

## Chapter 2

### Climate change-related threats to national security

2.1 This chapter summarises evidence received by the committee on the threats to Australia's national security posed by climate change. It begins by outlining the recognition of climate change as a current and existential national security risk. The chapter then outlines how climate change is affecting the Australian community and economy. It covers how climate change is influencing regional instability, population movement and demands for humanitarian assistance and disaster relief (HADR). Finally, the chapter notes climate change contributes to issues for Defence, including affecting personnel health and the sustainability of estate and assets.

#### Climate change identified as a national security risk

2.2 Leading international security organisations and defence forces have identified climate change as a significant security threat for at least the last decade.<sup>1</sup> For example, the United Nations (UN) Security Council first debated climate security in 2007.<sup>2</sup> The topic was also discussed during Senate Foreign Affairs, Defence and Trade Legislation Estimates hearings in the same year.<sup>3</sup> The prominence of climate security policy grew in the United States (US) from the early 2000s, though 'it was not until the Obama Administration that climate security came into its own'.<sup>4</sup> Since then, climate security has been a focus of many high-level national planning documents, including the 2015 *National Security Strategy*, which identified climate change as an 'urgent and growing threat' to national security.<sup>5</sup> The 2017 *National Security Strategy* did not focus on climate security; however it was identified as a national security threat in recent US Defense appropriation legislation.<sup>6</sup> An American report found approximately 70 per cent of nations have explicitly stated that climate change is a national security concern.<sup>7</sup>

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1 These include the United Nations (UN) General Assembly, the Intergovernmental Panel on Climate Change (IPCC), Pentagon, United Kingdom military, NATO, Group of 7 member countries and the Global Military Advisory Council on Climate Change. Climate Council, *Submission 18*, pp. 8–9.

2 UN, 'Security Council Holds First-Ever Debate On Impact Of Climate Change On Peace, Security, Hearing Over 50 Speakers', 5663rd Meeting, *Media release*, 17 April 2007.

3 Mr Michael Pezzullo, Deputy Secretary, Strategy, Defence, *Committee Estimates Hansard*, 31 May 2007, pp. 101-105.

4 Michael Thomas, *The Securitization of Climate Change Australian and United States' Military Responses (2003–2013)*, UNSW, Springer, Canberra, Australia, 2017, p. 56.

5 President of the United States, *National Security Strategy*, February 2015, p. 12.

6 President of the United States, *National Security Strategy of the United States of America*, December 2017; *National Defense Authorization Act for Fiscal Year 2018* (US).

7 American Security Project, *The Global Security Defense Index on Climate Change*, <https://www.americansecurityproject.org/climate-energy-and-security/climate-change/gsdicc/> (accessed 2 April 2018).

2.3 American climate security expert Ms Sherri Goodman described climate change as a 'direct threat to the national security of Australia', and a 'global existential risk'.<sup>8</sup> Other submissions also recognised climate change as an existential risk, defined as 'one that threatens the premature extinction of Earth-originating intelligent life or the permanent and drastic destruction of its potential for desirable future development'.<sup>9</sup> Mr Mark Crossweller, Director General of Emergency Management Australia (EMA), also referred to the 'existential nature' of climate change risks.<sup>10</sup>

#### *Climate change viewed as a current threat*

2.4 The 2015 United States Department of Defense (US DoD) report mentioned in the terms of reference characterised 'climate change as a present security threat, not strictly a long-term risk'.<sup>11</sup> Illustrating this immediacy, Ms Goodman described recent climate-related events:

...we know now that the hurricane train that has come through the United States this fall and the wildfires that we are experiencing are, in part, due to additional climate risks. And we know that the storms that you've been experiencing in your part of the world [Australia] now are also attributable, in part, to accelerated climate risks. The problem also is not a distant one in the future but it's now. We are experiencing this in regular sunny-day flooding at military bases in the United States and in changes in the Arctic, forcing the first wave of displaced persons from villages in the Arctic.<sup>12</sup>

2.5 The Climate Council further stated the effects of climate change 'are already contributing to increases in the forced migration of people within and between nations, as well as playing a role in heightening social and political tensions, flowing onto conflict and violence'.<sup>13</sup>

2.6 A recent Australian Government report highlighted how Australia is 'already experiencing the impacts of a changing climate, particularly changes associated with increases in temperature, the frequency and intensity of extreme heat events, extreme fire weather, and drought'.<sup>14</sup> For example, it noted 'communities in the Torres Strait

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8 *Submission 8*, p. 1. Other submissions that recognised climate change as an existential threat included Dr Stuart Pearson, *Submission 34*; Mr Ian Dunlop, *Submission 36*; and Honorary Professor Admiral Chris Barrie AC RAN (retired), *Submission 38*.

9 Nick Bostrom, 'Existential risk prevention as global priority', *Global Policy*, vol. 4, no. 1, 2013, p. 15.

10 *Proof Committee Hansard*, 20 March 2018, p. 7.

11 United States Department of Defense (US DoD), *National Security Implications of Climate-Related Risks and a Changing Climate*, July 2015, p. 14.

12 *Committee Hansard*, 8 December 2017, pp. 1–2.

13 *Submission 18*, p. 8.

14 Australian Government, *Australia's 7<sup>th</sup> National Communication on Climate Change*, A report under the United Nations Framework Convention on Climate Change, December 2017, p. 109.

are already being impacted by rising sea levels and many of the region's coral reefs have been severely impacted by increased sea surface temperatures'.<sup>15</sup>

### **Threats to Australian communities and economy**

2.7 As outlined in chapter 1, national security can be understood broadly to include state security, human security and the viability of infrastructure and economies. This section shows how climate change is contributing to threats to the health of Australian individuals, communities, and the economy.

#### ***Extreme weather and physical effects***

2.8 The committee received evidence that climate change entails a diverse range of climate effects. This report does not address these in detail, however the 2015 US DoD report identified the following areas of climate-related security risk:

- persistently recurring conditions such as flooding, drought, and higher temperatures increasing the strain on fragile states and vulnerable populations;
- more frequent and/or more severe extreme weather events which may require involvement of US DoD units, personnel and assets in humanitarian assistance and disaster relief;
- sea level rise and temperature changes leading to greater chance of flooding in coastal communities and increasing adverse impacts on navigation safety, damages to port facilities and cooperative security locations and displaced populations;
- decreases in Arctic ice cover, type, and thickness leading to greater access for tourism, shipping, resource exploration and extraction and military activities.<sup>16</sup>

2.9 This summary shows climate change is contributing to adverse events across different time-scales, including slower-onset changes such as sea level rise, and sudden events such as floods.<sup>17</sup>

2.10 The US DoD report warned '[a]lthough climate-related stress will disproportionately affect fragile and conflict-affected states, even resilient, well-developed countries are subject to the effects of climate change in significant and consequential ways'.<sup>18</sup> The committee heard how climate change is already influencing Australian conditions. Mr Crossweller explained:

Climate change is heightening the severity of natural hazards. We are already seeing increasingly frequent and intense extreme heat events, and

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15 *Australia's 7<sup>th</sup> National Communication on Climate Change*, December 2017, p. 113.

