's military future (2015) in *New Zealand Herald*. This article sums up the procurement problems that the New Zealand Defence Force/Ministry of Defence has had in recent years, which include a $771 million purchase of NH90 helicopters which reportedly do not work properly and are not suited for the Pacific environment (Edwards, 2015).

[32] Jen Judson from Politico wrote a piece titled *The Icebreaker Gap* in which they detail how Russia has approximately 40 ships that are capable of icebreaking, whilst the United States has only three, one of which is not currently operational (Judson, 2015). The United States is currently renting icebreakers off of other nations.

the fisheries in the Southern Ocean because of the acidification of oceans globally, thus causing an increase in illegal or overfishing in the Southern Ocean.

The acidification of oceans is caused by absorption of carbon dioxide by the water, which in recent years has been estimated at twenty-four million tons of carbon dioxide every day being sequestered by the ocean – a staggering one million tons every hour of every day (Meduna, 2015, p. 72). Over the past two centuries, an estimated one third of *all* carbon dioxide has been absorbed into the ocean. The acidification of the ocean affects sea creatures which have calcified skeletons or build shells. Coral reefs are one example that Meduna writes about in their book *Towards A Warmer World*: "Coral reefs are the marine equivalent of tropical rainforests… Even though coral reefs cover only 1 per cent of the Earth's surface, they support half a billion people" (Meduna, 2015, p. 73). However coral reefs are sensitive to acidification and are in steady decline, taking the marine life that exists within the reef structure down with them.

This should be seen as a blow to the health of the wider fish ecosystem. Not only are fish suffering from overfishing, their very habitat is becoming more hostile. Further, the melting of the Antarctic ice caused by climate change has opened new areas for fishing, with new species becoming easier to catch in areas that might not be protected or patrolled (Nilsson, Fulton, Haward, & Johnson, 2016, p. 176). This will add a further security challenge to Antarctica, which may hinder the New Zealand government in achieving its strategic aim of monitoring and stopping illegal fishing within the Antarctic.

Perhaps one way to mitigate this would be to purchase more offshore patrol vessels to protect the area that is biologically and strategically important to New Zealand. This would be costly as the acquisition of ships costs hundreds of millions of dollars. However, since

fisheries add an approximate $1.41 billion in exports to the economy (Statistics New Zealand, 2016) and our reputation in the rules-based international order is hard to quantify in terms of economic costs, the consequences of not funding these extra measures are too high. When we consider Brown's definition of national security, the poaching of fish within New Zealand's Antarctic waters may meet the criteria of an economic threat to New Zealand's national security.

The inclusion of the effects of climate change in the DWP would be one step towards the securitisation of the issue. Increasing the amount of Antarctic patrols would be necessary in order to fully securitise New Zealand's national interests in the Antarctic. Some may argue that the cost of acquiring more patrol vessels to be prohibitive, and whilst this is a valid reservation, through analysing these issues within the Copenhagen School of Security it allows for the use of extraordinary measures to nullify the threats to national security.

To summarise before moving on to the next chapter, climate change is threatening Antarctica in a complex way. Not only is the ice at risk of thinning and melting, the ecosystems that lives within Antarctica are being challenged by the changing climate. This chapter has argued that because New Zealand's economic interests will be harmed by the effects of climate change on Antarctica, it constitutes a threat to national security and needs to be securitised by the New Zealand Defence Force. The NZDF could strengthen the DWP 2016 by including these national security implications, as well as acquiring enough offshore patrol vessels to minimise any illegal fishing which would put further strain on fish stocks which New Zealand can fish.

C: The South Pacific

The South Pacific and the Defence White Paper 2016

The South Pacific features heavily within the Defence White Paper 2016, and is included in the Prime Ministerial Foreword and mentioned 38 times in the document. In the strategic assessment of New Zealand's immediate region, the DWP 2016 notes that while there has been a moderate level of stability in the South Pacific "the region continues to face a range of economic, governance, and environmental challenges" and that these challenges may require a deployment of NZDF forces within the next ten years for either humanitarian or disaster relief work (New Zealand Government, 2016a, p. 11).

Constitutional obligations and historical links are the two reasons why the NZDF plan to "contribute to, and where necessary lead, operations in the South Pacific (New Zealand Government, 2016a, p. 39). Examples of these operations include assisting with maritime surveillance; disaster relief; aiding in the professional development of security forces and; "contributing to stability and support operations" (New Zealand Government, 2016a, p. 39). The South Pacific is ranked third in terms of NZDF's priorities, only coming after New Zealand and its EEZ, and Antarctica and the Southern Ocean area.

The DWP 2016 predicts that the South Pacific is encountering - or going to encounter - many challenges, including, the growing pressures on resources, particularly on fish stocks. The DWP 2016 also paints a grim climatic future for the South Pacific: "rising sea levels, less predictable rainfall, cyclones and storm surges are likely to become more intense and frequent over the next 25 years" (New Zealand Government, 2016a, p. 29). While resource scarcity and national security are closely linked, there is no mention within the DWP 2016 of

the effects of climate change on the South Pacific and the national security challenges which they pose.[33] The remainder of this chapter will suggest a number of ways in which the DWP 2016 could be strengthened by addressing specific climate change-related issues that will affect the South Pacific.

Climate Change and the South Pacific: A Disaster Waiting to Happen

Climate change poses a range of challenges to states within the South Pacific ranging from threats to national security to complete destruction of these island states. *Climate Change and Pacific Islands: Indicators and Impacts* report written by the Pacific Islands Regional Climate Assessment details the extent of the impact that climate change will have on states within the South Pacific. The report states how there will be an increase in coral bleaching which will adversely impact marine life and the populations which rely on them for food and finance. Freshwater supplies on some islands and atolls are expected to decrease due to the drier and warmer weather as well as an increase in coastal flooding and erosion as sea levels rise (Pacific Islands Regional Climate Assessment, 2012, p. 4). The effect of these include, but are not limited to, damage to agricultural crops, industry, infrastructure, and tourism.

The report also notes the disastrous effect ocean acidification is going to have on the local fishing industries. Not only will fish stocks with the EEZs of states in the South Pacific be affected, but as ocean acidification occurs globally, foreign states will also experience acidification within their fishing industries and may send more ships into the waters of the South Pacific, creating more competition over fewer resources.

[33] Whilst the DWP 2016 may discuss some of the impacts of climate change in this chapter, by not naming it then there is an inability to securitise it.

