Chapter 4

Preparing for extreme weather events

Introduction

4.1 A major focus of this inquiry was to consider how well prepared the Australian community, together with utilities, essential and emergency services and industry are for the predicted increase in the number and intensity of extreme weather events. The impacts of past extreme weather events and projected future impacts are discussed in other chapters.

4.2 Many witnesses made a strong argument for decreasing human effects on the environment in order to reduce the impact of extreme weather events. However, the reality is that cyclones, heavy rainfall causing floods, rising sea levels and tidal surges, heatwaves or bushfires have always been a factor in Australia's climate and will continue to be so, probably to an increasing extent. For this reason, improving the nation's preparedness for these events remains an important way to reduce the risk and impact on people, property and economic stability. The concepts which underpin such preparedness are those of adaptation and mitigation and these are discussed in detail in this chapter. The chapter commences with a consideration of the evidence about preparedness in key sectors and then examines how this applies in emergency situations.[1]

Adaptation and mitigation

4.3 Adaptation and mitigation are strategies which refer to positive preparation for extreme events. Specifically, adaptation refers to how societies and ecologies adjust to accommodate new weather patterns, while mitigation refers to measures that are undertaken to reduce the impact of potentially disastrous events when they do occur. Adaptation and mitigation are 'very, very closely related' according to Associate Professor David King of the Centre of Disaster Studies:

> We feel that adaptation is one strategy encompassed within mitigation and that if you are trying to get people to be prepared for the next hazard event then you are helping them in terms of adaptation for long-term changes and for increased regularity of events.[2]

4.4 The Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education (DIICCSRTE) defined adaptation as 'managing the impact of

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1 See terms of reference (c) and (d).

2 Associate Professor David King, Director, Centre of Disaster Studies, James Cook University, *Committee Hansard*, 22 February 2013, p. 10.

climate change'.[3] The department described government funded research into adaptation and the linkage between overarching information and practical implementation:

> …the government provid[es] the information on which adaptation decisions are based….When it comes to decision making, you need these two things to come together, being the capability at the local level to use that information and to look at how decisions are robust to a range of future scenarios.[4]

General preparedness

4.5 This section describes information received by the committee about Australia's preparedness for extreme weather events. The committee was advised that preparedness varies across the country. While some outstanding examples of adaptation in some geographical locations were presented, deficiencies and gaps were also identified. Likewise some sectors appeared to be better prepared than others. As the Director of the National Climate Change Adaptation Research Facility (NCCARF) put it, all levels of government and the private sector are 'on a pretty steep learning curve with respect to extreme events'.[5]

4.6 Mr John Connor of the Climate Institute described preparedness as 'patchy':

> …we compiled Australia's first-ever sectoral resilience and readiness indicators for these sectors. We were surprised, given Australia's history of extremes, that the readiness was patchy. It was poorly coordinated and reliant on historic data. Our infrastructure managers are walking backwards with blinkers on into an uncertain and high-risk feature.[6]

4.7 Associate Professor Laura Stocker from the Curtin University Sustainability Policy Institute went so far to say that there was inadequate planning by the state government and general ignorance in communities.[7]

4.8 The committee heard that in contrast, in the Northern Territory where extreme events occur more regularly, this regularity means that preparations for and responses to such events are better developed:[8]

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3 Ms Benedikte Jensen, First Assistant Secretary, Adaptation, Science and Communications Division, DIICCSRTE, *Committee Hansard*, 11 April 2013, p. 62.

4 Ms Benedikte Jensen, DIICCSRTE ,*Committee Hansard*, 11 April 2013, p. 63.

5 Professor Jean Palutikof, NCCARF, *Committee Hansard*, 10 April 2013, p. 31.

6 Mr John Connor, Chief Executive Officer, The Climate Institute, *Committee Hansard*, 11 April 2013, p. 38.

7 Associate Professor Laura Stocker, Coastal Collaboration Cluster, Curtin University Sustainability Policy Institute, *Committee Hansard*, 7 March 2013, p. 17.

8 Northern Territory Police, Fire and Emergency Services, *Committee Hansard*, 7 March 2013, pp 1–6.

> I would just like to say by way of introduction that the Northern Territory is quite used to having emergency events every year. It is well practised in the management of flooding through the wet season as a matter of course, with towns being cut off as a matter of course. So a lot of what might be seen as an emergency down in the southern regions is a fact of life up here and we are organised to deal with it.[9]

4.9 The committee was advised that the business sector was conspicuously absent from long-term planning for extreme weather. Mr Ian Dunlop, formerly an executive in the energy industry advised the committee that, in his view, business leaders had underestimated both the extent and speed of climate change.[10]

Implementation

4.10 This section provides an overview of some of the issues relating to implementation of strategies for adaptation and mitigation. Green Cross Australia gave an example of how the twin strategies of mitigation and adaptation can deliver benefits:

> …where you can integrate adaptation and mitigation it is a great idea. When we talk to companies like BlueScope Steel that have rooftops that resist hail and also are painted white—so there are less insurance claims, there is less damage from storms, they are reflective and cooler to live in—it just strikes us as a win-win.[11]

4.11 Professor David Karoly, representing the Wentworth Group of Concerned Scientisits, described some successful adaptations taking place in Australia in response to previous disasters, but noted that much more was needed:

> In fact, what has happened in Australia over time is changes—very sensible changes—in adaptation to past extreme events, such as Cyclone Tracy leading to changes in building codes in northern Australia, or changes in protection against wildfires, and the massive improvements that we have had in the technology and infrastructure that is now available, such as the helicopters and the aircraft, for fighting bushfires. There have been massive adaptive responses. They are not sufficient.[12]

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9 Mr Peter Davies, Acting Chief Information Officer, Northern Territory Police, Fire and Emergency Services, *Committee Hansard*, 7 March 2013, pp 1 & 4.

10 Mr Ian Dunlop, *Committee Hansard*, 7 June 2013, pp 17 & 19.

11 Ms Mara Bun, Chief Executive Officer, Green Cross Australia, *Committee Hansard*, 22 February 2013, p. 17.

12 Professor David Karoly, Wentworth Group of Concerned Scientists, *Committee Hansard*, 11 April 2013, p. 33.

4.12 Despite these positive examples, according to the Australian Local Government Association (ALGA), there has been a reduction in local mitigation projects in recent years.[13]

4.13 Similarly, Mr Glenn Evans of the Floodplain Management Association claimed that flood risk management plans have been left unimplemented due to lack of funding and that 'flood mitigation has ceased to be a top-of-mind issue in all levels of government'.[14] Mr Evans was of the view that local councils had reduced numbers of staff with necessary expertise, leading to increased delays in implementation.[15]

4.14 Mr Evans expressed concern that assessment of flood risk in land use planning did not take place at the appropriate time in the process:

> There needs to be an assessment of the flood risk of land proposed for development right at the beginning of the planning process. In New South Wales the assessment of flood risk often happens a fair way up the chain. You might actually be at the development application stage before there are detailed flood assessments. By that time there are already financial commitments to develop that site. Even if the site may be deemed a suitable risk, there are often huge additional costs involved in building things on that site to suit the flood risk; whereas, if the assessment of flood risk had been carried out initially it might have been decided, "This is not really a good place to build".[16]

4.15 Mitigation for flooding often takes the form of protective walls, but witnesses indicated that flood planning is more complex than simply erecting defences. While protective infrastructure can reduce vulnerability to floods, the committee was advised that 'they also bring problems because they can encourage more and more development behind them and no levy is going to stop every flood'.[17] This concern was echoed by Mr Evans who argued that levees can cause complacency about flood risk:

> There will nearly always be a bigger flood than what you design for…If it overtops, it comes very quickly and it becomes too late for people to evacuate, so there is the potential for disaster…[Locals] ignored the advice [to evacuate] because there was a mitigation structure in place.[18]

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13 Mr Adrian Beresford-Wylie, Chief Executive, ALGA, *Committee Hansard,* 11 April 2013, p. 2.

14 Mr Glenn Evans, Executive Officer, Floodplain Management Association, *Committee Hansard,* 10 April 2013, p. 21.

15 Mr Glenn Evans, Floodplain Management Association, *Committee Hansard,* 10 April 2013, p. 21.

16 Mr Glenn Evans, Floodplain Management Association, *Committee Hansard,* 10 April 2013, p. 21.

17 Professor John McAneney, Managing Director, Risk Frontiers, *Committee Hansard,* 10 April 2013, p. 4.

18 Mr Glenn Evans, Floodplain Management Association, *Committee Hansard,* 10 April 2013, p. 22.

4.16 Another weakness in general land use planning was identified by NCCARF who stated that local government:

> …lack[s] the support that they need in terms of policy, regulation and legislation in order to feel that they are able to act around adaptation. Especially people working in local government but also people working in [the] private sector do not feel that they have got the regulatory framework that allows them to act with confidence.[19]

4.17 A significant aspect of mitigation is how it is to be funded, as multiple local projects, many as yet uncosted, would be involved. The Insurance Australia Group (IAG) has analysed funding as having two aspects: affordability of insurance (see Chapter 3) and government access to funding. IAG advised the committee that:

> The first one is about insurance affordability and how we make sure that the broader spectrum of community can continue to afford insurance and protect their assets so that they do not ultimately fall back to government…
>
> The second piece then is: how does government actually get access to funding and coordinate funding to be able to invest in mitigation that will ultimately reduce the economic cost of losses over time?[20]

4.18 Representatives of the insurance industry alerted the committee to the practical implications of adapting to extreme weather events:

> From the insurance industry's perspective, the need for adaptation to extreme weather conditions is not a theoretical exercise or something that we need to contemplate doing in 10, 20 or 30 years' time; it is something that we are paying money and claims about right now, so we actually need to see adaptation of the built environment sooner rather than later.[21]

4.19 While the committee heard some good news in relation to mitigation and adaptation at a local level, evidence presented to the committee suggests that there is much to be done before adaptation and mitigation strategies are being adequately implemented.

