

Chapter 3

Costs and impacts of extreme weather events

3.1 The costs and impacts of extreme weather events are wide-reaching, ranging from the financial costs incurred by governments, businesses and households to the impacts on the physical and psychological health of those individuals who have experienced such natural disasters.

3.2 As outlined in the previous two chapters, droughts, bushfires, floods, storms and heatwaves are just some of the extreme weather events that have affected Australia over recent decades. The extent of these extreme events means that many Australians have experienced and in some way been affected by them. These events damage and destroy homes, livestock, crops, infrastructure and ecosystems. Exposure to these disasters is not just related to climate change, with Australians becoming increasingly vulnerable to extreme weather events as the population grows and expands across the continent. This means the costs and impacts of extreme weather events can be expected to increase into the future.

3.3 Financial costs can broadly be divided into preventative/risk-management costs, which are incurred prior to an event, and post-event costs, which are incurred after an extreme weather event, and include the cost of reconstruction following a natural disaster, losses from business interruption and compensation. This chapter considers post-event financial costs, impacts on physical and psychological health, other social impacts, particularly on vulnerable members of the community, and impacts on the environment.

Financial costs of extreme weather events

3.4 Estimates of the cost of extreme weather events are usually taken from insurance data or figures of government spending. These estimates of cost can be vastly different depending upon the methodology used, however, all estimates of the cost of extreme weather events show that they cost Australians billions of dollars every year with predictions of costs set to increase in the future.

3.5 The committee heard varying estimates of the total financial cost of extreme weather events in Australia, ranging from approximately \$900 million to \$4 billion annually.¹ The two most frequently quoted figures come from a 2001 report by the former Bureau of Transport Economics (BTE) and a 2008 article by Ryan Crompton and John McAneney.² A number of insurance bodies also submitted to the inquiry

1 For example see Centre for Risk and Community Safety (CRCS), *Submission 59*, pp 5–6; Actuaries Institute, *Submission 67*, p. 1; Green Cross Australia, *Submission 141*, p. 18; and Insurance Australia Group (IAG), *Submission 144*, p. 16.

2 R. Crompton and J. McAneney, 'Normalised Australian insured losses from meteorological hazard: 1967–2006', *Environmental Science and Policy*, vol. 11, 2008. Note that the Bureau of Transport Economics (BTE) is now known as the Bureau of Infrastructure, Transport and Regional Economics (BITRE) and is part of the Commonwealth Department of Infrastructure and Transport.

their estimates of the cost of extreme weather events based on amounts paid by private insurers for property damage.

3.6 The BTE estimated that natural disasters (including earthquakes) cost the Australian community \$37.8 billion in 1999 prices over the period of 1967–1999.³ The average annual cost of these disasters during this period was \$1.14 billion (including the costs of deaths and injuries).⁴ The BTE noted that the average annual cost was strongly influenced by three extreme events: Cyclone Tracy (1974), the Newcastle earthquake (1989) and the Sydney hailstorm (1999).⁵ The BTE found that if these three events are removed from the calculations, the average annual cost declines to \$860 million.⁶

3.7 The BTE also noted that the annual cost of disasters is highly variable:

The annual cost in years in which extreme events do not occur can be as high as \$2.7 billion in 1999 prices. In years in which extreme events occur, the total cost can be much higher. As a result, it is not possible to assess whether the annual cost is increasing or decreasing over time.⁷

3.8 In its calculations, the BTE relied on the Emergency Management Australia (EMA) database which includes insured loss data from the Insurance Council of Australia, plus broader cost estimates from sources such as newspaper reports.⁸

3.9 In their article, *Normalised Australian insured losses from meteorological hazards: 1967–2006*, Crompton and McAneney used insurance claim data to estimate average annual weather-related normalised damage over that 40 year period at \$820 million, with a standard deviation of \$960 million.⁹ Crompton and McAneney normalised their data for inflation, population, wealth and building standards at 2006

3 BTE, *Economic costs of natural disasters in Australia*, Commonwealth of Australia, Canberra, 2001, p. xvi, available at: http://www.bitre.gov.au/publications/2001/files/report_103.pdf (accessed 29 May 2013).