In 2012 the value of the fishing industry in Oceania was US$7billion, with fleets of vessels mainly coming from the North Pacific, and to a lesser extent from Europe, to fish in the resource-rich waters of the South Pacific (Centre for Strategic Studies New Zealand, 2015). This is a substantial amount of money, and it is not foreseeable that states or companies would want to forego such large profits. In turn this economic interests on the behalf of companies or states would put pressure on the existing fish stocks, would create increased competition for those that remain. This competition would have an adverse effect on the amount of fish caught by South Pacific Island states, and will have significant effects on their economies. In 2007 the value of the Cook Islands fishery industry was 6.3% of their national GDP, and made up 79.4% of all exports. The 2007 estimates (the most recent available) of the value of the Fijian fishing industry were US$56.2million, and the industry employed 9,114 people. For Kiribati, 2008 data shows that there fishing industry was worth US$11.8million, nearly ten percent of GDP (Gillett, 2011).[34]

Climate change will exacerbate the prevalence of disease and illness in states within the South Pacific. The World Health Organisation (WHO) is currently running a project to mitigate some of these effects in Fiji, as part of their commitment to the Paris Climate Agreement. This WHO project has predicted that there will be an increase in "some climate-sensitive diseases (CSDs) such as dengue fever, leptospirosis, typhoid fever and diarrhoea among the Fiji population" (WHO, p. 1). While this project is focussing on Fiji, it should not be seen in isolation as across the South Pacific we will see an increase in these climate-sensitive diseases, due to the fact that many countries in the South Pacific have a similar climate. Ultimately

[34] Small island states in the South Pacific rely heavily on remittances from families who live outside of the states sending money home. When we remove the remittances out of the GDP figures, the importance of the fisheries grows (Brown, Connell, & Jimenez-Soto, 2014).

these effects of climate change will force people to migrate either to higher land or to continental locations, particularly New Zealand and Australia who already have large existing Pacific Island populations, in order to escape the cumulative effects of climate change.

When we consider Brown's definition of national security, we can see that climate change will be an immense threat to the national security of countries in the South Pacific. States will not be able to maintain their economic integrity because climate change poses a risk to their industries, or be able to protect their natural or physical integrity because of the devastating effects of climate change, and the ability for governance will be hampered if states are underwater, arid, or have faced large-scale immigration. This will have a flow-on effect to New Zealand's national security by creating an unstable region in which New Zealand inhabits.

International positions on the South Pacific

There a range of international positions on the South Pacific, dependant on each country's geo-political area, strategical goals, and capacity. Australia's *Defence White Paper 2016* states that climate change will be a factor that will contribute to instability for some countries within the South Pacific and has dedicated resources to mitigating the destabilising effects that climate change will have (Australian Government, 2016, pp. 41, 48). The extent of this is laid out in Chapter 5 of the Australian *Defence White Paper 2016* and includes the Australian government providing replacement patrol boats to selected South Pacific states so that they can continue to monitor fisheries, as well as "contributing to the development of shared maritime domain awareness," as well as "strengthening the capabilities of the defence and security forces of Pacific Island Countries to act in support of shared interests" (Australian Government, 2016, p. 126).

The United States' *Quadrennial Defense Review 2014* does not mention the South Pacific, but it does place a lot of emphasis on the Asia-Pacific. This is in line with Obama's rebalancing of foreign policy, which is shifting away from Europe and the Middle East, and is focused more on the rise of China. Like the *Quadrennial Defence Review*, the United Kingdom's *National Security Strategy and Strategic Defence and Security Review 2015* does not have any mention of the South Pacific.

Securitisation of Climate Change in the South Pacific

This thesis recommends that both a traditional and non-traditional approach to the securitisation of climate change in the South Pacific be pursued.

A non-traditional approach to the securitisation of climate change in the South Pacific is for New Zealand to reduce the amount of greenhouse gasses it contributes to the atmosphere, and apply direct international pressure to other states to do so. Not only is this in New Zealand's best strategic interests, as a stable regional environment is what New Zealand expresses in the DWP 2016, it could also be argued that New Zealand has a moral prerogative to do so. Tokelau, for example, is a territory of New Zealand and is going to be affected by climate change in almost unparalleled way – from complete destruction of their fisheries due to acidification and overfishing, to being almost underwater. (RNZ, 2016). This raises the question of the obligation that New Zealand has to its territories.

Another non-traditional securitisation approach that New Zealand could pursue is to resettle those from the South Pacific who are forced to migrate due to climate change. New Zealand has a large population of Pacific peoples: the 2013 census recorded that 296,941

people in New Zealand identified as belonging to one or more Pacific ethnic groups, which is 7.4% of the total population of New Zealand (Statistics New Zealand, 2014). This substantial Pacific population means that there is a robust link between New Zealanders and those people who live on island states and atolls who are going to be threatened by climate change. If New Zealand were to not take in these forced migrants then we may see civil discontent rise. Just as an influx of immigrants may challenge societal sovereignty, ignoring the plight of a group of people who have close family and societal links may create a civil and political crisis. By accepting more of these forced migrants New Zealand would be helping those in need, as well as ensuring that national security is secure by preventing civil disobedience.

Aside from reducing its carbon emissions, and accepting more climate refugees, New Zealand could pursue a more traditional securitisation approach by following Australia's lead in the South Pacific. This could extend to lending, giving, or using NZDF ships to patrol the waters of states in the South Pacific. As already demonstrated, challenges to the fishing industry are going to be a threat to the economies of some of New Zealand's closest neighbours, therefore support steps need to be adopted by the DWP 2016. While New Zealand already contributes military aid to its South Pacific neighbours, if New Zealand wants to maintain its strategic presence in the South Pacific then there will need to be an increase in support in order to meet the demand.

D: Humanitarian Work

This thesis has addressed the devastating effects climate change will have on human populations worldwide. What has not been covered is the humanitarian response that is going to be required to address some of these crises. This chapter will show the reader the impact climate change will have on the humanitarian sector and the sector's ability to respond to the growing pressures. It will also look at what the Defence White Paper 2016 says about the NZDF's role in humanitarian work. This chapter will conclude by looking at overseas examples, and investigating how New Zealand could incorporate some of these policies into strengthening the DWP 2016.

Growing Humanitarian Need and its Ability to Counteract Terrorism

The 'High-Level Panel on Humanitarian Financing Report to the United Nationals Secretary-General' released a report in 2016 that states that the world spends around US$25 billion each year on aid, which goes to 125 million people worldwide (p. v). While this may appear to be a substantial amount of money, in effect it is only 1/3120 of the worldwide annual GDP, and would require an extra US$15 billion to meet the total humanitarian need (Ibid, p. v). This monetary assistance goes to the 42,500 people around the world who are displaced every day because of violence and conflict, and the 53,000 people displaced per day because of weather related events (Ibid, p. 1).