16 US DoD, *National Security Implications of Climate-Related Risks and a Changing Climate*, July 2015, pp. 4–5.

17 Department of Foreign Affairs and Trade (DFAT), *Submission 61*, p. 10.

18 US DoD, *National Security Implications of Climate-Related Risks and a Changing Climate*, July 2015, p. 14.

we will see more extreme fire weather and a longer fire season, increased rainfall and rises in sea level amplifying the effects of high tides and storm surges.<sup>19</sup>

2.11 Dr Simon Bradshaw of Oxfam Australia reiterated 'this is not a future scenario; we're looking at very serious impacts now and projections of far more serious impacts in the future'.<sup>20</sup> The Department of the Environment and Energy summarised some of the projected impacts of climate change in Australia, including:

...an increase in the number of days with weather conducive to fire in southern and eastern Australia; extreme rainfall events are likely to increase in intensity by the end of the century across most of Australia; a decrease in winter and spring rainfall across southern continental Australia; fewer tropical cyclones form in the southern hemisphere than are currently observed, but a higher proportion of those will be more intense, with ongoing large variability from decade to decade; and further sea-level rise around Australia in coming decades.<sup>21</sup>

2.12 The Climate Council cautioned 'as climate change continues to affect extreme weather events, societal resilience and government service delivery will be increasingly tested'.<sup>22</sup> Mr Crossweller reflected on climate-related changes to recent fire conditions:

What we saw emerge this summer was the potential for something we had modelled and spoken about for some time: four states under extreme pressure from severe fire weather and potentially severe fire in the landscape simultaneously. That puts all states under extreme pressure to not only respond to the effects but also to pick up the recovery aspects afterwards. We do a lot of this work, particularly with cyclones as well as they move south and intensify into the Gold Coast and northern New South Wales...I've been in the industry for 34 years, and it's only the last five years where I've seen deployments from other states into Western Australia for firefighting. It just hadn't been necessary up until five years ago; now it's a regular event.<sup>23</sup>

2.13 A recent Australian Government report similarly noted:

Although Australia is experienced at preparing for and responding to natural disasters, the influence of climate change on extreme weather will place pressure on our capacity to manage these events. For example, the changing frequency, magnitude and distribution of extreme weather may

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19 Mr Mark Crossweller, Director General of Emergency Management Australia (EMA), *Proof Committee Hansard*, 20 March 2018, p. 2.

20 *Committee Hansard*, 8 December 2017, p. 42.

21 Department of the Environment and Energy, *Submission 60*, p. 3. See Australian Government, *State of the Climate 2016*, Australian Bureau of Meteorology and Commonwealth Scientific and Industrial Research Organisation (CSIRO), 2016.

22 *Submission 18 Attachment 1*, p. 47.

23 Mr Crossweller, *Proof Committee Hansard*, 20 March 2018, p. 7.

result in natural disasters occurring in new areas and where emergency management experience is limited. Natural disasters could increasingly occur in close succession, limiting the time available for a community to recover between events.<sup>24</sup>

2.14 The Australian Strategic Policy Institute (ASPI) described how the physical effects of climate change have:

...the potential to affect water shortages, increase health problems including the spread of disease, and increase potential for property damage, (for example, through more flooding, coastal erosion, storm surges and extreme weather events) and disrupt critical infrastructure...Increased heat, pests, water stress and diseases will pose adaptation challenges for crop and livestock production...<sup>25</sup>

2.15 ASPI therefore argued Australian agencies should consider the 'potentially devastating climate change impacts on Australian lives and property' as a significant national security threat.<sup>26</sup>

### ***Health and wellbeing***

2.16 Climate change contributes to a range of negative health consequences.<sup>27</sup> Jesuit Social Services observed these 'are not limited to third world or war torn countries. We have already seen examples of adverse community health impacts from extreme climate events here in Australia'.<sup>28</sup> The Australian Climate and Health Alliance 2017 *Framework for a National Strategy on Climate, Health and Well-being for Australia* detailed the following current and projected health impacts:

#### **EXTREME WEATHER EVENTS**

Increased intensity, duration and frequency of extreme weather events such as floods, storms and heatwaves, are placing increasing pressure on health services and infrastructure and putting more Australians at risk of illness, death and post-traumatic stress...

#### **INFECTIOUS DISEASES**

A warmer climate and changing rainfall patterns will increase the range and prevalence of food, water and vector-borne diseases such as dengue fever (which is expected to reach northern NSW by 2100), parasitic (zoonotic) diseases, and the prevalence of illnesses resulting from exposure to pathogens...

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24 Australian Government, *Australia's 7<sup>th</sup> National Communication on Climate Change*, A report under the United Nations Framework Convention on Climate Change, December 2017, p. 120.

25 Athol Yates and Anthony Bergin, *Hardening Australia: Climate change and national disaster resilience*, Australian Strategic Policy Institute (ASPI), Special Report, August 2009, 24, p. 2.

26 *Hardening Australia: Climate change and national disaster resilience*, ASPI, p. 2.

27 Lancet Countdown, *The Lancet Countdown on health and climate change: from 25 years of inaction to a global transformation for public health*, October 2017.

28 *Submission 52*, p. 4.

## FOOD AND WATER SECURITY

Changes in prevailing weather patterns may threaten the security and quality of water sources and the productivity of major agricultural regions in Australia, with implications for ensuring food and water security for a growing population...

## OCCUPATIONAL HEALTH IMPACTS

Hotter temperatures place outdoor and manual labourers at increased risk of heat-related illnesses, work accidents and death, while the increased incidence of extreme weather events increases occupational risks for emergency services...

## MENTAL ILLNESS AND STRESS

Ongoing environmental change and more frequent and severe weather events, combined with the social and economic impacts of climate change, increase the risk that Australians will experience mental illness and stress...