4 BTE, *Economic costs of natural disasters in Australia*, Commonwealth of Australia, Canberra, 2001, p. xvi. Estimated averages costs were \$1.3 million for a fatality, \$317 000 for a serious injury and \$10 600 for a minor injury. The estimated total cost of deaths and injuries during the period 1967–1999 was \$1.4 billion at an average cost of \$41 million per year.

5 BTE, *Economic costs of natural disasters in Australia*, Commonwealth of Australia, Canberra, 2001, p. xvi.

6 BTE, *Economic costs of natural disasters in Australia*, Commonwealth of Australia, Canberra, 2001, p. xvi.

7 BTE, *Economic costs of natural disasters in Australia*, Commonwealth of Australia, Canberra, 2001, p. xvi.

8 BTE, *Economic costs of natural disasters in Australia*, Commonwealth of Australia, Canberra, 2001, p. xiv.

9 R. Crompton and J. McAneney, 'Normalised Australian insured losses from meteorological hazard: 1967–2006', *Environmental Science and Policy*, vol. 11, 2008, p. 374.

levels. They concluded that increasing insured losses due to natural hazards in Australia is a result of increasing dwelling numbers and value.¹⁰

3.10 The Actuaries Institute estimated the average cost of annual weather-related general insurance claims to be \$1.9 billion for homes, \$1.0 billion for commercial property and \$0.4 billion for motor vehicles, giving a total cost of \$3.3 billion per annum.¹¹ This total comprises \$1.1 billion for wind damage, \$700 million for hail damage, \$700 million for flood damage, \$500 million for cyclone damage and \$300 million for bushfire damage.¹² However, the Actuaries Institute noted that the actual cost of extreme weather events would be much higher than these estimates if other incidentals were included.¹³ The Actuaries Institute stated:

To place this \$3.3bn in context, this cost represents the property damage costs borne by private insurers only and we highlight that there are also substantial costs that are met from other sources. Such further costs include public infrastructure damage, non-property economic losses (such as the impact of increased unemployment) and life and health insurance. We have not quantified and considered non-economic impacts on natural ecosystems, social and economic infrastructure.¹⁴

3.11 In a report released on 20 June 2013, Deloitte Access Economics calculated that between 2000 and 2012, the insured losses borne by insurers as a result of natural disasters totalled \$16.1 billion, an average of over \$1.2 billion per year.¹⁵ The total economic cost of natural disasters in Australia was estimated in the Deloitte report to average around \$6.3 billion per year.¹⁶ Deloitte further claimed that the forecast annual cost in real terms of natural disasters (across government, business and communities) in Australia could double by 2030 and reach \$23 billion by 2050.¹⁷

3.1 The Deloitte report also sought to quantify the cost of natural disasters to Australian governments. Deloitte estimated that total annual costs to governments of natural disasters is around \$700 million per year in real terms and that Australian governments collectively face approximately 11 per cent of the total economic costs

10 R. Crompton and J. McAneney, 'Normalised Australian insured losses from meteorological hazard: 1967–2006', *Environmental Science and Policy*, vol. 11, 2008, p. 375.

11 Actuaries Institute, *Submission 67*, p. 1.

12 Actuaries Institute, *Submission 67*, p. 1. They note that these projections are averages and there will be considerable volatility from year to year. These projections also represent a single point estimate as part of a range of possible results.

13 Actuaries Institute, *Submission 67*, p. 1.

14 Actuaries Institute, *Submission 67*, p. 1.

15 Deloitte Access Economics, *Building our nation's resilience to natural disasters*, June 2013, p. 17.

16 Deloitte Access Economics, *Building our nation's resilience to natural disasters*, June 2013, p. 19.

17 Deloitte Access Economics, *Building our nation's resilience to natural disasters*, June 2013, p. 19.

of natural disasters, of which 80 per cent is outlaid by the Commonwealth government.¹⁸ The Deloitte report forecast that the annual costs to Australian governments of natural disasters will increase to \$2.3 billion in real terms over the period to 2050.¹⁹

3.12 Insurance Australia Group (IAG), the parent company of a number of insurers, similarly submitted that natural disasters over the past five years in Australia have caused over \$3 billion of damage to private property and infrastructure.²⁰ According to IAG:

The Australian and Queensland Governments have incurred over \$7.5 billion in reconstruction and recovery costs related to the 2010–11 Queensland floods and Cyclone Yasi. Insurers have paid out more than \$3.7 billion to policyholders for the same events. Even before the events of the last five years Australia's annual average insured losses due to natural perils was estimated at around \$1 billion.²¹