These are 2014 figures, but through earlier discussion we can ascertain that the cost of aid will go up at an associated rate due to the increasing frequency of climate-related

humanitarian disasters.[35] The Feinstein International Center claims in its 2012 report *Climate Change as a Driver of Humanitarian Crises and Response* that the cost of humanitarian aid missions may jump anwhere between 32% to 1600% per year, in the forthcoming years (Walker, Glasser, & Kambli, 2012, p. 19). A 32% increase on current levels of spending would make the humanitarian aid budget US$800billion in 32 years, all things remaining constant. As this is the conservative estimation, it cannot be stressed enough just how expensive the humanitarian response to climate change will be.

The links between humanitarian work and threats to national security are difficult to establish and is an emerging academic field. However, a growing body of literature supports the view that humanitarian aid, when properly allocated, can reduce terrorism. The former United States' Secretary of State Colin Powell said that terorism flourishes in areas that experience "poverty, despair and hopelessness, where people see no future" (Purdum & Sanger, 2002).

The Federal Reserve Bank of St Louis conducted a study where it found that aid can help to stablise a regime and assist in counterterrorism measures (Bandyopadhyay, Sandler, & Younas, 2010, p. 29). However the same study shows that different types of aid have different outcomes on counterterrorism efforts: "…general aid reduces regime instability in the recipient, but discourages its proactive efforts [in regard to counter terrorism]" (Bandyopadhyay, Sandler, & Younas, 2010, pp. 28-29).

[35] A discussion around what constitutes a climate-related humanitarian disasters is needed, but falls outside of the scope for this thesis. This thesis will use the definition the Feinstein International Center use in their publication *Climate Change as a Driver of Humanitarian Crises and Response*: a humanitarian crisis is an event that meets one of more of the following four criteria: a) ten or more people killed; b) One hundred or more people affected; c) a declaration of a state of emergency; or when there is a call for international assistance (definition adopted from Walker, Glasser, & Kambli, 2012, p. 7).

To summarise, before moving on to look at New Zealand's outline for humanitarian work in the DWP 2016, climate change is going to increase the need and the cost of humanitarian work. When humanitarian aid is given to states it can have an effect of being a counter-terror measure. Thus, aside from any moral presuppositions, it is in the interests of national security for New Zealand and other states to increase their humanitarian aid budget. This is why it is important to analyse our current commitments, and how we can improve them.

Humanitarianism and the Defence White Paper 2016

Humanitarian work in the Defence White Paper 2016 could be characterised as an afterthought. While it is mentioned in the ministerial foreword, it either tends to be put at the end of the strategic planning, or reinforce what the NZDF is already doing. For example, humanitarian assistance and disaster relief is mentioned in the DWP 2016 when discussing the deepening strategic relationship between the United States and New Zealand in the Middle East (New Zealand Government, 2016a, p. 33). Again, when observing the links between New Zealand and Europe, humanitarian and disaster relief activity is approached as a joint exercise between New Zealand and France within the South Pacific (New Zealand Government, 2016a, p. 35).

The DWP 2016 also mentions maintaining the existing levels of humanitarian aid: "providing national Humanitarian Aid and Disaster Relief response options at current levels" (New Zealand Government, 2016a, p. 52). This is largely the extent of the mention of humanitarianism in the DWP 2016. If we examine the New Zealand Government Defence Capability Plan 2016 we can see that there are plans to increase New Zealand's humanitarian

ability, some of this will include increasing the land combat operations that have medical facilities, obtaining a tactical airlift capability to assist with humanitarian assistance, as well as obtaining a new offshore patrol vessel which will have some humanitarian responsibilities (New Zealand Government, 2016b, pp. 28. 29, 38).

It is then apparent that there is a gap between what is in the Defence White Paper 2016 and the Defence Capabilities Plan 2016. If we consider the DWP 2016 to be the planning document, and the DCP 2016 to be the 'doing' document then this begs the question about the synchronisation of the two. It would appear that the continuation of humanitarian services that the DWP 2016 wants to continue at current levels may require new investments, as outlined in the DCP 2016. It cannot be possible to continue a service whilst investing in other capabilities and then say that this is just the continuation of services. Putting this lexical disparity aside, it could be argued that both the plans are insufficient, especially in light of what our international counterparts are doing.

International approaches to humanitarianism and climate change

The Australian Defence White Paper incorporates elements of humanitarian work in many areas. The Australian Defence White Paper 2016 mentions 'humanitarian' 28 times, compared to the DWP 2016's 15 mentions. The Australian Defence White Paper does similar positioning to the DWP 2016 in terms of using humanitarian commitments as a way to boost alliances, such as their commitment to providing "humanitarian assistance and disaster relief at short notice in the Indo-Pacific region or further afield when required" (Australian Government, 2016, p. 76). However the Australian Government also have the nuanced view articulated in their White Paper that humanitarian aid can contribute to denying terrorists a

safe-haven, in particular when in conjunction with “military, intelligence, political, diplomatic [and] economic” intervention (Australian Government, 2016, p. 48). Further, the Australian government also recognises that humanitarian assistance in the South Pacific will be needed to combat the state fragility that will arise with climate challenges (Australian Government, 2016, p. 48).

The Australian Government also plans to introduce unmanned aircraft in the early 2020s to assist with humanitarian assistance, will introduce a new joint humanitarian exercise with Indonesia, and will increase investment in multilateral international efforts to tackle challenges such as terrorism and humanitarian disasters (Australian Government, 2016, pp. 98, 126, 118). The United Kingdom’s Security Review 2015 is very similar to New Zealand’s Defence White Paper 2016 in that it says that humanitarian work is part of the status quo for the respective defence forces, but with no recognition of the growing humanitarian crises or a plan to invest more to deal with them. For example, “We have provided humanitarian aid [to Ukraine], and we will continue to support Ukraine with advice and assistance on fighting corruption, defence reform and training their Armed Forces” (Her Majesty's Government, 2015, p. 54)

Looking across to the United States’ Quadrennial Defence Review 2014 we can see that humanitarian work is included in the last of the three defence strategy pillars: “Project power and win decisively, to defeat aggression, disrupt and destroy terrorist networks, and provide humanitarian assistance and disaster relief” (United States Department of Defense, 2014, p. v). However, the Quadrennial Defence Review 2014 mostly talks about current humanitarian projects and not about expanding them in the face of rising humanitarian disasters.

New Zealand needs a cross-agency response to climate change-related humanitarian work. A failure to do so will not just be morally unjustifiable, but could pose a threat to New Zealand's national security. This could be perhaps considered outside of the scope of this thesis because it is not in the realm of the Defence White Paper 2016, however, the aid budget directly impacts on the defence portfolio so there is a need for a close collaboration between agencies.