Communication and coordination

4.20 The committee considered evidence that poor communication, inadequate coordination and inconsistency are among the most significant barriers to preparation for extreme weather events. The challenge of coordination across different jurisdictions and sectors is discussed in detail in Chapter 5 and will only be briefly addressed here. However, from the evidence the committee notes that while some progress has been made in communicating important messages to enable community

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19 Professor Jean Palutikof, NCCARF, *Committee Hansard*, 10 April 2013, p. 31.

20 Ms Julie Batch, Group General Manager, Reinsurance, IAG, *Committee Hansard*, 10 April 2013, p. 14.

21 Mr Karl Sullivan, General Manager Policy–Risk and Disaster Planning Directorate, Insurance Council of Australia (ICA), *Committee Hansard*, 10 April 2013, p. 10.

members and organisations to be better prepared for extreme weather events, there is still much work to be done in this area.

4.21 Dr Cassandra Goldie, Chief Executive Officer of the Australian Council of Social Service (ACOSS), encouraged the Commonwealth government to take an active role in collaboration:

> We think there is a need for a deliberate process at that level to draw up what has worked, to work out what is scalable and what does need to be mandated, and what on the alternative needs to be enabling. …Also I think we do need to be ensuring there is a way to get through to local organisations. We also see local government having a key role here in providing the frameworks for the ongoing coordination of local action.[22]

4.22 Dr Blair Trewin from the Australian Meteorological and Oceanographic Society observed that:

> There is definitely a need for improving communication between the agencies doing research and people on the ground who are at the sharp end of climate change adaptation…. Another part of that is making sure there is good and relevant resource material available from the science community in a form that is accessible to other decision makers.[23]

4.23 Another example of confusion was this description by the Tasmanian Branch of the Environmental Defenders Office:

> At a recent climate change adaptation forum in Hobart, numerous council representatives expressed frustration at the volume of conflicting information regarding climate change impacts and the difficulty in obtaining credible, consistent advice to guide their policy decisions.[24]

4.24 The implication of a lack of coordination and communication is that if people do not know who is responsible or how to organise the multiple strands of adaptation and mitigation, then preparedness will be disjointed and much less effective.

4.25 The committee also heard evidence that there are two aspects of communication which are relevant—communication between instrumentalities and sectors, and communication to citizens on the ground in vulnerable situations.

4.26 The Australian Conservation Foundation (ACF) noted the following principles of effective communication:

- local specific information

22 Dr Cassandra Goldie, ACOSS, *Committee Hansard,* 11 April 2013, p. 49.

23 Dr Blair Trewin, President, Australian Meteorological and Oceanographic Society, *Committee Hansard,* 20 February 2013, p. 21.

24 Environmental Defenders Office (Tasmania), *Submission 148*, p. 3.

- research on the best way of communicating the risks of climate change and extreme weather so citizens are prepared.[25]

4.27 The committee considers that good communication with local groups is vital if such principles are to be applied, yet representatives of community service organisations told the committee that these groups are routinely left out of prior planning and collaboration, and consider that they are not adequately resourced for the demands of extreme events.[26]

> What we have identified is that, when these things come along, they actually cripple the [community service] organisations that look to their needs…[A]fter a week 50 per cent of those organisations who provide food, medicine, disabled access and so on would not be operating…
>
> …when we have organisations which are well prepared and are operational…they become part of the solution. Indeed, they take some of the load off our traditional services.[27]

4.28 In a time of emergency, communication takes on a particular urgency. However, a number of witnesses provided information about the cost of having good communication systems in place. The committee was advised by the Northern Territory Police, Fire and Emergency Services:

> Luckily for us in the Territory one of the television stations plays a lot of emergency management advertising free; otherwise, we would not be able to afford it. But routine messages are really important. And increasingly doing them from a national perspective is also important...so that there is a consistent message being given to them about how to handle an emergency.[28]

4.29 Dr Michael Eburn described for the committee a lack of clarity about people's responsibilities during Black Saturday:

> Right down to the chief officers of those agencies, people were unclear on what their responsibility was. That comes down to the state legislation. I think state disaster plans are, despite their best efforts, very unclear about who is in charge of what and, in particular, about where the police sit against everybody else. That leads to a lot of confusion.[29]

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25 ACF, *Submission 36*, p. 2.

26 Dr Karl Mallon, Director, Science and Systems, Climate Risk Pty Ltd, *Committee Hansard,* 11 April 2013, p. 50; *Committee Hansard,* 11 April 2013, pp 46f.

27 Dr Karl Mallon, Climate Risk Pty Ltd, *Committee Hansard*, 11 April 2013, p. 50.

28 Mr Peter Davies, Northern Territory Police, Fire and Emergency Services, *Committee Hansard,* 7 March 2013, p. 5.

29 Dr Michael Eburn, *Committee Hansard,* 11 April 2013, p. 16.

4.30 Communication of heat alerts is an area where there has been some success and Australian systems have used lessons learned from reports of disasters in Europe. Professor Nicholls advised the committee that:

> In Melbourne we had a system in place before the 2009 heatwave the weekend before Black Saturday and we know that worked quite well. It has been further developed by the Department of Human Services in Victoria and their counterparts in other parts of Australia are also doing a good job to improve these sorts of systems. We can always do better but I think it is one of the success stories of the last decade.[30]

4.31 Good communication within the community was raised as a critical aspect of medical and health preparedness. The Australian Medical Association (AMA) advised that GPs should be anticipating more extreme conditions and advising at-risk groups in advance:

> …we see the elderly eight or nine times a year, on average, in our surgeries; and there is an opportunity for primary-care providers, as part of their preventive health impacts with their patients, to actually explain to people about ventilation, perspiration, evaporation and when it is appropriate to switch on that air conditioner…
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> The other time of life we have to be really careful of is infancy…New parents do not know some of these clues, and it is up to us to tell them.[31]

Knowledge and social capital

4.32 One of the major themes that came out of evidence presented to the committee was that of the need for improvements in community understanding and knowledge about how to prepare for and respond to, extreme weather events, and for this knowledge to be based on solid research and empirical evidence.

4.33 Submitters to this inquiry expressed deep concern about changes to climate and weather patterns, and many questioned the current level of education and public awareness in relation to how to manage extreme weather events.[32] The committee also heard from witnesses and submitters who suggest that people and organisations need to build relationships and social capital in order to be able to prepare and respond appropriately to extreme weather events. [33]

4.34 The City of Melbourne advised the committee of their research to determine residents' preparedness for impacts of weather changes predicted for Melbourne. This research found that that 35 per cent of residents and 50 per cent of businesses perceive

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30 Professor Neville Nicholls, *Committee Hansard,* 20 February 2013, p. 9.

31 Dr Steve Hambleton, President, AMA, *Committee Hansard,* 11 April 2013, p. 27.

32 Ms Mara Bun, Green Cross Australia, *Committee Hansard,* 22 February 2013, p. 17.

33 Mr David Cummins, *Submission 25,* p. 1; Ms Mara Bun, Green Cross Australia, *Committee Hansard,* 22 February 2013, p. 23.

a risk from extreme weather events. Only 53 per cent felt prepared for very hot days and only 41 per cent for flooding.[34] Only 16 per cent of businesses knew how to develop a flood plan.[35] The City of Melbourne suggested that 'ambiguity surrounding roles and responsibilities in preparing for extreme weather events...hampers the ability of the local government sector to prepare for and manage [them]'.[36]

The need for research

4.35 For the Australian community to be better prepared for extreme weather events, accessible and straightforward communication of complex scientific and economic information is important. Research gaps and the need for improved observations and data collection around extreme weather was discussed in Chapter 2. The following section of the report considers research into effective preparedness for extreme weather events.

4.36 Ms Olivia Kember of the Climate Institute noted that in some circumstances there may be pressure for information to be withheld and that this may hinder adaptation and mitigation:

> For some of these issues, there are going to be groups that stand to lose value by the disclosure of the true risks that they are facing. So there is always a risk that there will be political pressure for those findings not to be disclosed, which I think comes back to why we think disclosure early and often is really important. [37]

4.37 It was apparent to the committee that submitters and witnesses on the whole believed that sound research was very important. Both the Bureau of Meteorology (BoM) and CSIRO noted that physical data is fairly straightforward, but 'the nonphysical and social data starts to get harder'[38] and that:

> …there is plenty of science in other areas, including the social sciences, looking at things like barriers to adaptation, which we still have quite a bit to do on to understand…[39]

4.38 Dr Mark Stafford Smith from CSIRO added that:

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34 The City of Melbourne, *Submission 63*, p. 1.

35 The City of Melbourne, *Submission 63*, p. 3.

36 The City of Melbourne, *Submission 63*, p. 3.

37 Ms Olivia Kember, National Policy and Research Manager, The Climate Institute, *Committee Hansard,* 11 April 2013, p. 42.

38 Dr Neville Smith, Deputy Director, Research and Systems, BoM, *Committee Hansard,* 11 April 2013, p. 56.

39 Dr Mark Stafford Smith, Science Director, CSIRO Climate Adaption Flagship, *Committee Hansard,* 11 April 2013, p. 57.

> …responding to sea level rise [is] very complex. We are moving really into the social sciences of people's responses there and I do not think that is resolved.[40]

4.39 Some witnesses indicated that much more research is needed to enable effective decision-making and recommendations about reliable preparedness strategies. Others indicated there are knowledge gaps in certain areas,[41] and a need for more long-term funding for specialist research to be undertaken by well prepared and competent scientists.[42]

Infrastructure

4.40 Some of the impacts of extreme weather events on infrastructure and the subsequent disruptions to Australian communities and businesses are discussed in Chapter 3. Preparedness for extreme weather events requires that infrastructure is adapted appropriately for such events and that it has built-in qualities to mitigate the worst effects of these events. Such adaptations refer both to physical structures and to organisational structures that support them.