3.13 According to the Actuaries Institute, the most costly extreme weather event in Australia since 1999 was the January 2011 floods in Queensland and northern NSW at an economic loss of \$6 billion.²² The Australian Business Roundtable for Disaster Resilience and Safer Communities also found that 2011 'was the worst year on record in Australia for natural disasters' because of '[a]n unprecedented number of natural disasters' with total insured losses of around \$12 billion.²³ Crompton and McAneney estimated that, when normalised for 2006 prices, Tropical Cyclone Tracy (1974) cost \$3.65 billion and the Ash Wednesday bushfires (1983) cost \$1.63 billion.²⁴

3.14 The table below illustrates the most costly Australian weather related disasters from 1999 to 2011 based on figures from the Actuaries Institute.

18 Deloitte Access Economics, *Building our nation's resilience to natural disasters*, June 2013, p. 20.

19 Deloitte Access Economics, *Building our nation's resilience to natural disasters*, June 2013, p. 20.

20 IAG, *Submission 144*, p. 16.

21 IAG, *Submission 144*, p. 16.

22 Actuaries Institute, *Submission 67*, p. 13.

23 Australian Business Roundtable for Disaster Resilience and Safer Communities, 'A better way to protect Australia from natural disasters', Media release, 20 June 2013, http://www.iag.com.au/news/shareholder/20130620_abrt_protect_au_natural_disasters.shtml (accessed 5 July 2103).

24 R. Crompton and J. McAneney, 'Normalised Australian insured losses from meteorological hazard: 1967–2006', *Environmental Science and Policy*, vol. 11, 2008, p. 375.

Table 3.1: Most costly Australian weather related disasters 1999 to 2011²⁵

Year	Event	Economic Loss (\$ billion)
2011	Queensland and NSW floods	6.00
2007	Newcastle and Hunter Valley storms and floods	2.15
1999	Sydney hailstorm	2.12
2011	Tropical Cyclone Yasi	2.00
2006	Tropical Cyclone Larry	1.50
2009	Victorian bushfires (Black Saturday)	1.44
2010	Perth hailstorm	1.35
2010	Melbourne hailstorm	1.29

Difficulty calculating cost estimates

3.15 As shown in the examples above, disaster cost estimates in Australia are largely drawn from insurance claim data or insurance data with some augmentation.²⁶ The difficulty in relying on insurance data to assess the financial cost of extreme weather events is that it only accounts for insured losses which represent only a fraction of the total cost of a disaster.²⁷ The Centre for Risk and Community Safety (CRCS) at the Royal Melbourne Institute of Technology University highlighted the difficulty in relying only on insurance data for cost estimates:

...they [insurance data] do not include many indirect costs, valuations for loss of life, nor intangibles such as ecosystem services which can have significant impacts on cost estimates. The use of insurance data biases conclusions according to which hazards and assets are or are not insured.²⁸

3.16 The CRCS noted that for these reasons the estimate by the BTE differs to that of Crompton and McAneney.²⁹ The figures calculated by the BTE were based on insurance data combined with other estimates, normalised for inflation only and included the cost of the Newcastle earthquake. Crompton and McAneney's figures, on the other hand, were based solely on insurance data and were normalised for inflation, population, wealth and building standards.

25 Actuaries Institute, *Submission 67*, p. 1.

26 CRCS, *Submission 59*, p. 5.

27 CRCS, *Submission 59*, p. 5.

28 CRCS, *Submission 59*, p. 5.

29 CRCS, *Submission 59*, p. 6.

3.17 The CRCS acknowledged that heatwaves and drought, which are expected to become more frequent with higher global temperatures, are not included in most disaster impact data. The CRCS stated that because drought has a slower onset and does not directly result in death, injury or property damage, it is not often included in the same class of disasters as bushfires or floods.³⁰ The CRCS noted that this is despite drought being 'considered to be the most economically costly extreme weather event Australians face'.³¹

3.18 The Actuaries Institute similarly noted that some weather events are not covered by general insurance and are therefore not captured in insurance data on the cost of natural disasters:

Two perils that are primarily not met by private insurers are Drought and Action of the Sea and are therefore omitted from our cost estimates shown above. We are of the view that the additional cost for Drought and Actions of the Sea can be significantly larger than the increase in privately insured costs.³²

3.19 The CRCS concluded that 'estimating the cost of extreme weather in Australia is not straightforward. Data and methodology can lead to significantly different estimates'.³³

Cost to government

3.20 A significant part of the financial cost of extreme weather events is borne by the three levels of government in Australia: the Commonwealth government, state and territory governments and local governments. The Commonwealth government plays a coordinating role in allocating emergency funding to state and territory governments in the event of natural disasters, whilst state, territory and local governments must meet additional costs associated with infrastructure damage, clean up and the provision of support services. In addition to these costs, there is also likely a level of forgone revenue to governments as a result of the economic disruption of extreme weather events.

Commonwealth government

3.21 The Commonwealth government's primary funding mechanism for assisting with the social and economic impacts of extreme weather events is the Natural Disaster Relief and Recovery Arrangements (NDRRA).³⁴ The NDRRA provides partial reimbursement to the states and territories for expenditure on certain relief and recovery measures, such as personal hardship and distress assistance, restoration or replacement of essential public assets, and loans, subsidies and grants for affected

30 CRCS, *Submission 59*, p. 5.

31 CRCS, *Submission 59*, p. 5.

32 Actuaries Institute, *Submission 67*, p. 2.

33 CRCS, *Submission 59*, p. 6.

34 Attorney-General's Department (AGD), *Submission 64*, p. 5.

communities, small businesses and primary producers.³⁵ The Commonwealth government may reimburse up to 75 per cent of actual expenditure by the state or territory for expenditure in a financial year.³⁶ The NDRRA does not cover expenditure relating to the natural environment or human health.

3.22 To be eligible for NDRRA assistance, states and territories are required to have public assets insured or to have access to adequate capital to restore public assets if commercial insurance is not available or is not cost effective.³⁷ States and territories are also required to undertake effective mitigation strategies to reduce the impact of natural disasters.³⁸

3.23 The Commonwealth government has spent over \$6.1 billion in NDRRA in the past five financial years (between 2007–08 and 2011–12).³⁹ A significant portion of this funding was spent in response to the 2011 Queensland floods. Table 3.2 below shows the Commonwealth government's expenditure on NDRRA in recent years.

*Table 3.2: Natural Disaster Relief and Recovery Arrangements payments (\$ million)*⁴⁰

Year	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust
2011–12	...	...	2 951.0	1.7	...	...	...	7.9	2 960.6
2010–11	...	500.0	2 256.0	...	...	...	...	2.4	2 758.4
2009–10	6.1	4.3	104.5	...	...	...	...	2.7	118.3
2008–09	...	270.5	...	...	...	...	...	9.6	280.0
2007–08	7.7	...	...	...	2.0	0.6	...	7.2	16.9
Total	<i>13.8</i>	<i>774.8</i>	<i>5 311.5</i>	<i>1.7</i>	<i>2.0</i>	<i>0.6</i>	...	<i>29.8</i>	<i>6134.2</i>

3.24 For certain severe events the Commonwealth government may also provide assistance directly to individuals through the Australian Government Disaster Recovery Payment (AGDRP) and ex gratia assistance such as the Disaster Income Recovery Subsidy (DIRS).⁴¹

35 AGD, *Submission 64*, p. 5.

36 AGD, *Submission 64*, p. 5.

37 AGD, *Submission 64*, p. 5.

38 AGD, *Submission 64*, p. 5.

39 AGD, *Submission 64*, p. 5.

40 AGD, *Submission 64*, p. 5.

41 AGD, *Submission 64*, p. 5.

State and territory governments

3.25 State and territory governments bear primary responsibility for the protection of life, property and the environment within their borders in the event of a natural disaster. As such, state and territory governments incur the cost of extreme weather events in the areas of preparation, response and recovery.