E: Domestic Focus

The purpose of this chapter is to address elements of the Defence White Paper 2016 which did not fall under any of the other categories that this thesis has addressed – but are deserving of academic investigation. As such, this chapter will follow a slightly different order than those previous to it. The two topics this chapter will look at are the Exclusive Economic Zone and the Defence Estate. Both of these will be investigated subsequently by analysing the impacts of climate change on them and examining overseas examples to inform policy recommendations.[36]

Exclusive Economic Zone

New Zealand is surrounded by an area over which the state has exclusive property rights over, as established by the United Nations Convention Law of the Sea 1982. The area of the New Zealand EEZ is 4 million kilometres^2 which makes it the fourth largest in the world (Mansfield, 2006). Further to the EEZ, New Zealand also has ownership over a sizeable seabed - 1.7 million kilometres^2 (New Zealand Press Association, 2008). This ownership was established through the 'Commission on the Limits of the Continental Shelf', a United Nations entity established in 2008 that gives New Zealand sole proprietorial rights to mineral and petroleum reserves

[36] When looking at the EEZ, this thesis has chosen not to look abroad. This is because analysis of foreign defence policy documents, like the Australian Defence White Paper 2016 have little mention of their EEZ. At a rudimentary level, I believe the EEZ is important to New Zealand's defence policy because of the sheer size of it compared to our landmass.

located on and below the specific section of the seabed (New Zealand Press Association, 2008).[37]

Climate change is going to impact on fisheries worldwide, however to give regional context this thesis will briefly explore the impact of climate change on fisheries within New Zealand's EEZ. As the temperature rises within the New Zealand EEZ, traditional temperate fishery stocks may migrate to waters outside of the EEZ to seek a climate more suited to them (Law, et al., 2016, p. 11). The reduction in food supply for fish stocks may have the effect of reduced fishery yields, a change in the spatial distributions of fish stock, and the condition of fish once caught (Law, et al., 2016, p. 26). Because of these changes, it may be that the New Zealand fishing industry will not be able to sustain itself. However not only will this reduced catch mean that New Zealand fishing companies will be able to catch less, the worldwide decrease in fisheries because of overfishing and acidification brings the possibility of increased poaching from foreign vessels within New Zealand's EEZ.

The impacts on fisheries are important when we consider the monetary value that that fisheries within the EEZ add to the New Zealand economy. In 2010, wild fisheries were worth NZ$4 billion and supported over 10,000 jobs, whilst aquaculture added a further NZ$500 million to the New Zealand economy (Boyd & Law, 2011, p. 9). Further to this, the New Zealand Sport Fishing Council claim that recreational fishing generates NZ$1.7 billion in economic activity, and supports at least 8000 jobs (Rea, 2016).[38] Brown's definition of

[37] See Map A in the appendix for a visual representation of the EEZ and the continental shelf.
When we consider that the area of mainland New Zealand is 271,000km^2, and the combined area of the EEZ and Continental Shelf is 5.7 million kilometres^2, we can see just how vast New Zealand's maritime domain is.

[38] A note about this source: Trish Rea works for LegaSea. LegaSea is part of the New Zealand Sport Fishing Council, which is an advocacy group for recreational fishing. Whilst I have endeavoured to find the source of this valuation, I was not able to do so. Therefore it is necessary for me to treat this figure as a speculation, thus my wording that the New Zealand Sport Fishing Council 'claim' it.

national security stipulates that a threat to a polity's economy is also a threat to national security. Considering the role that fisheries play in New Zealand's economy, it should also be considered a threat to national security.[39]

The South Pacific chapter within this thesis focused on the national security implications of the relationship between climate change and fisheries, and the subsequent regional instability that this may cause for New Zealand. Conversely, the acidification of the ocean and the possibility of increased rates of poaching within New Zealand's EEZ, directly affects the economy of New Zealand. A robust response from the NZDF is needed to securitise this issue.

The Defence White Paper 2016 has the EEZ listed alongside mainland New Zealand as its top priority for the Defence Force's operational capabilities (New Zealand Government, 2016a, p. 11). Other mentions of the EEZ in the DWP 2016 include remarking that challenges of responding to activities with in the EEZ have intensified and affirming the role the Defence Force has in protecting the resources within the EEZ. The DWP 2016 also says that "Global pressure on fisheries will make New Zealand's [EEZ] a more attractive area for illegal, unregulated and unreported fishing in the future. There are also indications that people smugglers are targeting New Zealand" (New Zealand Government, 2016a, p. 29). This is very strong wording about the EEZ and signals that the New Zealand Government takes this issue seriously, however, without a securitisation of climate change in regards to the EEZ, these statements do not go far enough.

[39] Whilst the fisheries only plays a minor role in the economy, it could be a contributing factor to civil unrest if other industries were also to face disruption because of climate change. Considering the effects climate change will have on other primary industries within New Zealand, there could be substantial civil unrest due to a lagging economy.

Whilst the $20 billion investment in the NZDF will go some lengths to aid in the securitisation of the EEZ, the one additional patrol vessel will not be enough to patrol the Antarctic waters, the Southern Ocean, and the EEZ - which together make up a mammoth body of water. It is impossible to fully securitise warming waters, but it is possible to ensure foreign vessels do not enter New Zealand's waters to poach the dwindling fish stocks. Ultimately, the best securitisation for the EEZ would be to reduce the amount of carbon that is emitted since the ocean is one of the biggest carbon sinks that exists.

Defence Estate

The Defence Estate has an entire chapter dedicated to it within the Defence White Paper 2016. The Defence Estate is comprised of nine camps/bases, two training areas, a "number" of regional support facilities, spread out over 81,000 hectares with 5000 buildings (New Zealand Government, 2016a, p. 71). The DWP 2016 talks of a regeneration of the Estate by replacing facilities with newer, smarter versions, and where possible consolidate multiple sites into one. There is, however, no mention of climate change impacting on the viability of said sites, or on the Estate as a whole. Further to this, in 2016 the New Zealand Government released a document outlining their regeneration plan, without any mention of climate change.

Conversely, the Australian Defence White Paper 2016 also lays out their plans to grow the Australian Defence Force's Estate but mentions the impact climate change will have on it: "Climate change will also place pressure on the Defence estate, with sea level rises having

implications for Navy bases and more extreme weather events more frequently putting facilities at risk of damage" (Australian Government, 2016, p. 102).[40]

The New Zealand Government should consider the securitisation of their Defence Estate from climate change, in a similar manner to the Australian Government. New Zealand has only one operational navy base, HMNZS Philomel, which is located in Devonport in Auckland. The Devonport-Takapuna Local Board identified rising tides and increased rainfall as a potential hazard to the area. The Parliamentary Commissioner for the Environment has also identified Devonport as a low-lying area which will be prone to flooding in the future (Rafferty, 2015, pp. 18, 25, 27). Whilst most of the area that Parliamentary Commissioner has highlighted in Devonport is a golf course, there is also coastal area included in this which is where HMNZS Philomel is situated (Parliamentary Commissioner for the Environment, 2015, pp. 48, 49).