4.41 The Climate and Health Alliance (CAHA) advised the committee that the predicted 1–5 degree rise in the earth's temperature could have catastrophic impacts on human life and health.[43] The CAHA presented the committee with research to show that current infrastructure is inadequate to respond to the impacts likely to ensue from more intense and frequent heatwaves. Indeed, problems already exist:

> …heatwaves in Melbourne and Adelaide in 2009 put power supplies, morgue capacity and transport systems under stress. In Adelaide, railways buckled under the heat and commercial refrigeration vans were hired as makeshift morgues.[44]

4.42 The Climate Institute stressed the interdependence of infrastructure and described the roll-on effect of extreme heat leading to such events as buckling railway lines resulting in the closure of services, preventing employees from getting to work

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40 Dr Mark Stafford Smith, Science Director, CSIRO Climate Adaption Flagship, *Committee Hansard,* 11 April 2013, p. 57.

41 Dr Blair Trewin, Australian Meteorological and Oceanographic Society, *Committee Hansard,* 20 February 2013, p. 20.

42 Dr Blair Trewin, Australian Meteorological and Oceanographic Society, *Committee Hansard,* 20 February 2013, p. 22. See also Mr Paul Considine, Manager, Operations, Australasian Fire and Emergency Services Authorities Council (AFAC), *Committee Hansard,* 20 February 2013, p. 5; Mr Gary Morgan, Bushfire Cooperative Research Centre, *Committee Hansard,* 20 February 2013, Dr Anthony Kiem, *Committee Hansard,* 11 April 2013, pp 13 and 12–15; Ms Fiona Armstrong, Convenor, CAHA, *Committee Hansard,* 20 February 2013, p. 30.

43 Ms Fiona Armstrong, CAHA, *Committee Hansard,* 20 February 2013, p. 25.

44 Ms Fiona Armstrong, CAHA, *Committee Hansard,* 20 February 2013, p. 25.

and resulting in a loss to businesses. The institute suggested that better scenario-based planning could allow people and organisations to be prepared for impacts:

> [W]e do think there should be better focus on two- and four-degree scenarios for risk management and risk planning across government, and that governments are doing. We do think there are key tests that agencies with oversight of standards, such as the building commission, need...Finally, the Commonwealth should be a leader in…getting agencies themselves to look at and disclose those risks.[45]

4.43 It was generally agreed that extreme weather events also require much greater numbers of personnel on the ground to assist with, and manage impacts.[46] Professor Nicholls observed:

> …one of the problems with adaptation of any sort to climate change, particularly with something like this, is that it is a very personnel intense, that you would need a lot of people to be talking to a lot of other people.[47]

4.44 Engineers Australia defined two aspects of infrastructure preparedness: operational and strategic. Operational preparedness is 'geared to preparing, responding and recovering so that when damage occurs to infrastructure, continuity is rapidly restored'. Strategic preparedness is 'geared to preventing damage from occurring or minimising its impact'. Engineers Australia emphasised that it is difficult to assess preparedness as there are no standard metrics across Australia.[48] In the absence of rigorous measurements, they based their conclusions on examination of responses to recent disastrous events. Their conclusion was that there is reasonable operational preparedness but 'a low level of strategic preparedness'.[49]

4.45 It was noted that preparedness was patchy across different sectors.[50] According to the Climate Institute, water infrastructure is quite well prepared, and some property areas, but with transport and electricity infrastructure 'there were some issues where we found very poor preparation, very much reliance on historical data'.[51]

4.46 The South Australian State Emergency Management Committee (SEMC) felt that South Australia was well prepared for emergencies:

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45 Mr John Connor, The Climate Institute, *Committee Hansard*, 11 April 2013, pp 39–40.

46 Mr Paul Considine, AFAC, *Committee Hansard*, 20 February 2013, p. 3; Mr Andrew Coghlan, National Manager, Emergency Services, Australian Red Cross, *Committee Hansard*, 20 February 2013, pp 32–34.

47 Professor Neville Nicholls, *Committee Hansard*, 20 February 2013, p. 10.

48 Engineers Australia, *Submission 128*, p. 7.

49 Engineers Australia, *Submission 128*, p. 8.

50 Ms Olivia Kember, The Climate Institute, *Committee Hansard*, 11 April 2013, p. 40.

51 Mr John Connor, The Climate Institute, *Committee Hansard*, 11 April 2013, p. 40.

> The SEMC supports the national policy shift towards building community resilience to natural disasters…
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> South Australia has undertaken a Critical Infrastructure Protection program in line with the national critical infrastructure model. Under this program South Australian Government authorities collaborate with the owners and operators of critical infrastructure to ensure risk assessments are undertaken and protective mitigation measures implemented.[52]

4.47 University of Queensland researchers gave evidence from the 2010-11 Queensland floods on the issue of food security. The general disruption caused crops to be spoilt, products not to reach processing plants, severely reduced distribution, food shortages and price increases. While alternative transportation, supply sources and relaxing quality standards mitigated the impact to some extent, their evidence suggests inadequate preparation especially among community members who resorted to panic buying.[53] The submission commented that:

> …some sections of the community suffered from low levels of 'food literacy' during and after the floods. Food literacy captures peoples' ability to identify and use fresh and nutritious food, ensuring a healthy diet and avoiding waste.[54]

4.48 The Local Government Association of Queensland (LGAQ) drew attention to exclusions and limitations in the Natural Disaster Relief and Recovery Arrangements Determination which mean that 'only one betterment application had been approved so far'.[55] The LGAQ stated that:

> From a long term resilience building perspective, of the 73 councils in Queensland the LGAQ estimates that the majority of councils are not where they should be…Approximately 2/3 of councils will have undertaken some work in a particular area.[56]

4.49 It attributed lack of adaptation strategies to a paucity of good quality data, limited people and financial resources, and failure by communities to demand action.[57]

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52 SEMC, *Submission 162*, p. 9.

53 Ms Amy McMahon, Dr Kiah Smith, Ms Jane Muller, Mr Paul Belesky and Professor Geoffrey Lawrence, *Submission 35,* pp 3–4.

54 Ms Amy McMahon, Dr Kiah Smith, Ms Jane Muller, Mr Paul Belesky and Professor Geoffrey Lawrence, *Submission 35,* p. 7.

55 Local Government Association of Queensland, *Submission 68,* p. 4.

56 Local Government Association of Queensland, *Submission 68,* p. 4.

57 Local Government Association of Queensland, *Submission 68,* p. 4.

Electricity, transport and water

4.50 As mentioned above, the committee heard that the preparedness of essential services, such as electricity, transport and water, to cope with extreme weather events is variable.

4.51 Mr James Hanson from the Conservation Council of Western Australia commented on the correlation between very hot weather and energy demand. Some relevant policy measures that have been proposed are:

- increasing the price of power to reflect the cost of producing the power;
- smart meters; and
- managing peaks over short high intensity demand periods.[58]

4.52 However, these mitigation measures are not necessarily in place.

4.53 Attention was drawn to the vulnerability of local electricity services where power poles (particularly wooden poles) and wires may fail and cause fires during heat waves, while transformers should be operable under all conditions.[59]

4.54 At the macro level, the Clean Energy Council submitted that since the electricity sector is the major source of Australia's greenhouse gas emissions, preparation should be underway to make 'a rapid switch to low carbon heating, cooling and electricity generation'.[60]

4.55 In the transport sector, the Climate Institute suggested that railways were responding positively and 'putting in place plans to improve. They have extended their risk assessment to cover climate change'.[61]

4.56 The Australia National Retailers Association (ANRA) noted the importance of getting supplies into disaster areas. During the 2011 Queensland floods, stock was damaged while roads were cut (see also Chapter 3):

> Despite this challenge, the use of novel methods for overcoming constraints in the transport networks - incorporating aspects of the road, rail, air and sea freight networks from as far away as Adelaide, Sydney and Darwin - meant that households in isolated areas did not go without basic necessities for survival.[62]

4.57 However, ANRA also noted room for improvement:

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58 Mr James Hanson, Climate and Energy Program Manager, Conservation Council of Western Australia, *Committee Hansard*, 7 March 2013, p. 11.

59 Conservation Council of South Australia, *Submission 120*, p. 4.

60 Clean Energy Council, *Submission 118*, pp 3 & 4.

61 Ms Olivia Kember, The Climate Institute, *Committee Hansard*, 11 April 2013, p. 41.

62 ANRA, *Submission 110*, p. 1.

- there was no mechanism for any dialogue with retailers initially;
- there were perceived difficulties in Australian Defence Force participation because of regulations and lack of common standards for packing; and
- applying normal trading restrictions limited availability of essential items.[63]

4.58 The committee was advised that Sydney Water had undertaken some studies to evaluate its strengths and opportunities under climate change conditions. Research data indicated that the five water utilities surveyed were:

- Reasonably strong in their ability to "survive a crisis";
- Less able in the area of "thriving in a world of uncertainty";
- Strong on the emergency side but business as usual has more room for improvement.[64]

4.59 In its submission, the Water Services Association of Australia (WSAA) summarised its progress to respond to extreme weather events through:

- diversifying water supplies;
- reducing water use;
- improving the way utilities manage waterways and wetlands;
- changing the way decisions are made;
- rethinking advice for development in flood prone and vulnerable coastal areas;
- planning for risk.[65]

Telecommunications

4.60 The ability of agencies and citizens to respond to extreme weather events is particularly reliant on telecommunication and communications networks. The committee heard that the major issue for telecommunications is whether operations continue effectively in an extreme weather event. The capacity of communication networks to deal with emergencies and natural disasters was the subject of a previous inquiry by this committee and more information on this topic may be found in that report.[66]

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63 ANRA, *Submission 110*, p. 2.

64 WSAA, *Submission 76, Attachment 2* (*Benchmarking resilience*), p. 5.

65 WSAA, *Submission 76*, p. 7.

66 Senate Environment and Communications References Committee, *The capacity of communication networks and emergency warning systems to deal with emergencies and natural disasters*, November 2011.