## AEROALLERGENS AND AIR POLLUTION

Increases in atmospheric temperatures may lengthen the pollen season and alter chemical reactions of some air pollutants such as ozone and particulate matter, increasing exposure to aeroallergens and aggravating conditions such as allergic rhinitis, as well as heart and lung conditions including asthma, while increasing the risk of mortality...

## VULNERABLE POPULATIONS

Vulnerable populations will suffer disproportionately the adverse health impacts of climate change in Australia, with people with pre-existing medical conditions, older people, young, disabled, socioeconomically disadvantaged and Indigenous Australians identified as being particularly vulnerable. Climate change places undue burden on those least responsible and least able to respond...<sup>29</sup>

2.17 The framework noted heatwaves in Victoria in 2009 and 2014 'contributed to 374 and 167 excess deaths, respectively', and the 2016 thunderstorm asthma event 'caused a 3,000% increase in asthma-related admissions to intensive care and is thought to have contributed to the death of nine people'.<sup>30</sup> It also highlighted the economic costs of climate-mediated events, noting 'the health and social costs of the Black Saturday bushfires and 2011 Queensland floods total[led] AUD\$3.9 and \$7.4 billion respectively'.<sup>31</sup>

2.18 Dr Craig James, Research Program Director, CSIRO, also noted rising temperatures contribute to 'the heat island effect in cities', which results in 'heightened

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29 Climate and Health Alliance, *Framework for a National Strategy on Climate, Health and Well-being for Australia*, June 2017, p. 18.

30 *Framework for a National Strategy on Climate, Health and Well-being for Australia*, p. 5, [original emphasis removed].

31 *Framework for a National Strategy on Climate, Health and Well-being for Australia*, p. 5, [original emphasis removed].

death rates during heatwaves and those sorts of impacts'.<sup>32</sup> Mr Crowweller similarly stated 'that heat's effect on infrastructure is a significant concern domestically'.<sup>33</sup> Dr James described how extreme heat can also affect Australia's economy, and explained that it has occupational health and safety ramifications, partly because it is 'pretty hard to continue to labour for a full normal working day when the temperatures are exceeding 40 degrees'.<sup>34</sup>

2.19 Dr James mentioned how climate change can contribute to low water quality and supply, negatively affecting health, food security and agricultural production.<sup>35</sup> He also noted 'there's other direct effects on food supply that aren't related to water—for example, CO2 fertilisation changes the quality of the actual food products'.<sup>36</sup>

### ***Economy***

2.20 Sustainable Business Australia argued 'the notion of national security transcends beyond the military paradigm, and incorporates the threats to the social and economic well-being of Australia'.<sup>37</sup> The 2015 Australian Government *National Climate Resilience and Adaptation Strategy* stated the 'Australian community is financially exposed to the impacts of natural disasters, and this risk is increasing'.<sup>38</sup> In 2017, the Australian Prudential Regulation Authority (APRA) identified risks to businesses from the physical effects of climate change, transition risks as societies shift to a low-carbon economy, and liability risks for leaders who fail to respond to climate change.<sup>39</sup> The Centre for Policy Development (CPD) provided examples of physical climate risks, such as direct damage to a company's assets, and transition risks, such as collapse in demand for products and the 'stranding' of assets due to market shifts.<sup>40</sup> The Senate Economics References Committee has also recently inquired into the financial risk associated with carbon for Australian businesses, and climate change-related insurance issues.<sup>41</sup> In 2017, a leading international task force on climate-related financial disclosures cautioned '[t]he potential impacts of climate

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32 *Proof Committee Hansard*, 20 March 2018, p. 5.

33 Mr Crowweller, *Proof Committee Hansard*, 20 March 2018, p.7.

34 *Proof Committee Hansard*, 20 March 2018, p. 5.

35 *Proof Committee Hansard*, 20 March 2018, p. 5.

36 *Proof Committee Hansard*, 20 March 2018, p. 5.

37 *Submission 48*, p. 1. See also Dr Paul Barnes, ASPI, *Committee Hansard*, 8 December 2017, pp. 12–13.

38 Australian Government, *National Climate Resilience and Adaptation Strategy*, 2015, p. 63.

39 Mr Geoff Summerhayes, Executive Board Member, 'Australia's new horizon: Climate change challenges and prudential risk', Australian Prudential Regulation Authority, *Speech*, Insurance Council of Australia Annual Forum, Sydney, February 2017.

40 Mr Sam Hurley and Ms Kate Mackenzie, *Climate horizons: next steps for scenario analysis in Australia*, Centre for Policy Development (CPD), November 2017, p. 5.

41 Senate Economics References Committee, *Carbon risk: a burning issue*, April 2017; *Australia's general insurance industry: sapping consumers of the will to compare*, August 2017, pp. 70–74.

change on organizations...are not only physical and do not manifest only in the long term'.<sup>42</sup>

2.21 The US National Centers for Environmental Information (NCEI) reported that in 2017, the US 'was impacted by 16 separate billion-dollar disaster events'.<sup>43</sup> These included freeze and drought events, floods, wildfires, storms and hurricanes Harvey, Irma and Maria. NCEI illustrated the recent change in average number of events causing losses exceeding \$1 billion in the US, stating that the '1980–2017 annual average is 6.0 events (CPI-adjusted); the annual average for the most recent 5 years (2013–2017) is 11.6 events (CPI-adjusted)'.<sup>44</sup> NCEI argued '[m]ore notable than the high frequency of these events was the cumulative cost', estimated to be US\$309.5 billion (CPI-adjusted to present).<sup>45</sup>

2.22 A 2016 report considered the social impacts of disasters in Australia, and estimated 'in 2015, the total economic cost of natural disasters in an average year—including tangible and intangible costs – exceeded \$9 billion, which is equivalent to about 0.6% of gross domestic product (GDP) in the same year'.<sup>46</sup> A 2017 report estimated the 'total economic cost of natural disasters is growing and will reach \$39 billion per year by 2050' in Australia without including the effects of climate change, indicating the actual cost is likely to be significantly higher.<sup>47</sup>

2.23 Specific sectors are also threatened by climate change. For example, participants raised the increasing costs of insurance and reinsurance due to extreme weather events.<sup>48</sup> In 2017, APRA stated:

Several smaller insurers are already reluctant to underwrite policies for some customers in high-risk parts of Australia, while general insurers have come under intense political and consumer pressure to justify substantial

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42 Task Force on Climate-related Financial Disclosures, *Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures (June 2017)*, Financial Stability Board, p. ii.