When we consider New Zealand's *sole* naval base is in an area that the local board and the Parliamentary Commissioner for the Environment has identified as an that is prone to flooding, then it would make strategic sense for the New Zealand Government to be planning for the possibility of the flooding to eventuate. This is just one example, however as there are over 81,000 hectares of Defence Estate over different terrains, we know that climate change will impact these environments in a myriad of ways.

[40] The United States' Quadrennial Defense Review has no mention of the US Defence Estate. However, there is mention of making the bases of the US Defence Force more resilient (United States Department of Defense, 2014, p. 38). Likewise, the United Kingdom's National Security Strategy and Strategic Defence and Security Review 2015 makes no mention of their Defence Estate, except to say that it is going to be downsized.

Discussion

The purpose of this pre-conclusion discussion chapter is to discuss the limitations and the wider implications of this study.

New Zealand is going to face a variety of climatic challenges due to climate change which makes it difficult to generalise about the 'New Zealand experience.' For example, the east coast of New Zealand is going to face significantly different climate challenges than the west coast of the South Island. Likewise, within New Zealand's EEZ there are going to be different changes to the ocean ecosystems – the corals in the northern parts of the EEZ will be affected in a way that is completely different to the waters within Antarctica. The size of New Zealand's territory and the fact that it is spread over so many different geographical areas offers a challenge to this thesis – it is nigh impossible to cover all aspects of climate change and New Zealand within such a small thesis. However, this thesis has aimed to cover all of the important aspects which will impact on Defence Policy, and in the bibliography there are further reading materials.

A further challenge to this thesis is the fact that climate change and defence policy are politicised. When I started this thesis, I wrote to the Ministry of Defence and inquired about the status of climate change within the Defence White Paper 2016 and did not receive a reply. During the writing this thesis, I also had to readjust the United States position on climate change to reflect the statements that President Trump was making. Due to the political instability that Trump's election has created, and his differing views of climate change from his predecessor, this thesis has had to be changed many times. I have endeavoured to make it as correct as possible, however due to unknown quantities that Trump offers, I am unsure of the longevity of the study.

Further, the exponential warming that the world is currently experiencing means that this thesis has had to be updated many times during the writing process. As this thesis was written over a year that was split over a calendar year, we have had more up to date information about how 2016 was the hottest year on record. This has meant in writing this thesis I have had to rewrite sections for them to be as up to date as possible.

A further limitation of this study as the fact that the climate change has not often been considered to be a security threat, and as such is an emerging field in academia, and policy writers have not fully adapted to this. This has meant that international defence policies which can be compared to New Zealand's are few and far between. In time there may be more literature on the strategic impacts of climate change, and this may influence policy writers. In the interim, this thesis fills a gap in the literature gap.

An objection which has been raised to several of my recommendations in conversation about my thesis is that the cost of the securitisation of climate change would be too exorbitant. Whilst I acknowledge that the cost of securitisation of climate change within New Zealand may be high, the cost of not doing so is even higher. The Copenhagen School of Securitisation which this thesis has used to offer ways that climate change may be securitised says that when there is a threat to national security, extraordinary measures must be taken. This thesis has demonstrated on many levels that climate change will pose a threat to national security, so this enables the New Zealand government to use extraordinary measures to remove the threat. Perhaps this could entail extra revenue gathering measures to pay for it.

Conclusion

This thesis has established five areas in the Defence White Paper 2016 where climate change-related national security considerations could have been implemented. This was preceded by substantial evidence of both the existence of climate change and the threat to national security which climate change poses. Through the use of the Copenhagen school of security, this has established a strong argument for the securitisation of climate change, through the inclusion of the threat that climate change poses within the Defence White Paper 2016.

A threat to national security is defined in this thesis by Harold Brown's definition of national security which says that if something threatens a state's ability to "preserve the nation's physical integrity and territory; to maintain its economic relations with the rest of the world on reasonable terms; to protect [the state's] nature, institutions, and governance from outside, and to control its borders" (Brown H. , 1983, p. 4). This thesis has demonstrated how climate change will impact on each and every criterion in which Brown lays out. Climate change will impact on New Zealand's industries, which in turn will threaten the national security. New Zealand's fisheries, agriculture, and forestry will all be impacted on by the changing weather patterns. New Zealand's physical integrity will be placed under pressure through the increased numbers of forced migrants seeking safety from civil war, rising sea levels and food shortages.

Through analysis of the Strategic Outlook in the Defence White Paper 2016, this thesis has demonstrated that there is a fundamental lack of climate change considerations when compared to our international counterparts. This exclusion of climate change has the potential to signal to our allies that New Zealand does not take climate change as seriously as

they do. An easy way for New Zealand to counteract this is to include climate change in their next strategic outlook.

International attention on Antarctica is growing at a fast rate, and the Defence White Paper 2016 takes steps to address this, with emphasis on assisting the New Zealand scientific mission and monitoring illegal fishing. However this thesis has established that without considering the implications of climate change on Antarctica then this strategic planning is not adequate. This is because of the substantial effects climate change will have on the acquisition program that New Zealand is embarking on as well as a risk to the fishing industries which New Zealand relies on. There is also an opportunity for New Zealand to bolster its international reputation through the acquisition of another ice-breaker to lend to the United States, as they are in dire need of another.

The Defence White Paper 2016 has the South Pacific listed as a key priority for the Defence Force in the coming years. Despite this, there is no mention of climate change and the South Pacific. This thesis has clearly shown that climate change will significantly and severely impact on states within the South Pacific creating regional instability which may threaten New Zealand's national security, especially if there were masses of forced migrants trying to flee to New Zealand. Further, this thesis has shown how New Zealand's fishing industry will be significantly impacted on by climate change, thus further posing a threat to national security. The recommendations this thesis has posited are to both reduce carbon emissions to stop the acidification of oceans and rising sea levels, and to also purchase more patrol vessels to ensure that poaching of fisheries does not impact too heavily on states within the South Pacific, including New Zealand.