3.26 The committee heard evidence from the South Australian and Northern Territory governments on the financial costs of natural disasters.⁴² The South Australian State Emergency Management Committee (SEMC) informed the committee that the average annual economic cost of extreme weather events in the state is over \$67 million.⁴³ The SEMC stated:

In a South Australian context extreme weather economic costs have historically been spread across three hazard classes with average annual economic costs over the period 1967–1999 as follows:

Floods—\$26.26 million [per annum]

Storms—\$23.5 million [per annum]

Bushfires—\$17.27 million [per annum].⁴⁴

3.27 The SEMC noted that these cost estimates are based on the 2001 BTE report and that 'it is likely that more contemporary analysis factoring in recent high impact and high cost events in South Australia...would make these average annual economic costs significantly higher'.⁴⁵ The SEMC suggested there would be benefit in improving the national evidence base on the costs of natural disasters by refreshing the BTE data.⁴⁶

3.28 In addition to floods, storms and bushfires, the South Australian SEMC recognised that other hazards have the potential to add to the long term costs of extreme weather in South Australia, including damage to infrastructure and residential housing from sea inundation and coastal erosion.⁴⁷ The impact of unprecedented extreme heatwaves across south eastern Australia is also likely to impact on the state, leading to health impacts and disruptions to essential services, including electricity and transport.⁴⁸

3.29 The SEMC also stated that:

42 South Australian State Emergency Management Committee (South Australian SEMC), *Submission 162*, p. 4; and Northern Territory Government, *Submission 129*, p. 4.

43 South Australian SEMC, *Submission 162*, p. 4.

44 South Australian SEMC, *Submission 162*, p. 4.

45 South Australian SEMC, *Submission 162*, p. 4.

46 South Australian SEMC, *Submission 162*, p. 5.

47 South Australian SEMC, *Submission 162*, p. 5.

48 South Australian SEMC, *Submission 162*, p. 5.

...it is difficult to ascertain the exact benefit of mitigation efforts on recovery costs. Currently there is no nationally consistent approach to the identification and collection of post-disaster assessment information. Hence data is currently not captured or analysed in a way to allow nationally consistent analysis and comparison.

The South Australian government therefore suggested that there would be national benefit in the establishment of a common and consistent system of data collection and analysis across all states and territories.⁴⁹

3.30 The SEMC stated that 'this may provide an avenue for improving the knowledge base of natural disasters in Australia, and could be used to help guide or inform decision making'.⁵⁰

3.31 The Northern Territory government informed the committee that extreme weather events are likely to impact on northern Australia in the form of more intense daily rainfall events, severe thunderstorms and tropical cyclones.⁵¹ Central Australia has also been impacted by changing vegetation and animal populations which have resulted in extreme fire events and feral animal issues.⁵²

3.32 The Northern Territory government identified that these effects of extreme weather are likely to lead to increased flood situations, increased exposure to coastal issues such as storm surge and a rise in water levels, and increased occurrence of extreme temperatures which will reduce infrastructure life and increase maintenance demands.⁵³

Local government

3.33 Local governments often face costs from extreme weather events when infrastructure and services are affected. For example, the Brisbane City Council advised the committee that the 2011 Queensland floods resulted in \$400 million worth of damage to major infrastructure and homes, in addition to economic, environmental and social impacts.⁵⁴ The Townsville City Council informed the committee that there have been over thirty-five weather related events that have affected the area since 1970.⁵⁵ According to the council, major repairs and reconstruction works have been undertaken to repair damaged infrastructure, with the cost continuing to escalate.⁵⁶

3.34 The Local Government Association of Queensland (LGAQ) lamented the fact that currently available cost data 'is often not in holistic, manageable formats that

49 South Australian SEMC, *Submission 162*, p. 5.

50 South Australian SEMC, *Submission 162*, p. 5.

51 Northern Territory Government, *Submission 129*, p. 4.

52 Northern Territory Government, *Submission 129*, p. 4.

53 Northern Territory Government, *Submission 129*, p. 4.

54 Brisbane City Council, *Submission 123*, p. 2.

55 Townsville City Council, *Submission 32*, p. 1.

56 Townsville City Council, *Submission 32*, p. 3.

could assist councils to properly understand the potential overall costs of extreme weather events'.⁵⁷ The LGAQ stated that:

The intrinsic environmental, cultural and social value of natural assets is difficult to measure before extreme weather events and even more difficult to estimate as a component of the broader community loss after the event.