4.61 A range of communications technologies have been used effectively in recent times to warn people of impending weather crises.[67] However, while weather forecasting is much more accurate than in the past, the committee heard that people still need convincing to trust and act on this information.[68]

4.62 In disaster situations, telecommunications can be adversely affected. Ms Yve Earnshaw, Director of Dunalley Community Neighbourhood Centre, described the needs of the Nubeena community in Tasmania after the recent bushfire:

> There were thousands of people trapped in the region and there was no power. We went and opened up the community house with a generator—it is my and my husband's own generator. Basically, we plugged it in and set up some computers, and we got an old telephone to plug into the wall because, of course, with no power, only old landlines would work. We wondered what was going to happen. Then, over the next few days, literally hundreds of people came through the house to use the internet and to charge their mobile phones…There were no communications available in the region, virtually, except for emergency personnel.[69]

4.63 Telstra's submission asserted its growing capacity in relation to extreme weather events. It noted its Global Operations Centre, Major Incident Management and training of technical staff so that they can be 'highly effective in responding to extreme weather events'.[70] Telstra advised the committee of its corporate Crisis Management team, which both resolves crisis generated problems and also anticipates planning required for such crises.[71]

4.64 The Australian Mobile Telecommunications Association (AMTA) submitted that existing networks are well placed to deal with extreme weather events and itemised examples of effective responses. The capability depends on:

> …having in place appropriate processes and the ability to deploy personnel and resources quickly and efficiently. Appropriate processes and protocols include having established points of contact for ESOs [Emergency Service Organisations] and network operators.[72]

4.65 AMTA also noted that:

> …the resilience of mobile networks in bushfire-prone areas is partially dependent on maintaining a schedule of back burning around mobile base stations. This is an example of how regular preparedness processes are vital

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67 Mr Paul Considine, AFAC, *Committee Hansard,* 20 February 2013, p. 2.

68 Professor Neville Nicholls, *Committee Hansard,* 20 February 2013, p. 9.

69 Ms Yve Earnshaw, Dunalley Community Neighbourhood Centre Inc., *Committee Hansard,* 11 April 2013, p. 47.

70 Telstra, *Submission 112,* p. 2.

71 Telstra, *Submission 112,* p. 2.

72 AMTA *Submission 79*, p. 3.

> to ensuring the resilience of telecommunications networks during natural disasters or emergencies.[73]

4.66 The Department of Broadband, Communications and the Digital Economy (DBCDE) said that providers had learnt from recent events and are updating their responses. Temporary systems are being used 'routinely' to circumvent loss of function when infrastructure is damaged. Their submission referred to quick responses in recent bushfire events. The National Broadband Network (NBN) is designed with back-up built into it and it has 'specified high availability and reliability targets for its Long Term Satellite System'.[74] In addition, the government is working with states and territories to 'improve the effectiveness, clarity and consistency broadcasting emergency warnings'.[75]

Construction and property

4.67 The most significant adaptation for the construction and property industry is to build structures in places which will not be risk prone under changed climate conditions. Yet in this area the committee heard much evidence that there is confusion of responsibilities and often resistance from individuals and organisations who do not factor these risks into their plans.

4.68 The most important mitigation strategy is to make buildings according to specifications which will limit damage in extreme conditions. Witnesses and submitters advised the committee that progress was being made, although existing buildings and building standards need updating.

4.69 The Insurance Council of Australia (ICA) identified several steps to preparing for extreme weather events:

> - The first is creating better buildings… we are interested in building code changes to enhance the durability of property…
> - We are keen to see a requirement at a national level for the risk-appropriate use of available land… to develop [floodplains] … in a risk-appropriate fashion…
> - We need to create an informed, risk-aware community by providing clear, credible, understandable hazard information at a property level for all individuals so that they can make the right decisions about their future in that location and how to insure themselves appropriately…
> - We need to work to protect those existing communities from the exposures they have now through better mitigation.[76]

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73 AMTA *Submission 79*, p. 5

74 DBCDE), *Submission 66,* p. 2.

75 DBCDE, *Submission 66,* p. 3.

76 Mr Karl Sullivan, ICA, *Committee Hansard,* p. 11.

Where structures are built

4.70 The summation of the causes of loss through natural disasters given by Professor John McAneney from Risk Frontiers was that:

> …the increasing cost of natural disasters is mainly driven by more and more stuff being built in harm's way. These losses and this trend cannot be attributed yet to global climate change.[77]

4.71 The Wentworth Group of Concerned Scientists noted the historical legacy of inappropriate building sites:

> We have allowed infrastructure to go to places which are in harm's way to natural forces.…So extreme event phenomena have impacted adversely on our society ever since the Governor Macquarie days. What we do not have is a clear articulation as to what is at risk now and what could be at risk in the future with growing population.[78]

4.72 Information from the Coastal Collaboration Centre stated that certain highly vulnerable coastal areas in Western Australian would be exempted in legislation from limitations on development due to projected sea-level rise. These included areas in Bunbury and Derby:[79]

> That state coastal planning policy includes a response to increased expectations of sea-level rise. The policy drafted by the [state] Department of Planning is definitely an improvement …[but] interpretation [of that policy] is likely to mean that development will probably continue on the coast in certain coastal development nodes and that areas that are identified as critical for economic return will be exempt from the increased setback for coastal planning.[80]

4.73 The committed heard evidence which placed state and local government at the centre of decisions for land usage. Mr Paul Considine from the Australasian Fire and Emergency Services Authorities Council (AFAC) suggested that the key issue is that property owners understand and explicitly accept the level of risk that comes with their usage. He rejected the common idea that responsibility rested with emergency services:

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77 Professor John McAneney, Risk Frontiers, *Committee Hansard,* 10 April 2013, p. 1.

78 Professor Bruce Thom, Wentworth Group of Concerned Scientists, *Committee Hansard,* 11 April 2013, p. 30.

79 Associate Professor Laura Stocker, Coastal Collaboration Cluster, Curtin University Sustainability Policy Institute, *Committee Hansard,* 7 March 2013, p. 17.

80 Associate Professor Laura Stocker, Coastal Collaboration Cluster, Curtin University Sustainability Policy Institute, *Committee Hansard,* 7 March 2013, p. 16.

> What we want people to understand is that using land which is subject to natural catastrophes comes with risks and that those risks cannot be deferred to emergency services or passed on. They have to be accepted.[81]

4.74 Professor Rodger Tomlinson also commented on the issue of land values and building in unsuitable places:

> To be a little bit flippant, it seems that the closer you get to the shoreline the more value there is, if you just look at property values…[Property owners] do not really respond because they want to be there—until it is too late, of course.[82]

4.75 The Northern Territory Police gave a succinct summary of this dilemma:

> Part of the problem we have here is that the best places to live for 99 per cent of the time are the worst places to be when the extreme event comes along.[83]

4.76 He emphasised the importance of a long term view in planning which would acknowledge that if people build in vulnerable places and their houses fall, they will have to deal with that, and, if they are not able, state and territory governments will be expected to bear the costs.[84]

4.77 Professor Thom expressed concern that the finance sector did not consider disaster risk when giving loans for houses:

> But with coastal areas there is no doubt that many people are prepared to still live in vulnerable areas and not have insurance; but still they get loans to have houses there. This really bothers me.[85]

4.78 The committee was advised that appropriate land use may be undermined by ill-informed decisions. For example, Climate Future claimed that:

> …the NSW Govt. has stated that Councils should no longer use the benchmarks for sea level rise set in 2010. Instead they have to develop their own benchmarks. This has left many Councils in limbo with no support for action to reduce storm impacts on the community.[86]

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81 Mr Paul Considine, AFAC, *Committee Hansard,* 20 February 2013 p. 4.

82 Professor Rodger Tomlinson, Director, Griffith Centre for Coastal Management, Griffith University, *Committee Hansard,* 22 February 2013, p. 27.

83 Mr Peter Davies, Northern Territory Police, Fire and Emergency Services, *Committee Hansard,* 7 March 2013, p. 7.

84 Mr Peter Davies, Northern Territory Police, Fire and Emergency Services, *Committee Hansard,* 7 March 2013, p. 7.

85 Professor Bruce Thom, Wentworth Group of Concerned Scientists, *Committee Hansard,* 11 April 2013, p. 32.

86 Climate Future, *Submission 50*, p. 3.

4.79 Similarly the Director of the Centre for Disaster Studies at James Cook University, Associate Professor King, noted problems with Queensland legislation:

> The Queensland State Planning Policy 1/03 has not been effective in guiding land use planning in vulnerable locations. …Ideally the primary planning legislation should directly identify hazard mitigation planning under the act, so that it is central to planning rather than an add-on through a state planning policy. This will require a significant rewriting of the Sustainable Planning Act (or a new act) in Queensland, and most probably in other states as well. Issues of public safety have to be compulsory, not an option of best practice.[87]

4.80 Mr Evans from the Floodplain Management Association also noted inappropriate siting of buildings and said that future development should not occur in places which require flood levees or other mitigation strategies.[88]

4.81 Several witnesses drew attention to inadequacies in the important area of flood mapping. For example, Associate Professor King emphasised the need for comprehensive flood studies: 'In some cases [this] is going to be expensive, but you cannot make any decisions until you have these comprehensive studies'.[89] This was a point he returned to several times in speaking with the committee, summarising in these terms:

> Good, comprehensive flood mapping makes it possible to define where these areas are—which are the most vulnerable—to rank them in terms of vulnerability and then to begin a process of perhaps trying to persuade people to relocate, to sell their houses and to gradually rezone over a long period of time. It will not be a short process.[90]

How structures are built

4.82 The committee heard that there are two major issues in construction:

- having building codes which are better aligned with increased risks from more frequent and more intense extreme weather events; and
- providing incentives which facilitate 'building better', not just replacing damaged structures.

4.83 Associate Professor King submitted that:

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87 Associate Professor David King, Centre for Disaster Studies, James Cook University, *Submission 82*, p. 3.

88 Mr Glenn Evans, Floodplain Management Association, *Committee Hansard*, 10 April 2013, p. 22.

89 Associate Professor David King, Centre for Disaster Studies, James Cook University, *Committee Hansard*, 22 February 2013, p. 11.