This thesis has established the links between climate change, humanitarian work, and national security. In doing so, this thesis showed that not mentioning climate change is a flaw

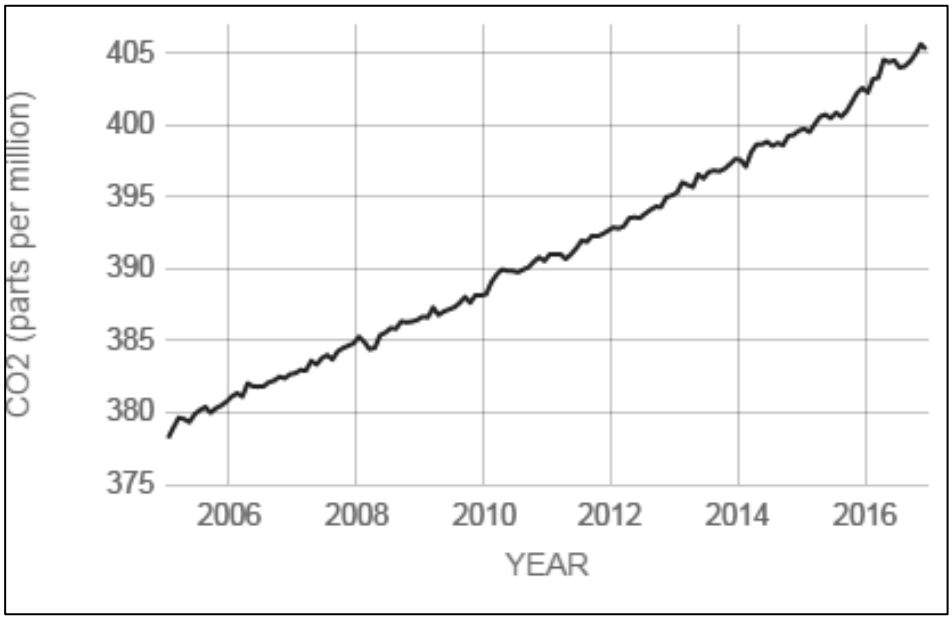
within the DWP 2016. Humanitarian work is not a central component of the DWP 2016, however if the New Zealand government were to invest more money in humanitarian aid it would further secure New Zealand's national security.

Lastly, this thesis looked at two crucial domestic elements – the Exclusive Economic Zone and the Defence Estate – both of which are going to be severely impacted on by climate change. The EEZ is listed in the DWP 2016 as the highest priority for the New Zealand Defence Force, yet despite this there is no mention of climate change. A securitisation of the EEZ needs to take place if the New Zealand government is serious about the EEZ being its top priority. Increasing foreign poachers and the decline of fish stock because of climate change related biological processes means that New Zeeland's fishing industry and territorial integrity will be threatened. Lastly, the New Zealand Defence Force is planning to revitalise its Defence Estate as outlined in the DWP 2016. This thesis recommends that the New Zealand Defence Force take steps to make its Defence Estate resilient in the face of climate change.

The scholarly importance of this study is to both add to the current academic discourse around the threat that climate change poses to national security, and also to add to the narrative which puts New Zealand at the focus of climate change and national security, something which is lacking in wider academia. This study can be added to in the future through wider cross-cultural comparative analysis with a comparison of the Defence White Paper 2016 with more of New Zealand's international counterparts. That analysis would have the potential to show further gaps within New Zealand's defence policy and would have the potential to inform defence policy makers. Due to the evolving nature of climate change, these studies would have to be done in regular intervals, so as to capture this and be as up to date as possible.

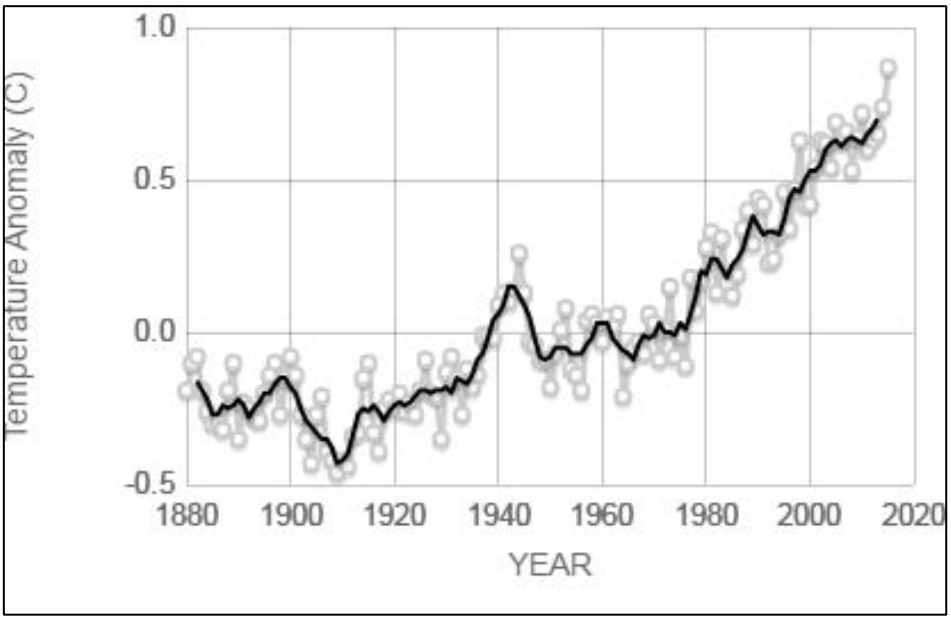
Appendix

Graph A: This graph shows the amount of CO^2 as parts per million in the atmosphere. It is important to note the great leap in the amount of CO^2 present in the atmosphere post-industrialisation.



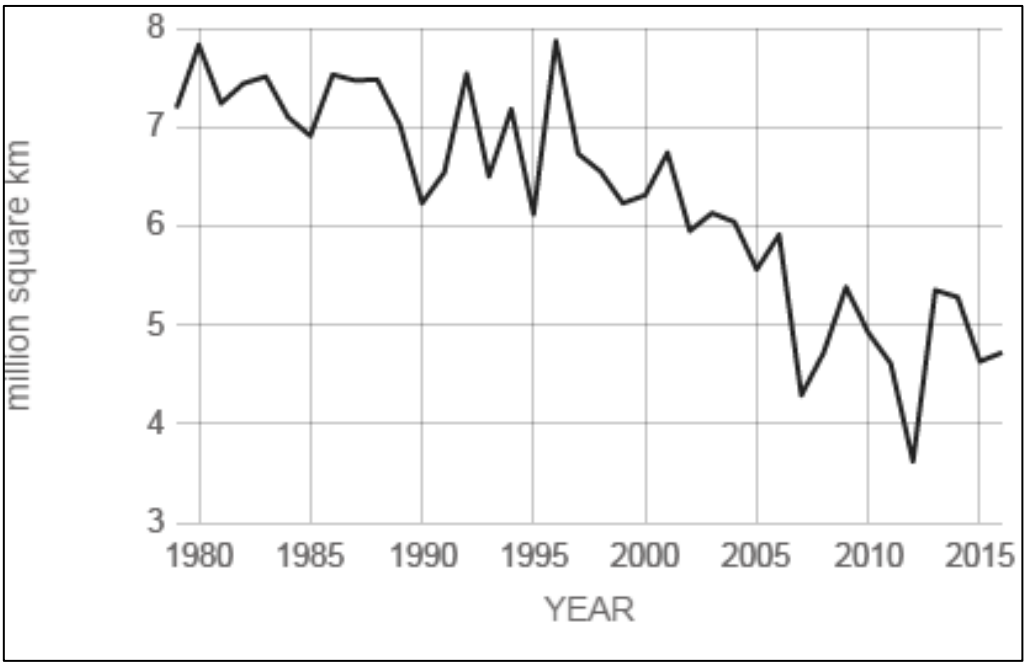
Source: (National Aeronautics and Space Administration, 2016a)

Graph B: This graph plots the average temperature anomalies. The white plot points are the annual mean, whilst the black trend line is the 5 year average. What should be noticeable to the reader is the trend of increasing anomalies.