43 National Centers for Environmental Information, National Oceanic and Atmospheric Administration (NCEI), *Billion-Dollar Weather and Climate Disasters: Overview*, <https://www.ncdc.noaa.gov/billions/> (accessed 14 May 2018).

44 NCEI, *Billion-Dollar Weather and Climate Disasters: Overview*.

45 NCEI, *Billion-Dollar Weather and Climate Disasters: Overview*.

46 Australian Business Roundtable for Disaster Resilience & Safer Communities, *Economic Cost of the Social Impact of Natural Disasters*, Deloitte Access Economics, 2016, p. 12.

47 Australian Business Roundtable for Disaster Resilience & Safer Communities, *Building resilience to natural disasters in our states and territories*, Deloitte Access Economics, 2017, p. 7.

48 Rear Admiral Titley, *Committee Hansard*, 8 December 2017, p. 11; Dr Barnes, *Committee Hansard*, 8 December 2017, pp. 12–13; Mr Dunlop, *Committee Hansard*, 8 December 2017, pp. 53–56.

premium rises that have made insurance in high-risk areas harder to afford.<sup>49</sup>

2.24 Sustainable Business Australia described how climate change is affecting other industries, including agriculture:

The agricultural industry is heavily dependent on the availability of resources such as water and fertile land....A reduction in the supply of agricultural products and water availability may threaten Australia's food security, increase commodity prices, create social and political unrest, inflation, and eventually an economic slowdown....The challenges climate change will impose may significantly disrupt supply and the quality of produce and foodstuff, potentially creating regional instability.<sup>50</sup>

2.25 The Climate Council illustrated how Australia's tourism sector is being adversely affected by the effects of climate change. Its 2018 report identified the degradation of popular destinations, including bleaching of the Great Barrier Reef, extreme heat and water scarcity in the Red Centre, rising sea levels and extreme heat in the Top End, sea level rise affecting Australia's beaches and a decreasing snow season affecting Australia's ski tourism.<sup>51</sup> The report argued the 'tourism industry in Australia is extremely vulnerable, mainly due to its reliance on nature-based attractions that are already feeling the impacts of sea level rise and increasing extreme weather events'.<sup>52</sup>

2.26 More positively, Mr Ian Dunlop described the transition to renewable energy sources as 'the biggest investment opportunity the world has ever seen'.<sup>53</sup> The *2017 Foreign Policy White Paper* also recognised the Australian economy could benefit from a transition to renewable energy, contending:

Australia stands to benefit from these trends because of our abundant renewable resources and expertise in low emissions, clean energy and renewable technology. We will have the opportunity to boost exports of climate services and technologies and to attract investment. Australia also has expertise in sustainable agriculture and cities, climate smart infrastructure, water management and climate finance.<sup>54</sup>

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49 Mr Summerhayes, *The weight of money: A business case for climate risk resilience*, CPD, Sydney, 29 November 2017, p. 3. The issue of Australians experiencing difficulties accessing insurance has also been covered recently in the media (see, for example: Sarah Ferguson and Michael Brissenden, 'Weather alert', *Four Corners*, ABC, 5 March 2018; Alice Uribe, 'Deloitte climate expert says large parts of Australia could become 'uninsurable'', *Australian Financial Review*, 24 October 2017).

50 *Submission 48*, p. 2.

51 Professor Lesley Hughes, Petra Stock, Louis Brailsford and Dr David Alexander, *Icons At Risk: Climate Change Threatening Australian Tourism*, Climate Council, 2018, p. III.

52 *Icons At Risk: Climate Change Threatening Australian Tourism*, Climate Council, 2018, p. IV.

53 *Committee Hansard*, 8 December 2017, p. 53.

54 *2017 Foreign Policy White Paper*, p. 87.

## Threats to Australia's region

2.27 Former Chief of the Defence Force, Honorary Professor Admiral Chris Barrie AC RAN (retired) predicted that of all seven continents, Australia is likely to be the most affected by a changing climate.<sup>55</sup> Other submissions also noted the impacts of climate change are likely to be particularly severe in Australia's region (variously considered to be the Asia-Pacific or Indo-Pacific region).<sup>56</sup> The committee heard that climate change is acting as a 'threat multiplier' by compounding existing threats in the region.<sup>57</sup> Departmental representatives agreed climate change is a threat multiplier, 'exacerbating existing threats to human security, including geopolitical, socioeconomic, water, energy, food and health challenges that diminish resilience and increase the likelihood of conflict'.<sup>58</sup> Dr Anthony Bergin and Ms Zoe Glasson from ASPI stated:

...climate change-related temperature increases and a higher incidence and intensity of extreme weather events may lead to population displacement, conflict over resources, food and water shortages, further environmental degradation, and the further weakening of fragile states.<sup>59</sup>

2.28 This section summarises views on climate change's contribution to demands for Australia to provide overseas HADR, manage population movements, and address regional instability.

### *Regional vulnerability to climate effects*

2.29 Australia's Official Statement to the 2017 Global Platform for Disaster Risk Reduction stated: 'Our region is already the most disaster-prone in the world but climate change is affecting the frequency, intensity, magnitude and location of natural hazards'.<sup>60</sup> The CPD summarised some regional vulnerabilities:

Asia is the most exposed region to low elevation climatic impacts like flooding and displacement...and has more than 90 per cent of the world's exposure to tropical cyclones...The Indo-Pacific region has the world's fastest growing economic hubs, its most populated cities, and the majority of the world's poor. It also has the greatest vulnerability to climate-induced humanitarian and natural disasters such as severe storms, flooding and extreme heat, as well as the flow-on effects such as damage to economic and social infrastructure, disease outbreak, malnutrition and food and water

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55 Admiral Barrie, *Submission 38*, [p. 3].

56 Breakthrough National Centre for Climate Restoration (Breakthrough), *Submission 36 Attachment 2*.

57 Professor Anthony Burke and Professor Shirley Scott, *Submission 51*, p. 7. The phrase 'threat multiplier' was 'personally coined' by Ms Goodman, *Submission 8*, p. 2.

58 Mr Crosweiler, *Proof Committee Hansard*, 20 March 2018, p. 2; Air Vice Marshal Mel Hupfeld, Head Force Design, Defence, *Proof Committee Hansard*, 20 March 2018, p. 3.