90 Associate Professor David King, Centre for Disaster Studies, James Cook University, *Committee Hansard*, 22 February 2013, pp 14–15.

> Education to improve the house-building process (regulation, design, construction, certification and maintenance) aimed at all parties (designer, builder, certifier, and owner) will enhance community resilience.[91]

4.84 Research of the Association for Mitigation Studies for Top End Cyclones Inc. (AMSTECI) concluded that Darwin is at risk from category 5 cyclones but is not adequately prepared for this. AMSTECI reported that buildings put up since 1983 would not withstand category 5 wind speeds and that cyclone shelters do not meet relevant standards.[92]

4.85 Mr Adrian Beresford-Wylie from ALGA identified difficulties in improving buildings after a disaster:

> That is the idea that, if a piece of infrastructure is destroyed, the original disaster relief arrangements allowed funding to restore it to its pre-existing state before the disaster struck. ... The relief arrangements do provide for betterment, which is to rebuild that infrastructure to a better standard. Even though there have been changes to the betterment clauses contained in the disaster relief arrangements, it is still difficult to address the challenge facing local government infrastructure.[93]

4.86 The Australian Sustainable Built Environment Council commented that:

> …our new buildings and suburbs are being built based on past climate information not on predicted future climate change. This risks leaving a legacy of urban communities being underprepared for future climate change impacts.[94]

4.87 The experience of Green Cross Australia in Queensland showed that a major barrier to mitigating property damage is the impulse to immediately replace property that has been destroyed, instead of taking a little more time to create a better built environment. Nevertheless, Green Cross Australia reported that people were very responsive to a green building guide. Local recovery committees in Victoria after Black Saturday had also worked with the government to encourage people to 'build it back green'. Green Cross Australia articulated the hope that:

> …increasingly homes will come out of the ground that can actually have lower insurance premiums because they are designed to withstand hazards in a much better way, and are also highly sustainable.[95]

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91 Associate Professor David King, Centre for Disaster Studies, James Cook University, *Submission 82,* p. 2.

92 AMSTECI, *Submission 344*, pp 3–5.

93 Mr Adrian Beresford-Wylie, ALGA, *Committee Hansard*, 11 April 2013, p. 3.

94 Australian Sustainable Built Environment Council, *Submission 119,* p. 2.

95 Ms Mara Bun, Green Cross Australia, *Committee Hansard,* 22 February 2013, p. 19.

4.88 The committee is encouraged by the concept of 'building better' and believes that this is one of the means by which Australians will mitigate the effects of future extreme weather events. The committee was also pleased to receive evidence of 'getting it right' after Cyclone Yasi:

> Cyclone Yasi showed that things were actually working…The North Queensland community felt very much that it was 'get on with it'. And they did. The fact that they got on with it and dealt with it…without loss of life and without an enormous loss of housing shows that people did know what to do.[96]

Forestry and agriculture

4.89 The committee heard that the forestry and agriculture industries are particularly vulnerable to bushfires. In its submission the Australian Forest Products Association (AFPA) stated:

> The greatest impacts of climate change on forests will be associated with the hotter drier environment, with increased risk of bushfires and cyclonic activity, greater stress on trees increasing susceptibility to pest and disease incursions and decreasing productivity, and greater variability and intensity of rainfall influencing hydrological cycles and potential soil erosion.[97]

4.90 In response to this scenario, in November 2009, the *National Climate Change and Commercial Forestry Action Plan 2009-1012* was produced to guide forestry action and adaptation. Timber Queensland has also prepared a guide for industry to respond to cyclones.[98]

4.91 AFPA felt that:

> Effective bushfire management appears to be a problem of social and political commitment to effective preventative land management rather than a case of scientific and operational complexity. A well-coordinated land management strategy could help reduce fire risk.[99]

4.92 Professor Bindoff from Antarctic Climate and Ecosystems Cooperative Research Council described some positive uptake of adaptation strategies in Tasmania around rye-grass. The Tasmanian Farmers and Graziers Association has worked with the viticulture industry so that 'people who are going to invest in grapes now are

96 Associate Professor David King, Centre for Disaster Studies, James Cook University, *Committee Hansard*, 22 February 2013, p. 13.

97 AFPA, *Submission 37*, p. 2.

98 AFPA, *Submission 37*, p. 3.

99 AFPA, *Submission 37*, p. 5.

thinking about what kinds of grapes they are going to plant' for success in higher temperatures.[100]

4.93 The Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) told the committee of successful research into soil resilience:

> [We] know now that the Mallee is more resilient to loss of soil because of the investments that are being made in improving natural resource management across both farmers and off-farm management. We are also improving the policy environment in terms of corridors and what connectivity means in terms of improving resilience as well. So this is a key focus of our work both at a programmatic level and in our policy construct.[101]

4.94 These few examples demonstrate once again that preparedness is variable across sectors and regions.

Natural environment

4.95 The natural environment is both a subject for protection from extreme weather and an agent for mitigating its effects. The consistent message from those commenting on the natural environment was, in the words of Mr Peter Cosier from the Wentworth Group of Concerned Scientists, that:

> …the single most effective thing to do in terms of securing the health of the landscape in the face of significant change is to get your ecosystems into a healthy condition. It is a no-regrets action. We should be doing it anyway.[102]

4.96 Sometimes this means work to restore ecosystems. The Wentworth Group explained:

> The two things that are very strong in the case of catchments are first and foremost to maintain our native vegetation in place…The second thing is to minimise the extraction of water from our river system so that our ecosystems are in a good place to respond to the extremes of drought and flooding circumstances.[103]

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100 Professor Nathaniel Bindoff, Program Leader, Climate Futures, Antarctic Climate and Ecosystems Cooperative Research Council, *Committee Hansard,* 10 April 2013, pp 27–28.

101 Mr Sean Sullivan, First Assistant Secretary, Biodiversity Conservation Division, Department of Sustainability, Environment, Water, Population and Communities (SEWPaC), *Committee Hansard,* 10 April 2013, p. 64.

102 Mr Peter Cosier, Convenor, Wentworth Group of Concerned Scientists, *Committee Hansard,* 11 April 2013, p. 35.

103 Dr John Williams, Wentworth Group of Concerned Scientists, *Committee Hansard,* 11 April 2013, p. 30.

4.97 Moreover, protecting natural features also protects the human environment, as Professor Tomlinson's example of Geraldton in Western Australia illustrates.

> There is a fringing reef there that basically protects Geraldton as a piece of land. If sea levels rise, unless you keep propping up the reef then you lose that protection. That is a valid issue, but you would need to look in detail at the extent to which the reef would be degraded by things like ocean acidification and how that is relative to sea level rise.[104]

4.98 Mr Sullivan described another example:

> …studies post Yasi which showed that, where we had intact mangroves—and we were lucky that basically 97 per cent of mangroves were intact within that zone where Yasi came across the coast—the estimated damage bill would have been significantly higher in terms of damage to ecosystems, infrastructure and people and human lives if they were not intact.[105]

4.99 Professor Hughes of the Wentworth Group stressed that:

> …the main way that we can deal with [species adaptation] and help our ecosystems and our species be in the best shape for the future is to reduce all of the other threats, particularly habitat loss but also pollution and over harvesting, to improve the health of our landscapes. Mainly what we need to do is turn the clock back on habitat loss and vegetation clearing.[106]

4.100 In the case of systems, WWF-Australia emphasised that there are limits to adaption and that therefore mitigation must be accelerated.[107] They believed that current progress is inadequate:

> Federal, state and local governments have various adaptation programs in place to build resilience and provide habitat protection; unfortunately the extent of the programs remains inadequate, or they are under threat of reduced funding, wind-back or repeal…Too much investment has gone toward temporary fixes rather than securing protected areas and enduring conservation arrangements.[108]

Committee comment

4.101 As the discussion in the preceding sections demonstrates, there are multiple dimensions to evaluating whether essential services and key sectors of the Australian community are adequately prepared for extreme weather events. Some sectors and

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104 Professor Rodger Tomlinson, Griffith Centre for Coastal Management, *Committee Hansard*, 22 February 2013, p. 26.

105 Mr Sullivan, SEWPAC, *Committee Hansard*, 11 April 2013, pp 68–69.

106 Professor Lesley Hughes, Wentworth Group of Concerned Scientists, *Committee Hansard*, 11 April 2013, p. 35.

107 WWF-Australia, *Submission 124*, pp 2, 13.

108 WWF-Australia, *Submission 124*, p. 11.

regions are well-prepared and have taken into account the potential impacts of future extreme weather events; others are inadequately prepared and do not have a grasp on the possible implications of a changing climate leaving them particularly vulnerable to future natural disasters.

4.102 The committee agrees that more can and should be done to improve coordination between the states and territories. Such coordination would improve nationwide confidence that communities can adapt to extreme events and prevent disasters.

4.103 So far as the evidence is reliable and credible, the committee believes it is essential for landowners and prospective landowners to be aware and fully informed of the risks associated with their location or proposed buildings. The committee is mindful of the pressure tighter building codes may place on housing costs; however, the committee believes that reasonable precautions should be required against foreseeable and realistic risks. The committee recommends that credible and reliable flood mapping activities and the development of other information that would best inform landowners or prospective landowners of realistic potential risks from extreme weather events are prioritised and used to inform land use planning laws.

Recommendation 6

4.104 The committee recommends that credible and reliable flood mapping activities and the development of other information that would best inform landowners or prospective landowners of potential risks from extreme weather events are prioritised and used to inform land use planning laws.

4.105 It is also the committee's view that building codes should incorporate mitigation measures that take into account foreseeable and realistic risks from extreme weather events.

Recommendation 7

4.106 The committee recommends that building codes incorporate mitigation measures that take into account foreseeable risks from extreme weather events.