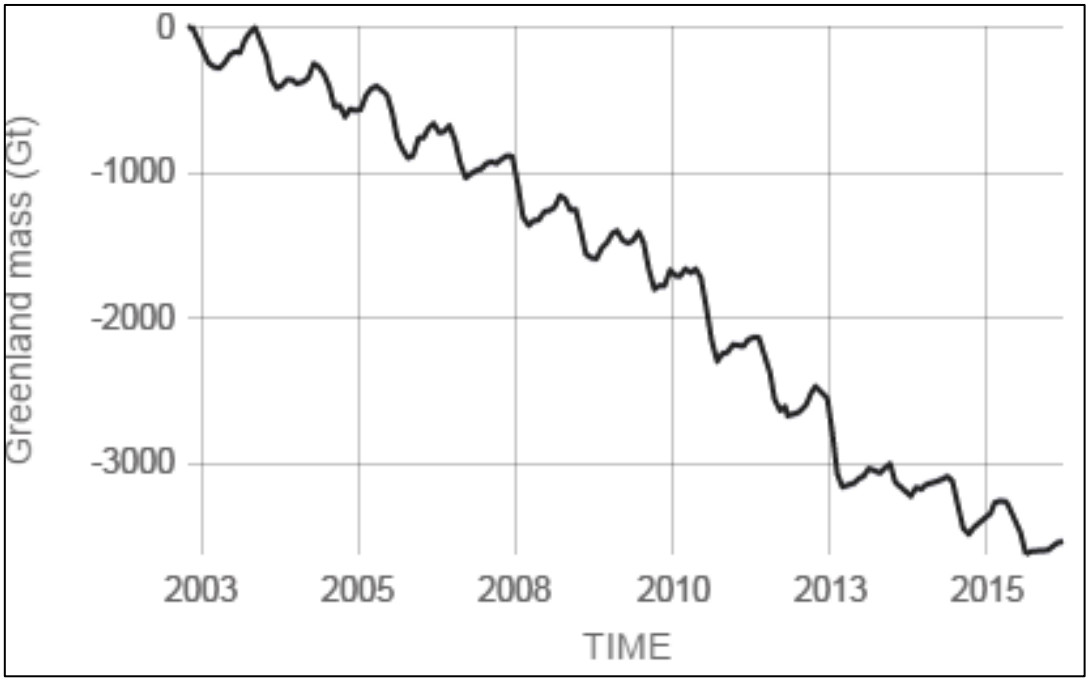
Source: (National Aeronautics and Space Administration, 2015)

Graph C: The graph below shows the average monthly Arctic sea ice extent in September since 1979, based on satellite observations.



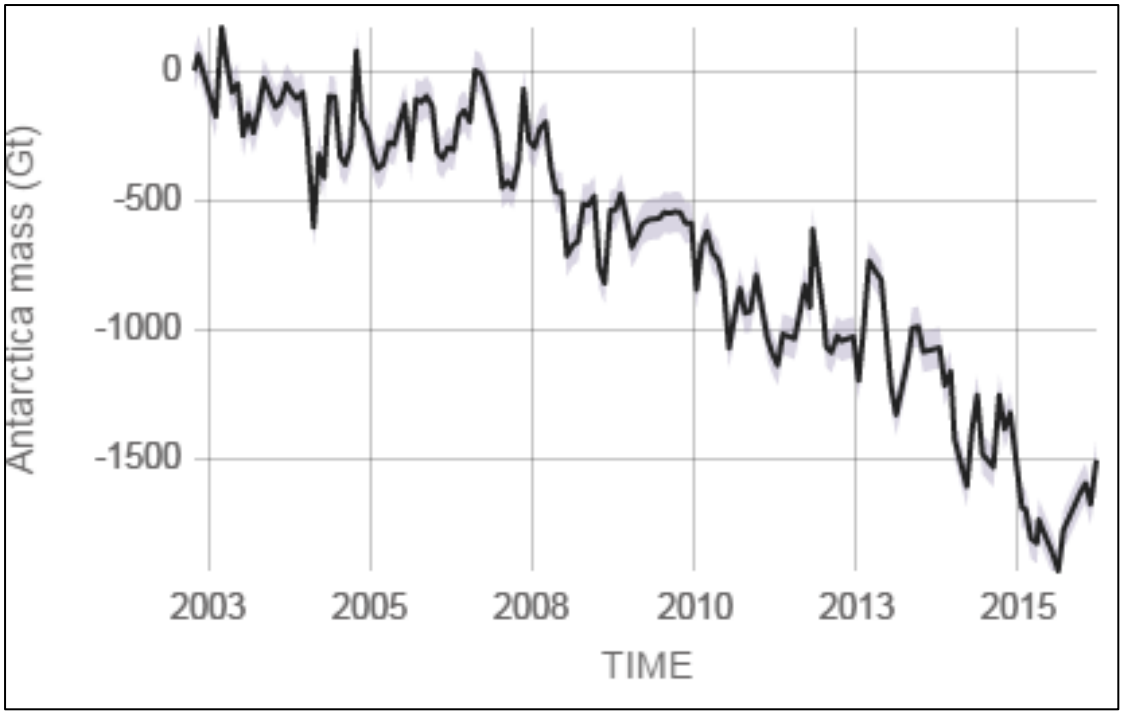
Source: (National Aeronautics and Space Administration, 2016b)

Graph D: The below graph shows the overall trend of the decreasing mass of ice in Greenland.