Methodologies for the measurement of potential community impacts should be available that assess a wide range of community, social, environmental and economic impacts to enable the development of broad-based mitigation strategies for severe weather.⁵⁸

The role of insurance

3.35 Discussion of the financial costs associated with extreme weather events and their attribution to governments, businesses and households is inextricably linked to insurance. The problems of non- and under-insurance were cited during the course of the inquiry and are defined as:

- **non-insurance** is a situation where a person does not have an insurance policy, or an insurance policy is held but an event occurs which is excluded from coverage by that policy;
- **under-insurance** occurs when the sum insured is below the rebuilding or replacement cost of the insured property.⁵⁹

3.36 Non-insurance and under-insurance can have a significant impact on who bears the costs of damage caused by extreme weather events. As the Insurance Council of Australia explained, businesses and households either choose to transfer risk to an insurer by taking out insurance or they choose to accept higher risk themselves by under-insuring or choosing not to insure at all and then likely seek financial assistance from government in the event of damage caused by an extreme weather event.⁶⁰

3.37 The availability and affordability of insurance was the subject of discussion during the course of the inquiry. The evidence to the committee was that home insurance premiums have risen significantly in recent years⁶¹ (see Figure 3.1). In particular, following recent extreme weather events some businesses and households in Queensland, New South Wales and Victoria have seen their insurance premiums increase significantly.

57 LGAQ, *Submission 68*, p. 4.

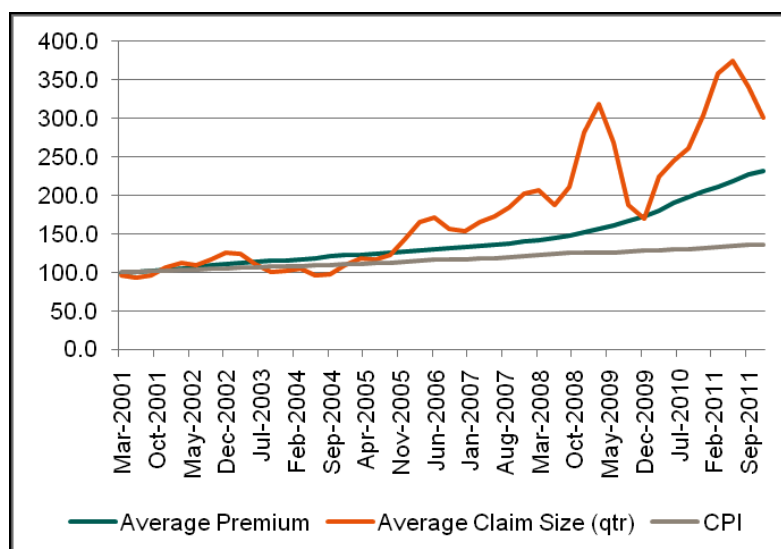
58 LGAQ, *Submission 68*, p. 4.

59 Chris Latham, Peter McCourt and Chris Larkin, 'Natural Disasters in Australia: Issues of funding and insurance', November 2010, pp 16–17.

60 Mr Alex Sanchez, General Manager Policy—Economics and Taxation, Insurance Council of Australia, *Committee Hansard*, 10 April 2013, p. 16.

61 IAG, *Submission 144*, p. 27; Suncorp, *Submission 77*, Attachment 1, p. 10.

Figure 3.1: Home Building Insurance - Trend Data⁶²



3.38 CGU Insurance advised the committee that these increases in insurance premiums have occurred in specific geographic locations where, historically, these areas have underpaid for their insurance:

...the events of recent years have been largely focused around Queensland and northern New South Wales, but we have also had one-off events. We had a major hailstorm event in Perth. We have had three events in Victoria. We are not seeing extraordinary growth in premium rates in Western Australia, South Australia or metropolitan Melbourne. What we are seeing is relatively significant increases in those areas that have, in historical terms, probably underpaid, based on past performance. The premiums that we are seeing at the moment, the increases that we are seeing at the moment, are probably in large part isolated to those segments of the community that are at greatest risk, where the losses have occurred. So we are seeing significant movements in Northern Queensland, parts of northern New South Wales and some regional centres.⁶³

3.39 Suncorp explained in its submission that:

...insurance pricing is a reflection of the risk and the value of the asset being insured. Insurers take particular care in ensuring our products are appropriately priced, using risk data collected over decades from multiple sources (e.g. the National Flood Information Database) to ensure we understand the degree and type of risk to be insured.⁶⁴

62 Suncorp, *Submission 77*, Attachment 1 (Suncorp, *Risky Business, Insurance and Natural Disaster Risk Management*, Policy Document), p. 10.