The health sector

General preparedness

4.107 According to *The Lancet*, in a series published in 2009, 'climate change is likely to be the greatest threat to human health this century':

> …so it is something we should be taking really seriously, both in terms of mitigation, trying to avoid the absolutely unmanageable consequences to human health from climate change, and in terms of early adaptation so that we can survive or adapt to cope with them. Extreme weather is a very good

> example of that. With preparedness for our health services, our emergency services and many other things, we could probably reduce the impacts.[109]

4.108 Dr Steve Hambleton, President of the Australian Medical Association (AMA), strongly argued for active planning to mitigate illness and death exacerbated by increased temperatures and extreme events. In his opening statement he said:

> There is no doubt that we need to do better planning. Extreme weather events pose a significant challenge to human health, and as the peak medical organisation we believe that preparing communities, service providers and governments for these health impacts is a public health priority...
>
> We do need to minimise and manage the health impacts of these more frequent, intensive weather events and we are concerned that the current policy response nationally is inadequate…
>
> We certainly acknowledge the importance of some jurisdictions already where some good things have happened. Much of it has been reactive rather than proactive, though. The National Strategy for Disaster Resilience has improved coordination, but there are some fundamental gaps.[110]

4.109 The CAHA described the effects on people of a warming world and claimed that:

> Australians are neither prepared for, nor informed about, the dangers of the warming climate and the severity and scale of extreme events they are likely to experience in coming years and decades. The unprecedented national heatwave of January 2013, floods of 2011, wild weather of 2012, and bushfires of 2009 give an insight into the weather of a warming world…
>
> Australia healthcare systems are ill-prepared to cope with extreme events and Australia's health professionals lack understanding of the health impacts of climate change. This affects the ability of both individuals and the health care system to prepare for and respond to extreme weather events. This puts lives at risk.[111]

4.110 An example was provided by the CAHA with reference to Cyclone Larry in 2006 where:

> Innisfail Hospital [was] forced to close, the Herberton Hospital los[t] power, and a leaking roof at the Atherton Hospital forc[ed] a partial evacuation. The demand for services overwhelmed available human

109 Dr George Crisp, Adviser, Conservation Council of Western Australia, *Committee Hansard,* 7 March 2013, p. 8.

110 Dr Steve Hambleton, AMA, *Committee Hansard,* 11 April 2013, p. 22.

111 CAHA, *Submission 75*, p. 2.

> resources and nurses were required to travel from Brisbane to provide support to the region.[112]

4.111 The committee heard there is more can be done to improve the understanding about the health impacts of climate change and extreme weather events amongst health professionals.[113]

4.112 This view was corroborated by Dr Eugenie Kayak, from Doctors for the Environment Australia (DEA), who stated:

> Extreme weather events have challenged and will challenge the existing capacity of our health services as well as put increasing demands on it to deliver this level of care. They will also directly jeopardise the ability of the health sector to care for and look after the wounded.[114]

4.113 DEA recommended setting up a national disaster and recovery fund to provide finance for extreme weather events and to remove the added pressure they cause to existing health service budgets.[115]

4.114 The committee heard criticism of the Department of Health and Ageing (DoHA) and health system:

> We have a huge department called DoHA and they closed their environmental health section recently—it had four people and an operating budget of $1 million. This is just laughable; it is a tick-the-box affair. They argue that environmental health matters are the responsibility of the states and territories....We would have hoped that, after these major events, they would have had funding boosts. Instead, in some states who seem to have an allergy to the word 'environment' they have actually closed some of those down. We think this really increases Australia's risk.[116]

Health and emergencies

4.115 In emergency situations health services are put to the test. This section discusses some of the key observations of stakeholders as to health services' capacity to mitigate disaster. There are encouraging examples of effective strategies but also deficiencies to learn from. Witnesses made a range of suggestions to improve operations in the future.

4.116 The committee heard from the Department of Health and Ageing about some areas where the Commonwealth helps in emergency situations. The Australian Medical Assistance Teams (AusMATs), established under the auspices of the

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112 CAHA, *Submission 75*, p. 12.

113 Ms Fiona Armstrong, CAHA, *Committee Hansard*, 20 February 2013, p. 30.

114 Dr Eugenie Kayak, Victorian Chair, DEA, *Committee Hansard*, 20 February 2013, p. 26.

115 Dr Eugenie Kayak, DEA, *Committee Hansard*, 20 February 2013, p. 26.

116 Dr Elizabeth Hanna, *Committee Hansard*, 11 April 2013, p. 14.

Australian Health Protection Principal Committee (AHPPC) which comprises every state chief health officer, are:

> …teams of health professionals who not only are expert in their own profession but also have been given training in disasters, and are able to support themselves if they are away for two weeks from a normal base.[117]

4.117 The committee heard that these teams have been effective in providing medical support, along with National Incident Room in the Office of Health Protection which provides assistance with the management of spontaneous volunteers during an emergency.[118]

4.118 The Northern Territory has the National Critical Trauma Centre in Darwin, increasing its capacity to deal with health issues in the north of the country.[119]

4.119 A critical health area during emergencies is the provision of pharmaceuticals:

> In order to support the Community Service Obligation in times of crisis, The Pharmacy Guild of Australia, the Department of Health, CSO Agency and CSO Distributors work together to turn their regular reporting and communicating channels into an effective emergency response mechanism, sharing information on road access to towns and pharmacies, facilitating contingency planning in cases where a supply warehouse may become compromised and coordinating the supply of medicines to emergency services when stock needs to be flown into isolated towns.[120]

4.120 The committee heard evidence that this was successfully accomplished during a number of extreme weather events in Queensland.[121]

4.121 According to the Department of Health and Ageing, knowledge has developed in the pharmaceutical supply chain which allows more effective dispensing in a time of emergency:

> [There has been] an exploration of recent trends in pharmaceutical manufacturing and getting us a much better understanding of that. It is a rapidly moving, rapidly developing and fluid industry that is seeing quite a bit of concentration of manufacturing sites in fewer places around the world. …
>
> [I]t is much more along the lines of just-in-time supply, throughout the supply chain, rather than big stockpiles in warehouses. That is what we are focused on so that we have a contingency plan ready to go.[122]

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117 Dr Jenny Firman, DoHA, *Committee Hansard*, 7 June 2013, p. 6.

118 Dr Jenny Firman, DoHA, *Committee Hansard*, 7 June 2013, p. 7.

119 Mr Peter Davies, Northern Territory Police, Fire and Emergency Services, *Committee Hansard*, 7 March 2013, p. 6.

120 National Pharmaceutical Services Association, *Submission 169*, p. 2.

121 National Pharmaceutical Services Association, *Submission 169*, p. 2.

4.122 There is evidence of work on the ground in helping people be prepared in their neighbourhoods. Red Cross has devoted increasing resources to preparedness rather than simple responsiveness. The committee was told of a program called REDiPlan, which 'works with households to be informed, to make a plan, to get a kit and to know their neighbours'.[123]

4.123 Although these examples of good work are positive, the committee heard further evidence to indicate that psychological, research and structural barriers remain which still need attention.

4.124 Dr Alexander Donald experienced the cyclone in Cairns and commented on the needs in the health sector. These included easier access to expertise and stock, and what he called 'templates' for managing nursing homes, hospitals, aged care, mental health patients and vulnerable people. He believed that these facilities did not necessarily have the resources to develop their own disaster response plans. He also identified a lack of planning in who should take responsibility and that ad hoc decisions about staff allocation in hospitals were taken. Dr Donald believed that a 'flying squad' of clinical staff should be prepared which could come in immediately to the area affected.[124]

4.125 Dr Donald's comments on the capacity of the health sector in disaster situations were endorsed by Dr Hanna[125] and Dr Hambleton, who also raised the issue of what happens when medical personnel are themselves the subjects of the disasters:

> With disaster planning...We have not actually said: "When we are unable to staff the department because they are looking after their families, what do we do?" That is where local jurisdictions will be overwhelmed, and we will need a broader plan.[126]

4.126 Dr Hambleton described specific scenarios where better coordination or knowledge could have alleviated major problems:

> In Brisbane the AMA in Queensland, to its credit, coordinated doctors locally to volunteer. Why wasn't that a plan that was ready to go? Large medical centres like my own let it be known that anybody who was affected by a flood could come in and get bulk-billed, so there was no financial barrier for those people who maybe had no resources. Why isn't there a registry somewhere, or why isn't the government causing a registry to be built, so they know who is ready to volunteer?[127]

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122 Mr Rob Cameron, Assistant Secretary, Office of Health Protection, DoHA, *Committee Hansard,* 7 June 2013, p. 7.

123 Mr Andrew Coghlan, Australian Red Cross, *Committee Hansard,* 20 February 2013, p. 32.

124 Dr Alexander Donald, *Committee Hansard,* 11 April 2013, pp 7–11.

125 Dr Elizabeth Hanna, *Committee Hansard,* 11 April 2013, p. 14.

126 Dr Steve Hambleton, AMA, *Committee Hansard,* 11 April 2013, p. 25.

127 Dr Steve Hambleton, AMA, *Committee Hansard,* 11 April 2013, p. 23.

> There was a train crash. There was [a] GP down the road with emergency medicine training who did not even know it had occurred but who could have been part of that response process.[128]
>
> How do you evacuate an entire hospital if you do not have a plan? If there are no plans in place, if there is no accreditation system that says you have to have a disaster plan, how are you going to engage with your community? How are you going to continue to provide services? These are the sorts of roles that are centralised and can be facilitated by government.[129]

4.127 While cyclones and bushfires are dramatic and obvious, the effects of heatwaves often creep upon communities unnoticed. Using figures from Brisbane based research, Professor Barnett from the Queensland University of Technology commented on health effects of heatwaves. He warned against over reliance on early warning systems:

> …whilst they may seem to be a good idea, there is no good evidence (from Australia or elsewhere) to show that they work…
>
> It is incredibly difficult to predict the number of deaths caused by a heatwave, because the numbers will depend on many things including: its timing…if there is a power cut…whether it occurs during a holiday (as elderly people may be left alone), and the number of vulnerable people which changes from week-to-week. These difficulties mean any early warning system is likely to have frequent false alarms, which may then undermine public confidence so that they then do not react to a well-timed warning.[130]

4.128 Witnesses often linked infrastructure weaknesses and health risk. The Australian Nursing Federation (Victorian Branch) believed that cost cutting, bed closures, waiting times and workforce reductions were impacting significantly on the hospital system and would only exacerbate problems in an extreme weather event.[131]

4.129 According to Professor Reser, although there is plenty of information available, there is very limited evaluation of it and of how different strategies, sources, materials and experiences might combine to produce effective 'convergence risk communication and disaster preparedness materials'.[132]

Psychological preparedness

4.130 Several experts in the social and medical fields drew the committee's attention to the significant aspect of psychological readiness to deal with an extreme weather

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128 Dr Steve Hambleton, AMA, *Committee Hansard,* 11 April 2013, p. 24.