59 *Submission 3*, p. 3.

60 Australian Government, *Australia's Official Statement to the 2017 Global Platform for Disaster Risk Reduction*, Cancun, Mexico, 24 May 2017, p. 1.

shortages. This is a volatile mix of factors that heightens the security risk posed to Australia.<sup>61</sup>

2.30 Former United Kingdom (UK) Government Climate and Security Envoy and retired Rear Admiral Neil Morisetti reiterated:

Australia lies in the region most vulnerable to the impact of a changing climate, including security threats, resulting from both the onset of long term trends and increased extreme weather events. The security and humanitarian risk is significantly higher than in other regions of the world. Australia's geographic position means it cannot afford to take climate security lightly.<sup>62</sup>

2.31 The *Framework for Resilient Development in the Pacific* warned the 'existence of some Pacific Island countries (PICs) is threatened by climate change'.<sup>63</sup> It cautioned:

Pacific Island countries and territories (PICTs) are highly exposed to a range of natural hazards of hydro-meteorological origin (such as cyclones, droughts, landslides and floods) and geological origin (including volcanic eruptions, earthquakes and tsunamis). These hazards often lead to disasters, which affect thousands of people and exacerbate existing development challenges in the region. Climate change predictions identify changes for the Pacific including an increase in extreme hot days and warm nights, extreme rainfall events, intensity of tropical cyclones in the South Pacific, sea level rise and ocean acidification.<sup>64</sup>

2.32 While 'communities in the South Pacific have survived environmental hardships and have a high degree of local resilience', climate change can 'make it more difficult for communities and governments to recover from disasters and resolve issues'.<sup>65</sup> For example:

Tropical Cyclone Pam affected 188,000 people in Vanuatu (70 percent of total population) and cost an estimated AUD 600 million or 64 per cent of their GDP. Tropical Cyclone Winston affected 540,400 people in Fiji (62 percent of total population) and cost an estimated USD 0.9 billion or 20 percent of their GDP.<sup>66</sup>

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61 *Submission 24*, [p. 3].

62 CPD, *Submission 24 Attachment 1*, p. 10.

63 *Framework for Resilient Development in the Pacific An Integrated Approach to Address Climate Change and Disaster Risk Management (FRDP) 2017-2030*, Voluntary Guidelines for the Pacific Islands Region, p. 14.

64 *Framework for Resilient Development in the Pacific*, p. 2.

65 Mr Greg MacPherson, Defence, 'Regional security implications of climate change and natural disasters in the South Pacific', *Indo-Pacific Strategic Digest 2017*, p. 260.

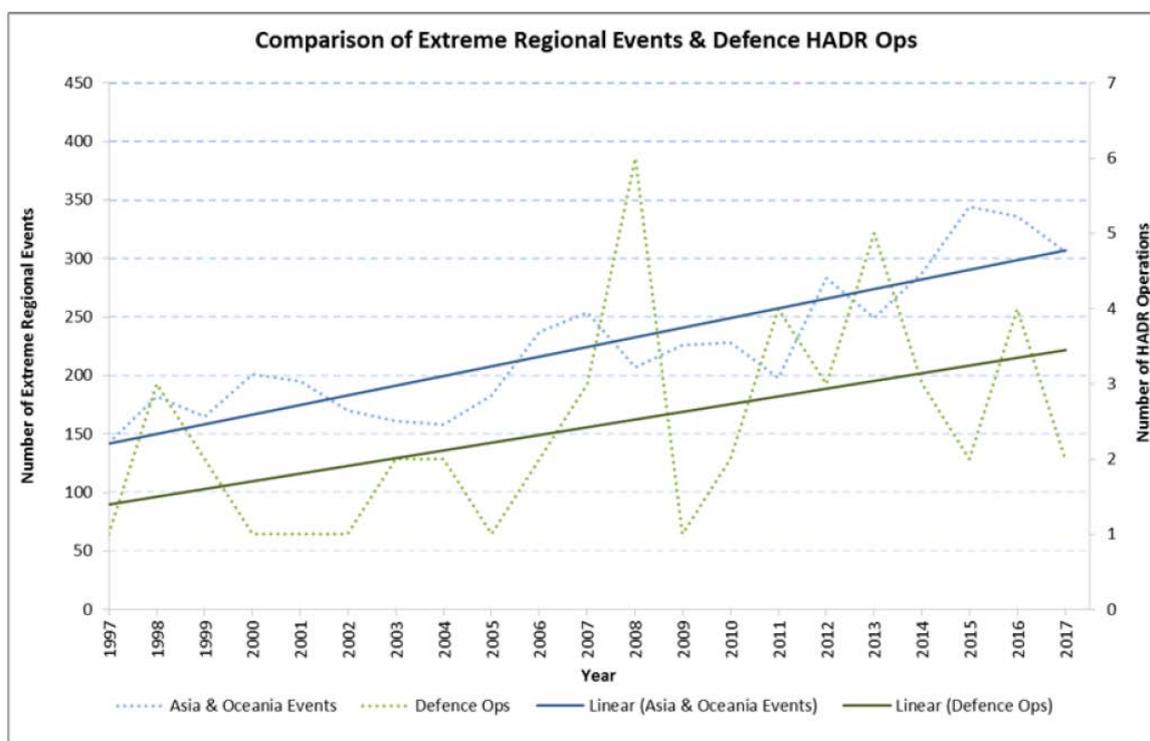
66 Australian Government, *Australia's Official Statement to the 2017 Global Platform for Disaster Risk Reduction*, Cancun, Mexico, 24 May 2017, p. 2.

### *Overseas humanitarian assistance and disaster relief*

2.33 Australia takes responsibility for providing HADR to vulnerable communities in the Indo-Pacific region in the context of climate change.<sup>67</sup> In 2016, the Chief of Army Lieutenant General Angus Campbell DSC AM referred to the challenge of 'an unstable planet...caused by climate change associated with global warming'.<sup>68</sup> He reasoned as 'weather events intensify we can reasonably expect to see the increasing use of Defence assets in support of humanitarian assistance and disaster relief (HADR) operations'.<sup>69</sup> The Department of Foreign Affairs and Trade confirmed that during 'the last 15 years there has been an increase in the ADF's [Australian Defence Force] involvement in regional humanitarian response'.<sup>70</sup>

2.34 The Department of Defence (Defence) further illustrated that there has been a comparable upwards trend for both disaster-related events in the region and Defence HADR operations over the past 20 years, as shown below.