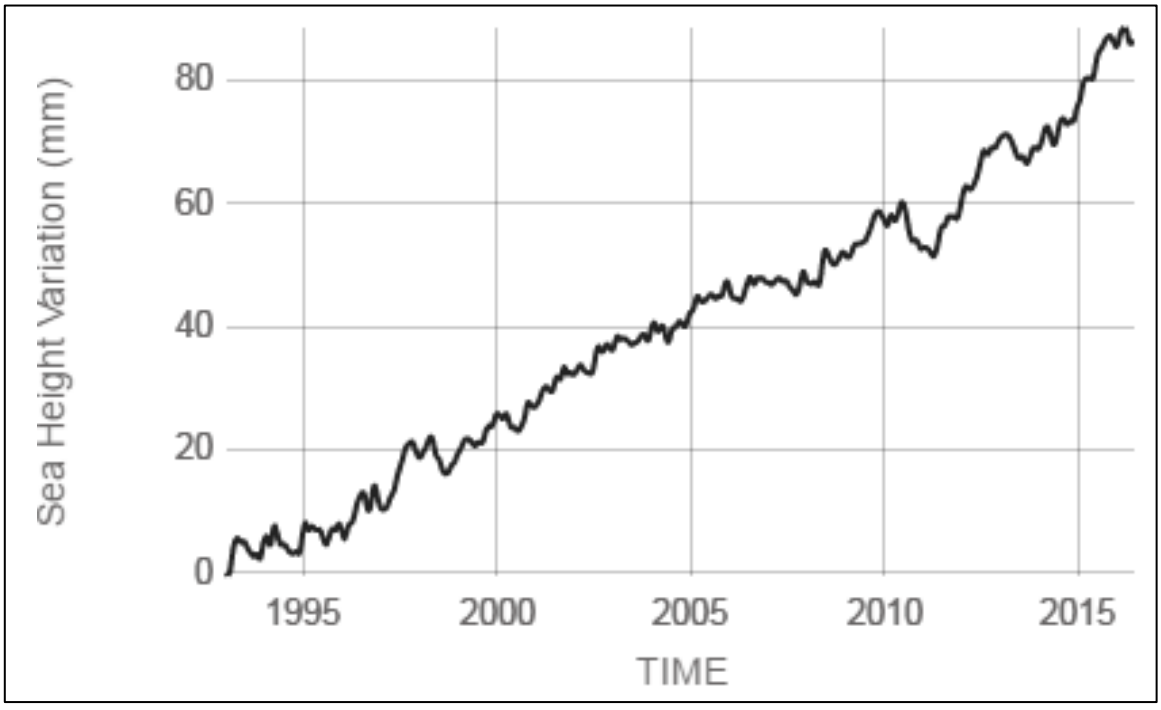
Source: (National Aeronautics and Space Administration, 2016c)

Graph E: This graph illustrates the decline in amount of ice in Antarctica.



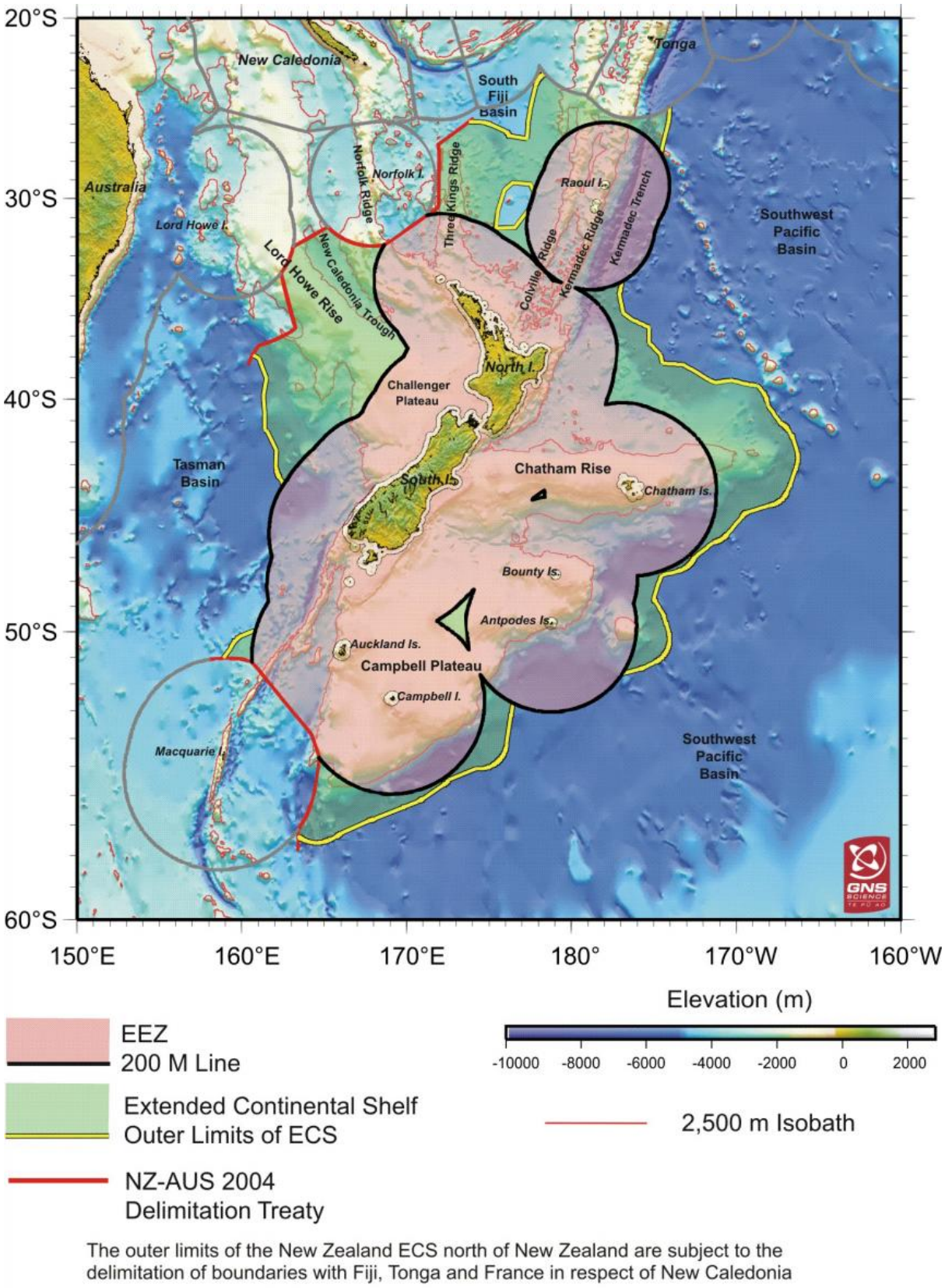
Source: (National Aeronautics and Space Administration, 2016c)

Graph F: The below graph demonstrates the rapid rate in which the sea level is increasing



. Source: (National Aeronautics and Space Administration, 2016d)

Map A: This map illustrates the geographical boundaries of New Zealand's Exclusive Economic Zone and Continental Shelf.



Source: (Land Information New Zealand, No Date)

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