129 Dr Steve Hambleton, AMA, *Committee Hansard,* 11 April 2013, p. 24.

130 Professor Adrian Barnett, *Submission 28,* p. 3.

131 Australian Nursing Federation (Victorian Branch), *Submission 20,* pp 8–10.

132 Professor Joseph Reser, Australian Psychological Society (APS), C*ommittee Hansard,* 20 February 2013, pp 24–25.

event. What seems clear is that *how* information is presented is as important as *what* information is presented in eliciting appropriate adaptation and mitigation actions.

4.131 Health professionals and psychologists gave some examples of effective responses:

> …very positive psychological and behavioural adaptation is happening in Australia right now. I think we need to capitalise on that … it is a very effective kind of understanding and if we are able to better understand public understanding, we could better engage with the public on this matter.[133]

4.132 Professor Reser from the Australian Psychological Society commented on psychological preparedness. He said that Australia was leading research in this area:

> …psychological preparedness and situational preparedness go hand-in-hand. If you do not have psychological preparedness and if you do not have some idea of how you are going to be feeling and operating and how other people are going to be operating in an emergency situation, actually that physical preparedness is not going to do you as much good as it could.[134]

4.133 The Australian Nursing Federation (Victorian Branch) referred to the Victorian Disaster Mental Health Workforce Capacity Survey, which revealed that:

> [There are] mental health risks to members of the community when faced with the consequences of a natural disaster…Victoria is a State exposed to risk in respect to future natural disasters so investment in service improvement is warranted.[135]

Emergency services

4.134 Prevention of most extreme weather events is normally out of human control; therefore, the focus of this inquiry has been on adapting to them and taking actions that mitigate such events becoming human and social catastrophes. Emergency services play a key role in mitigating the impact of extreme weather events and therefore must ensure they themselves are adapted for projected future extreme weather events.

Prevention and resources

4.135 As already discussed earlier in this chapter, planning for land use which takes into account possible extreme weather is crucial. For instance, witnesses such as the Centre for Disaster Studies strongly recommended that local councils should develop

133 Professor Joseph Reser, APS, C*ommittee Hansard,* 20 February 2013, p. 27.

134 Professor Joseph Reser, APS, C*ommittee Hansard,* 20 February 2013, pp 28–9.

135 Australian Nursing Federation (Victorian Branch), *Submission 20,* p. 10.

floodplain mapping and management plans based in best practice.[136] The theme of good local risk knowledge is also extremely relevant to emergency situations. Mr Paul Considine of AFAC noted that it was not the place of emergency services to dictate land use and be solely responsible for communicating risk; residents should have good knowledge of their environmental context:

> So it is very necessary, I would submit, that people who live in bushfire prone areas understand their environment, understand the risks inherent in living where they do and understand that getting a warning may just be part of the picture.[137]

4.136 The Northern Territory Police, Fire and Emergency Services explained that they have been training people in emergency management. Actions taken include the placement of cyclone shelters, translating emergency management messages into local languages, distributed through schools or on air and developing 'an extensive network of volunteer fire brigade and Bushfires NT units'.[138] An annual process of data update and briefing of key personnel to prepare indigenous remote communities was also described.[139]

4.137 Mr Gary Morgan, Chief Executive Officer of the Bushfire Cooperative Research Centre (Bushfire CRC), said that with a changing natural environment and expectations 'current practices will not sustain [fire agencies] into 2020'.[140] He elaborated on adequate preparedness for the future:

> …in the area of preparedness, first of all, you need the knowledge for how you are going to address the issues that may arise. Then you need to have information on how to use the technologies that are there, how to communicate the messages and how to get a clear response to those messages by the community and by the agency personnel to make sure that, under that shared responsibility, everybody is able to act in accord to save lives, property, assets and the environment, and that is about a whole lot of unanswered questions. Right at the moment we know that we cannot address the issues into the future unless we have new ways of doing so.[141]

4.138 The necessity for adequate funding was referred to by several witnesses. Mr Jody Nobbs, also from Northern Territory Police, Fire and Emergency Services,

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136 Associate Professor David King, Centre for Disaster Studies, James Cook University, *Submission 82,* p. 3

137 Mr Paul Considine, AFAC, *Committee Hansard,* 20 February 2013, p. 2.

138 Mr Peter Davies, Northern Territory Police, Fire and Emergency Services, *Committee Hansard,* 7 March 2013, p. 2.

139 Mr Peter Davies, Northern Territory Police, Fire and Emergency Services, *Committee Hansard,* 7 March 2013, pp 3–4.

140 Mr Gary Morgan, Chief Executive Officer, Bushfire CRC, *Committee Hansard,* 20 February 2013, p. 12.

141 Mr Gary Morgan, Bushfire CRC, *Committee Hansard,* 20 February 2013, p. 13.

told the committee that the major support the Commonwealth government might give is the provision of money:

> It would be nice if we could overcome the vertical fiscal imbalance somewhat—that is to say, of course, that the Commonwealth has the money and we have the responsibilities. Clearly, we really appreciate the contribution it has given over time through various grant schemes that we run up here in the Territory, which have had a huge impact on our ability to respond [to] emergencies. We would like those sorts of schemes to be strengthened. I also note that mitigation up here is very expensive. The dirt roads that flood every year get washed out and isolate people, and it is not cost effective from the Territory's perspective to replace that sort of infrastructure.[142]

4.139 AFAC commented on the resource implications of more frequent and intense weather events for the agencies it represents, namely 34 government fire, land management and emergency services bodies:

> This would necessitate an increase in the standing capacity of agencies both to prepare for and to respond to emergencies…This has implications both for funding staff and infrastructure, but also for maintaining the very large volunteer engagement…
>
> Much larger emergency events…will require more extensive arrangements for surge capacity to be in place. It is simply uneconomic…to maintain full-time fire and emergency services that are capable of combatting all conceivable incidents.[143]

4.140 With respect to the Commonwealth's role in emergency services, the Attorney-General's Department provided a comprehensive list of projects supported by the government. These include aerial firefighting, telephone warning systems and flood risk information.[144]

4.141 The Department of Human Services pointed to its role in improving emergency responses, and particularly the centrality of the National Emergency Call Centre Surge Capability (NECCSC) established in 2009:

> The NECCSC allows states and territories and Australian Government agencies to divert excess call loads received on their emergency (non-000) lines to the department and the Australian Taxation Office.[145]

142 Mr Jody Nobbs, Acting Director, Northern Territory Police, Fire and Emergency Services, *Committee Hansard*, 7 March 2013, pp 4–5.

143 AFAC, *Submission 38*, p. 3.

144 Attorney-General's Department, *Submission 64*, pp 11–16.

145 Department of Human Services, *Submission 116*, p. 2.

Effectiveness

4.142 The committee received information which demonstrated that preparations had been effective and that the community could be confident about emergency responses in critical situations. Instances of good communication, emergency preparedness planning and well-executed disaster management were given.

4.143 In November 2012 Telstra launched the world's first Emergency Alert warning system to send SMS alerts via landline and mobile phone.[146] Telstra claimed that in 2010–11, under disastrous conditions, its staff were prepared and able to restore services. The submission stated that 'in many cases the existence of multiple networks in affected areas meant that alternative forms of communication were still able to be maintained'.[147]

4.144 Although Save the Children recommended more targeted emergency plans for children, the good news was that:

> …from a child-focused perspective, examples can be found of proactive approaches to including the specific needs of children in Emergency Preparedness Plans. This can be seen at State level in Victoria and in certain Local Government Areas.[148]

4.145 Townsville City Council claimed that:

> The disaster management process is well exercised and coordinated in our local area with clear delineation of roles and responsibilities between agencies and respective levels of government.[149]

4.146 A substantial number of witnesses commented on positive bushfire responses and the committee heard that actions to deal with bushfires have benefitted from improved telecommunications and dissemination of knowledge. For example, the Bureau of Meteorology was commended by the Bushfire CRC for its contribution to research in smoke trajectories, fire spread and fire modelling, and to providing fire alerts in enough time for effective action.[150] In turn, the Tasmania Fire Service expressed its desire to publicly thank the Bushfire CRC for its input to which they attributed the fact that in the recent fires no lives had been lost.[151]

4.147 It was stated that good communications are at the 'heart' of the responses of both emergency services and communities in an emergency bushfire situation and that

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146 Telstra, *Submission 112*, p. 3; also AMTA, *Submission* 79.