*Figure 1—Comparison of Extreme Regional Events and Defence HADR Operations*



Defence, answer to question taken on notice (number 1) at 20 March 2018 hearing in Canberra (received 17 April 2018).

<sup>67</sup> DFAT, *Submission 61*, pp. 6–7.

<sup>68</sup> 'Chief of Army opening address to the 2016 Chief of Army's Exercise', *Speech*, Adelaide Convention Centre, Adelaide, 6 September 2016.

<sup>69</sup> Chief of Army opening address to the 2016 Chief of Army's Exercise'.

<sup>70</sup> DFAT, *Submission 61*, p. 14.

2.35 The committee heard details of the deployment of 'relatively large-scale ADF contingents in response to natural disasters' in the region.<sup>71</sup> For example, after Tropical Cyclone Winston affected Fiji in February 2016, Australia deployed HMAS Canberra and approximately 1000 personnel, as well as providing aerial assessments by surveillance aircraft, seven MRH-90 helicopters to assist with response efforts and deliver humanitarian stores, and C-17 and C-130 flights that delivered over 520 tonnes of humanitarian supplies and equipment.<sup>72</sup> Australia also provided \$35 million in assistance including funds for immediate supplies, support services and longer-term recovery and reconstruction.<sup>73</sup>

2.36 More recently, Australia provided support to Tonga and Samoa in the aftermath of Tropical Cyclone Gita.<sup>74</sup> This included the provision of \$14 million in assistance to support the response to the crisis in Tonga, emergency supplies, and longer-term reconstruction activities, 'particularly in restoring critical infrastructure and social services'.<sup>75</sup> The ADF also delivered approximately 140,000 kilograms of humanitarian aid from Brisbane using a Royal Australian Air Force C-17A Globemaster.<sup>76</sup>

2.37 The costs 'directly attributable to international HADR and major DACC [Defence Assistance to the Civil Community] operations' between 2012–13 and December 2017–18 totalled approximately \$18.2 million.<sup>77</sup> When asked by the committee whether this expenditure data could be used to forecast future expenditure, Mr Dunlop explained climate change is not a linear process amenable to such predictions, because the effects of climate change do not increase gradually.<sup>78</sup>

2.38 Non-military organisations are also being required to provide additional responses to extreme weather events in Australia and across the region. For example, the Australian Federal Police (AFP) has recognised:

The calls on AFP resources to assist the development of policing in Australia's nearby region are also likely to continue. Policing expertise and community engagement will be increasingly important in helping to manage instability in many regional countries. Climate change and more

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71 Defence, *Submission 63*, p. 9.

72 DFAT, *Submission 61*, p. 13.

73 DFAT, *Submission 61*, p. 13.

74 DFAT, Crisis Hub—Tropical Cyclone Gita, 20 February 2018, <http://dfat.gov.au/crisis-hub/Pages/cyclone-gita.aspx> (accessed 21 February 2018).

75 DFAT, Crisis Hub—Tropical Cyclone Gita, 20 February 2018; the Hon Julie Bishop MP, Minister for Foreign Affairs, 'Additional humanitarian assistance to Tonga', *Media release*, 23 March 2018.

76 Senator the Hon Marise Payne, Minister for Defence, 'Conclusion of Defence emergency assistance to Tonga and Fiji', *Media release*, 23 February 2018.

77 Defence, answer to written question on notice (number 1) following 8 December hearing in Canberra (received 27 February 2018).

78 *Committee Hansard*, 8 December 2017, p. 56.

intense weather patterns will disproportionately affect fragile states in Asia and the Pacific, leading to likely requirements for AFP contributions to humanitarian assistance and disaster relief.<sup>79</sup>

### ***Human mobility***

2.39 The Climate Change, Development and Mobility (CCDM) Research Group observed:

Human mobility (encompassing migration, displacement, relocation and resettlement) has been identified as an important strategy for adapting to climate change in the face of growing concerns about rising global temperatures and its associated impacts, particularly sea level rise and more severe and frequent extreme weather events.<sup>80</sup>

2.40 The former Department of Immigration and Border Protection (DIBP) stated 'climate change effects could permanently alter normal business, including the accessibility of assets and capability and the nature of challenges to our management of the border and migration'.<sup>81</sup> Submissions agreed that climate-related displacement and migration is likely to occur in Australia's region. However, as illustrated below, the committee heard varying evidence regarding the nature and scale of this migration, and the extent to which it will be problematic for Australia's national security.

#### *The influence of climate change on patterns of population displacement*

2.41 DIBP contended that the relationship between climate change and migration is 'non-linear, complex and unpredictable' and 'will not eventuate as straightforward cause and effect'.<sup>82</sup> The Kaldor Centre for International Refugee Law at the University of New South Wales similarly recognised that the effects of climate change:

...do not cause displacement on their own, but rather interact with other economic, social, and political drivers that themselves affect migration – like impoverishment, environmental degradation, recourse [sic] scarcity, lack of livelihood opportunities, and so on.<sup>83</sup>

2.42 According to World Vision Australia, Professor Walter Kälin identified the following five climate-related scenarios that may contribute to human displacement:

...hydro-meteorological disasters (i.e. flooding/cyclones); zones designated by governments as being too high-risk or dangerous for human habitation; environmental degradation and slow onset disasters (i.e. desertification, salinization of coastal zones); 'sinking' small island states; and violent

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79 Australian Federal Police, Futures Centre, <https://www.afp.gov.au/futures/implications> (accessed 21 February 2018).

80 Climate Change, Development and Mobility Research Group, *Submission 45*, p. 2.

81 *Submission 59*, p. 1.

82 Department of Immigration and Border Protection, *Submission 59*, pp. 1–2.

83 Kaldor Centre for International Refugee Law, *Submission 1*, p. 2.

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conflict triggered by a decrease in essential resources due to climate change.<sup>84</sup>

*Climate-related displacement in the region*

2.43 Oxfam Australia emphasised that '[d]isplacement linked to climate change is not a future threat but a current and growing reality, affecting millions of women, men, boys and girls around the world'.<sup>85</sup> Its 2017 report found:

Climate change is already forcing millions of people from their land and homes, and putting many more at risk of displacement in the future. Supercharged storms, more intense and prolonged droughts, rising seas and other impacts of climate change all exacerbate people's existing vulnerabilities and increase the likelihood of being forced to move.<sup>86</sup>

2.44 The CPD commented that there is a high risk of internal displacement due to climate-related effects in some Asian countries 'because of dense populations residing in coastal and/or floodplain areas that are vulnerable to the onsets of climate change, such as Bangladesh'.<sup>87</sup> Ms Goodman similarly warned rising sea levels could lead to mass displacement of populations near the coast in particularly the 'disaster alley' Asia-Pacific region.<sup>88</sup>

2.45 Other submissions focused on population movements from PICs. For example, the Australian Council for International Development (ACFID) asserted that 'for Pacific nations such as Tuvalu, Kiribati and Micronesia, climate change is already a genuine existential threat with the capacity to diminish their livelihoods and even erase their states' territorial footprints'.<sup>89</sup> The Climate Council explained that PICs are generally 'highly vulnerable to extreme weather events as many are low lying, remote and have limited disaster mitigation and adaptation capacity'.<sup>90</sup> The non-government organisation Peacifica described how people from PICs are already undertaking migration activities in response to climate change, including moving to urban areas and purchasing land in other PICs.<sup>91</sup> It posited that while PICs have relatively small populations, such movements 'may lead to cascading and destabilising population movements and pressures across the South Pacific region'.<sup>92</sup>

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84 World Vision Australia, *Submission 28*, p. 3.

85 Oxfam Australia, *Submission 40 Supplementary Submission 1*, p. 10.

86 Oxfam Australia, *Submission 40 Supplementary Submission 1*, p. 3.

87 *Submission 24 Attachment 1*, p. 20.

88 *Submission 8*, p. 7.

89 *Submission 53*, p. 7.

90 *Submission 18 Attachment 1*, p. 38.

91 *Submission 30*, pp. 4–5, 11.

92 *Submission 30*, pp. 4–5.

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*Scale of inter-country movement*

2.46 Some submissions warned that climate change may contribute to mass migration.<sup>93</sup> Ms Goodman suggested Australia's region is 'most likely to see increasing waves of migration from small island states or storm-affected, highly populated areas in Asia that can't accommodate people when a very strong storm hits'.<sup>94</sup> Admiral Barrie described a scenario in which millions of migrants may 'seek better fortunes in Australia' due to water and food insecurity in Asia.<sup>95</sup>

2.47 In contrast, the Kaldor Centre cautioned that the prospect of developed states such as Australia being inundated by people fleeing the impacts of climate change is a 'flawed notion' that will 'result in ill-attuned and inappropriate policy responses'.<sup>96</sup> The CCDM Research Group similarly cautioned 'studies announcing large numbers of so-called climate refugees crossing international borders have largely been discredited'.<sup>97</sup> Instead, the Kaldor Centre stated most climate-related displacement is likely to take place within countries, rather than across international borders.<sup>98</sup> Such 'internal displacement' may 'generate low-level social tensions and potential conflict over key resources such as land, housing, food, water and employment, and increase the human insecurity of the poor'.<sup>99</sup> The Climate Council concurred that the effects of climate change are more likely to result in internal displacement, at least in the short term.<sup>100</sup>

*Focus on human security*

2.48 The Kaldor Centre found 'there is little evidence to suggest that climate change-related movement will threaten national, regional or international security'.<sup>101</sup> Some reasoned the committee should not 'securitise migration and treat climate migrants as a threat', but rather 'avoid the border-protection paradigm' and focus on the human security challenges caused by climate-related migration.<sup>102</sup> For example, Oxfam Australia advocated that Australia support long-term strategies to allow 'the safe and dignified movement for those whom it becomes the only option'.<sup>103</sup> Suggestions are further outlined in chapter 5.

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93 See DFAT, *Submission 61*, p. 7.

94 *Committee Hansard*, 8 December 2017, p. 7.

95 *Submission 38*, [pp. 7–8]; *Committee Hansard*, 8 December 2017, p. 30.

96 *Submission 1*, p. 3.

97 *Submission 45*, p. 2.

98 *Submission 1*, p. 3.

99 *Submission 1*, pp. 3–4.

100 *Submission 18 Attachment 1*, p. 38.

101 *Submission 1*, p. 3.

102 Professor Burke, *Committee Hansard*, 8 December 2017, pp. 25–26.

103 *Submission 40*, pp. 5–6.

## ***Conflict***

2.49 Australian agencies may be required to undertake domestic and international operations relating to conflict, crime and terrorism exacerbated by climate change. American Rear Admiral David Titley (retired) told the committee the 'rapidly changing climate may create, accelerate and exacerbate already unstable situations throughout the world'.<sup>104</sup> He warned the 'security of both our nations rests on a stable world order' and '[c]limate change has the potential to disrupt that stability on a scale rarely seen'.<sup>105</sup> Conflict may result from food and water scarcity, pressures on social welfare and HADR agencies, and maritime border disputes.<sup>106</sup>

2.50 Defence outlined how climate change can contribute to conflict:

When climate impacts are combined with ethnic or other social grievances, they can contribute to increased migration, internal instability or intra-state insurgencies, often over greater competition for natural resources. These developments may foster terrorism or cross-border conflict.<sup>107</sup>

2.51 DFAT further explained:

Potential climate-induced resource competition that increase tensions within and between (particularly fragile) states, where international intervention may be required in the form of stabilisation, peacekeeping or post-conflict operations...Climate-related adverse impacts add to challenges for governments of fragile states, raising the risk of state failure and associated familiar threats of conflict, transnational crime and terrorism.<sup>108</sup>

2.52 These factors 'could lead to an increase in the demand for a wide spectrum of Defence responses', both within Australia and overseas.<sup>109</sup> The committee heard that national security agencies may be required to maintain law and order following disasters in Australia, though Admiral Barrie emphasised it is more appropriate for the police to perform this type of role than the military.<sup>110</sup>

2.53 Some submissions provided examples of international conflicts to which climate change had been found to contribute.<sup>111</sup> For instance, climate change exacerbated drought and desertification in Mali, and contributed to increases in food

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104 *Committee Hansard*, 8 December 2017, p. 2.

105 *Committee Hansard*, 8 December 2017, p. 3.

106 Climate Council, *Submission 18 Attachment 1*, p. 41.

107 *Submission 63*, p. 4.

108 *Submission 61*, p. 7.

109 Defence, *Submission 63*, p. 3.

110 *Committee Hansard*, 8 December 2017, p. 32.