147 Telstra, *Submission 112*, p. 5.

148 Save the Children Australia, *Submission 111*, p. 2.

149 Townsville City Council, *Submission 32*, p. 4.

150 Mr Gary Morgan, Bushfire CRC, *Committee Hansard*, 20 February 2013, p. 14.

151 Senator Milne, *Committee Hansard*, 20 February 2013, p. 13.

it is 'absolutely…a fundamental principle of emergency management that information flow is critical to successful outcomes'.[152]

4.148 The committee was advised that fire services have done a lot of work in developing a range of warning systems and message interfaces in recent years, including internet solutions and the Australasian Inter-service Incident Management System. AFAC emphasised that:

> [P]ublic information and getting warnings out should now be in the forefront of the minds of incident managers across Australia and the importance of doing so can be elevated in some circumstances to be equally important to get the information out as it is to get the fire out.[153]

4.149 However, a concern repeatedly raised with the committee was that when infrastructure dependent on electricity or communications towers are brought down by fires, many technologies will not work and that people must be able and willing to keep informed through multiple means, not least the battery-operated radio.[154]

4.150 AFAC explained that they are working cooperatively with state and territory emergency services under a memorandum of understanding. They cited substantial sharing of resources across borders in the Victorian Black Saturday bushfires, and the Queensland floods/Cyclone Yasi of 2010–11. However, AFAC also warned that there may be occasions when simultaneous demands are made in several states. [155]

4.151 With respect to floods there were also positive stories. An example of success was the claim by Mr Cameron, Manager of Disaster Operations at Brisbane City Council that:

> Queensland disaster management arrangements, which are based upon the Disaster Management Act 2003, have a proven history of providing efficient response and recovery for a multitude of emergency events ranging from cyclones through to flooding.[156]

4.152 He elaborated further on improved responses between 2008 and the 2011 flood due to better intelligence capability:

> [The Brisbane Incident Management System] had a rapid damage assessment and ability to get a better situation more quickly. This did aid in the effective response in 2011.[157]

4.153 Townsville City Council claimed that:

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152 Mr Paul Considine, AFAC, *Committee Hansard*, 20 February 2013, p. 5.

153 Mr Paul Considine, AFAC, *Committee Hansard*, 20 February 2013, p. 2.

154 Mr Paul Considine, AFAC, *Committee Hansard*, 20 February 2013, p. 6.

155 AFAC, *Submission 38*, p. 5.

156 Mr Jason Cameron, Brisbane City Council, *Committee Hansard*, 22 February 2013, p. 1.

157 Mr Jason Cameron, Brisbane City Council, *Committee Hansard*, 22 February 2013, p. 5.

> The disaster management process is well exercised and coordinated in our local area with clear delineation of roles and responsibilities between agencies and respective levels of government.[158]

Shortfalls

4.154 Balancing these positive stories of the effectiveness and success of emergency services in recent natural disasters were a range of suggestions from submitters and witnesses as to areas where emergency services could be improved.

4.155 There are two aspects to resourcing emergency services. Firstly, there is the need to have enough personnel for day-to-day operations especially if extreme weather is occurring more often, causing more frequent and intense demands. AFAC explained:

> …agencies need, as I am sure they are, to be aware that that is happening and they need to consider how that is going to be resourced, be that through increasing their full-time establishment, increasing seasonal workers—for instance, employing more firefighters during the fire season—or be it by maintaining and improving the recruitment of the volunteer establishment.[159]

4.156 Secondly, there is coping with emergency events that necessitate a sudden increase or 'surge' in resource provision. Dealing with this needs 'some advance strategic planning for how greater workloads may be handled'.[160]

4.157 The Bushfire CRC drew to the committee's attention the importance of quick responses to indications of bushfire danger. He stated that:

> If you do not have the ability to respond quickly, the fire is going to get larger; the larger the fire gets, the harder it is to put out; the harder it is to put out, the greater the costs. That is where there is a benefit cost analysis of investing early and investing in the right knowledge, the right people, the right places and the right equipment to enable the response to be adequate.[161]

4.158 With increasing extreme weather events and the prolonging of the fire season in both hemispheres, a new difficulty is that international backup resources may not be available.

> …there have been times when they have been having major fires running a lot longer in their season than they normally do and when ours have started

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158 Townsville City Council, *Submission 32,* p. 4.

159 Mr Paul Considine, AFAC, *Committee Hansard,* 20 February 2013, p. 2.

160 Mr Paul Considine, AFAC, *Committee Hansard,* 20 February 2013, p. 3.

161 Mr Gary Morgan, Bushfire CRC, *Committee Hansard,* 20 February 2013, p. 13.

> a lot earlier. If that trend continues, we are going to get to the stage where we are battling for resources.[162]

4.159 The National Secretary of United Firefighters Union of Australia, Mr Peter Marshall, gave some hard figures on the need for increased levels of operational staff:

> [T]he current population and climate change forecasts for operational staff needed to address increased bushfire activity would suggest a 28 to 40 per cent increase in operational staff—that is an extra 660 to 990 full-time employees—between now and 2026. This is for Victoria only. The basis for that is that we are looking at a temperature increase, from CSIRO predictions, of one to five degrees Celsius up to 2070.[163]

4.160 He quoted corroborating research into increased temperatures commissioned by the World Bank.[164] These figures are based only on Victorian needs, so if accurate, would be multiplied several times for all of Australia.

4.161 The committee was presented with a number of suggestions for improving data collection and dissemination. With respect to flooding, Mr Considine suggested that a more comprehensive network of rainfall gauges would improve the reliability of predictions for flash floods:

> In order to accurately predict flash flooding, it is necessary to have a good network of rainfall gauges, be they automatic rainfall gauges or be they monitored. And that is a weakness that I think state emergency services have recognised.[165]

4.162 The need for specific data to evaluate storms was raised by Professor Rodger Tomlinson.

> The nature of our work is very much about fundamental understanding and getting quite specific information for particular areas. That requires a great deal of detailed information for particular areas and often if there is a gauge or other instrumentation some distance away it is very, very difficult to implement that. From other work that I have been doing, for the Victorian government, I am very aware of quite significant gaps in the Waverider information, for example, on the coastline of Victoria.[166]

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162 Mr Gary Morgan, Bushfire CRC, *Committee Hansard,* 20 February 2013, p. 14.

163 Mr Peter Marshall, United Firefighters Union of Australia, *Committee Hansard,* 20 February 2013, p. 16.

164 Mr Peter Marshall, United Firefighters Union of Australia, *Committee Hansard,* 20 February 2013, p. 16.

165 Mr Paul Considine, AFAC, *Committee Hansard,* 20 February 2013, p. 2.

166 Professor Rodger Tomlinson, Griffith Centre for Coastal Management, *Committee Hansard,* 22 February 2013, p. 25.

4.163 He also pointed to the:

> …importance of making sure that the current data collection programs around the country are maintained and enhanced, because without data you may as well not bother with a computer program.[167]

4.164 Mr Davies from the Northern Territory Police, Fire and Emergency Services advised that they had some concerns about the cyclone data provided by the Bureau of Meteorology:

> A lot of the models used to calculate what will happen in the future with climate change, are based on American models, particularly with regard to cyclones. These models have never been tested practically in the Australian environment, so a lot of the data has changed over time. That is, the techniques that were used 20 years ago to monitor the cyclones have changed so that the quality of data going back over those years is variable. This is quite an important issue. …there is some concern about whether the historical data is accurate….
>
> …it is quite frightening that we are not doing enough research into the Australian environment.[168]

4.165 Locals Into Victoria's Environment commented in respect to sea level analysis that:

> A prudent risk management approach would demand that this full range of possible outcomes — including those with the most extreme impacts at the high end of the range at 2 metres — be incorporated into the government's assessment and adaptation work. But it has not…
>
> Instead, the government's work is based on three scenarios, none of which exceed 1.1 metres, a height which is little more than half that which the scientists are telling us could occur.[169]

4.166 The manager of Brisbane City Council disaster operations called for nationwide consistency—in legislation, terminology, systems operational procedures and understanding of activation levels.

> [Consistent legislation] would allow for consistency at all levels. Whilst we may change things like processes and procedures and standardisation of the actual activities themselves, standardising who is responsible for what and where across a nationalised spectrum would certainly allow for that more efficient and effective response to disasters, which, as we see, sometimes

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167 Professor Rodger Tomlinson, Griffith Centre for Coastal Management, *Committee Hansard*, 22 February 2013, p. 26.

168 Mr Peter Davies, Northern Territory Police, Fire and Emergency Services, *Committee Hansard*, 7 March 2013, p. 3.

169 Locals Into Victoria's Environment, *Submission 10*, p. 8.

> cross borders and occasionally require support from a number of agencies, including those federal agencies.[170]

4.167 Likewise Professor Thom testified to the desirability for national consistency in methodologies and standards, saying:

> [W]e actually need to have a national methodology that is consistent so that we do not have state-by-state variation or local council by local council variation and so that the local councils or whatever regional authorities are involved can go to that national body and seek the appropriate information…[171]

Committee comment

4.168 The evidence presented in this inquiry shows that the Australian community generally, and at local levels, is increasingly aware of predicted changes in weather patterns that will lead to more extreme events, and that they need to be prepared for this. Media coverage has ensured that recent catastrophes such as the Victorian bushfires and Brisbane floods are in the forefront of the public imagination.

4.169 However, the committee heard that the Australian community is still on a 'steep learning curve' as to what to do about the increasing probability of extreme weather events. Some sectors, such as telecommunications, are advanced in utilising the latest knowledge and technologies. In other areas, research work is incomplete, understanding is patchy and implementation is captive to a lack of clarity about responsibilities or resource deficiency.

4.170 The committee was particularly concerned by evidence that many facilities caring for vulnerable sectors of society do not necessarily have the resources to develop their own disaster response plans to enable them to respond appropriately to extreme weather events. Some of these facilities, such as hospitals, may not only be impacted by such events but also at the 'frontline' of responding to extreme weather events. It is therefore essential to ensure that all such facilities have emergency management plans in place.

Recommendation 8

4.171 The committee recommends that Commonwealth, state and territory governments ensure that all facilities caring for vulnerable groups, in particular hospitals, schools, childcare and aged care facilities, have emergency management plans, relevant to their geographic settings, in place and regularly revised.

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170 Mr Jason Cameron, Brisbane City Council, *Committee Hansard*, 22 February 2013, p. 2. See also pp 6 & 7.

171 Professor Bruce Thom, Wentworth Group of Concerned Scientists, *Committee Hansard*, 11 April 2013, p. 31.

4.172 The committee also believes that the very existence of this inquiry will start to raise the level of activity, but follow on action is needed. The most effective areas where the Commonwealth can contribute are by:

- ensuring that there is collaboration in knowledge production;
- coordinating structural and sectoral bodies; and
- providing resources and demanding accountability in their use.