111 For example, Professor Burke and Professor Scott, *Submission 51*, p. 10; Public Health Association of Australia, *Submission 43*, p. 5; Dr Kumuda Simpson-Gray, *Submission 68*, p. 2.

prices in Syria, thereby contributing to the destabilisation of fragile states.<sup>112</sup> A recent report from a research organisation founded by Ms Goodman noted climate change is driving water stress, and has 'already proven to be a trigger in refugee dynamics and political instability'.<sup>113</sup>

2.54 A number of submissions also noted Australia's naval assets may take on a larger maritime security role, including managing activities in the Southern Ocean and Antarctica such as illegal fishing 'due to climate change-induced fisheries migration'.<sup>114</sup> The Climate Council suggested 'sea-level rise, coastline retreat and the eventual submergence of small low-lying islands may affect the maritime boundaries of nations and alter exclusive economic zones in which natural resources are located'.<sup>115</sup> It speculated that the South China Sea dispute may be intensified by climate change.<sup>116</sup>

### **Threats to Defence**

2.55 While the previous sections outlined how climate change functions as a 'threat multiplier' and exacerbates existing threats, this section illustrates how climate change also works as a 'burden multiplier' and creates direct capability threats for Defence.<sup>117</sup> Dr Bergin and Ms Glasson described how the effects of climate change 'place additional stress on military resources, including ADF estate, personnel, support systems, facilities, supplies, collective training activities and command structures'.<sup>118</sup> Air Vice Marshal Mel Hupfeld, Head Force Design, Defence, told the committee climate change 'can certainly directly affect Defence's operations, our bases, our infrastructure, our equipment and our personnel'.<sup>119</sup>

### ***Personnel health***

2.56 Climate change has a range of negative health consequences, and these can affect Defence personnel. For example, climate change affects the spread of

112 Mr Dunlop, *Submission 36 Attachment 2*, p. 13; Climate Council, *Submission 18 Attachment 1*, p. 21.

113 CNA Military Advisory Board, *The Role of Water Stress in Instability and Conflict*, 2017, p. 9.

114 Dr Anthony Bergin and Ms Zoe Glasson, *Submission 3*, p. 5. See also: DFAT, *Submission 61*; Defence, *Submission 63*, p. 6; Dr Md Saiful Karim, *Submission 44*.

115 Climate Council, *Submission 18 Attachment 1*, p. 42. The committee is aware of research that found a small net land increase for some of Tuvalu's islands, despite sea level rise. The committee notes the research's statement that this 'does not negate the need to still vigorously support ongoing mitigation action to curtail future sea level impacts and climatic changes on small island nations or to undertake robust efforts to better define the constraints and thresholds of habitability (such as water resources and food supply) on atoll islands'. Paul S Kench, Murray R Ford and Susan D Owen, 'Patterns of island change and persistence offer alternate adaptation pathways for atoll nations', *Nature Communications*, article no. 605, 2018.

116 Climate Council, *Submission 18 Attachment 1*, p. 42.

117 Dr Bergin and Ms Glasson, *Submission 3*, p. 2; Climate Council, *Submission 18*, p. 6.

118 *Submission 3*, p. 2.

119 Air Vice Marshal Hupfeld, *Proof Committee Hansard*, 20 March 2018, p. 3.

conditions such as malaria, infectious diseases, respiratory issues and food-borne infections, all of which may undermine the health of Defence personnel.<sup>120</sup>

2.57 The Climate Council expressed concern that personnel undertaking training and exercises will be subjected to extreme weather events and more frequent and intense heatwaves, undermining ADF capability.<sup>121</sup> Ms Goodman said increasing temperatures are already 'affecting training days' for the US military.<sup>122</sup>

2.58 The Australian Psychological Society and Defence also described how mental health problems can be exacerbated by climate change, for example, following disasters or prolonged exposure to difficult operational conditions.<sup>123</sup>

### *Estate and assets*

2.59 Rear Admiral Titley told the committee that climate change is also likely to impact national security 'by posing increasing risks to the Department of Defence's estate and infrastructure group'.<sup>124</sup> For example, Defence's bases and equipment could be damaged by sea level rise, storm surge, coastal erosion and drought.<sup>125</sup> Defence submitted:

A large number of key Defence installations are at or just above sea level and much of Australia's infrastructure is ageing so there is an increased likelihood of climate change impacting Defence base operations in the short to medium term.<sup>126</sup>

2.60 Extreme weather events such as flooding and bushfires also have the potential to impede operations, 'disabling critical military infrastructure at times when rapid mobilisation is needed'.<sup>127</sup> The Climate Council also pointed out 'military bases rely on civilian infrastructure, such as water, power and transportation networks'.<sup>128</sup> Dr Michael Thomas, representing the Climate Council, advised that Defence:

...can't act in isolation about islanding their bases from this; they need to work with local communities, local councils, the local authorities—

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120 Anthony Press, Anthony Bergin and Eliza Garnsey, *Heavy Weather: Climate and the Australian Defence Force*, ASPI, Special Report no. 49, March 2013, pp. 29–30.

121 *Submission 18*, p. 6.

122 *Committee Hansard*, 8 December 2017, p. 4.

123 *Submission 16*; *Submission 63*, p. 6.

124 *Committee Hansard*, 8 December 2017, p. 2.

125 Athol Yates and Anthony Bergin, *Hardening Australia: Climate change and national disaster resilience*, ASPI, Special Report, August 2009, 24, p. 2; Climate Council, *Submission 18*, p. 7; Defence, *Submission 61*, p. 7.

126 *Submission 63*, p. 7.

127 Climate Council, *Submission 18*, p. 6.

128 *Submission 18*, p. 7.

electricity, water and all the utilities that enable Defence to mobilise in times of need.<sup>129</sup>

2.61 Defence reported that increased temperatures and the prevalence of natural hazards could also affect current and planned training grounds and facilities.<sup>130</sup>

2.62 The CPD raised the impact of rising sea levels on the current naval shipbuilding program, suggesting the 'vulnerability to natural disasters...could shut down shipbuilding capacity for periods of time'.<sup>131</sup>

2.63 The Defence submission outlined additional risks to assets, including the potential for increased temperatures and changes to the chemical composition of the atmosphere and oceans affecting the 'maintenance requirements and possibly the operational performance of major ADF assets'.<sup>132</sup>

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129 *Committee Hansard*, 8 December 2017, p. 38.

130 *Submission 63*, p. 7.

131 *Submission 24*, p. 5.

132 *Submission 63*, p. 7.