63 Mr Malcolm Freeman, General Manager, Business Partners, CGU Insurance Ltd, *Committee Hansard*, 10 April 2013, p. 16.

64 Suncorp, *Submission 77*, p. 2.

3.40 The Insurance Council of Australia (ICA) also offered an explanation for the recent premium increases as well as the decision by some insurers to no longer offer insurance in certain 'high risk areas':

Many Australian property insurers have responded to these changes (in the reinsurance market) with premium increases and by reviewing their risk exposure. Some insurers have subsequently taken steps to reduce their exposures to high risk areas if they could not achieve necessary premium increases commensurate with the risk in those areas.⁶⁵

3.41 The Actuaries Institute explained that:

The availability and affordability of insurance today has been influenced to some degree by the recent catastrophes in Australia (eg. Brisbane Floods) but also by such factors as low investment yields, higher reinsurance costs and more accurate address based pricing. Currently, many properties in high risk flood zones are able to purchase insurance but at unaffordable prices...⁶⁶

3.42 The Actuaries Institute submitted that premiums are likely to increase further in the future. Indeed, it predicted that 'an increase in weather related claims cost due to climate change would lead to a further 50% increase in premiums'.⁶⁷ The Actuaries Institute further predicted that:

Under climate change and in the absence of significant risk mitigation initiatives, it is likely that:

- More properties will be at risk of Flood, Cyclone and Storm Surge and will become uninsurable and unaffordable
- Bushfire prone areas will increase (small pockets may become uninsurable) but the additional cost for most is likely to be spread over the community
- Coastal Inundation (eg. King Tide) will remain uninsurable
- Premiums may rise for Storm and Hail but the additional cost will be spread over the community.⁶⁸

3.43 Suncorp submitted that 'risk reduction is key to ensuring a sustainable and accessible insurance industry'.⁶⁹ Indeed, many submissions outlined a number of ways in which risk (and hopefully therefore insurance premiums) can be reduced.⁷⁰ Some of these are discussed elsewhere in this report, including improving understanding of risk

65 Insurance Council of Australia, *Submission 15*, p. 1.

66 Actuaries Institute, *Submission 67*, p. 3.

67 Actuaries Institute, *Submission 67*, p. 2.

68 Actuaries Institute, *Submission 67*, p. 3.

69 Suncorp, *Submission 77*, p. 2.

70 See, for example, Suncorp, *Submission 77*, p. 2; ICA, *Submission 15*, pp 3, 8–13; Dr Sandra Schuster, *Submission 49*, Attachment 1, pp 4–5; Floodplain Management Association, *Submission 62*, pp 3–4; IAG, *Submission 144*, pp 29–34.

through better quality data, improved dissemination of appropriate information, better planning and strengthened building codes and adequate preparedness and mitigation measures. For example, the Floodplain Management Association argued that 'more accurate flood level predictions would lead to lower insurance premiums as the risks are more accurately assessed'.⁷¹

3.44 Increases in insurance premiums predictably result in a reduction in insurance coverage, even where consumers have experienced an extreme weather event and are more aware of the risks they face. CGU Insurance explained:

CHAIR: ...does that mean you are seeing more people drop their insurance coverage in those areas?

Mr Freeman: In those areas, yes.

CHAIR: That is despite the fact that obviously they have a higher understanding—

Mr Freeman: They do.

CHAIR: of the risk they face because they have lived through those risks.

Mr Freeman: And it is an issue that goes to the heart of the affordability debate.⁷²

3.45 The Insurance Council of Australia agreed:

CHAIR: ...The simple fact is, the higher the cost of insurance, the higher the cost of property insurance, the less households there are who are insured.

Mr Sanchez: ...yes.⁷³

3.46 A reduction in private insurance coverage has the impact of shifting the costs of repair and reconstruction following an extreme weather event from private insurers to individuals and also to governments, by way of assistance packages and payments. This in turn can have the perverse effect of further discouraging households from insuring their property as they believe, if they are affected by a natural disaster, they will receive financial assistance from government. The Northern Territory government described this as 'a very complex issue', outlining the problem as follows:

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. The Brisbane floods down the river are a classic example of that. Insurance and insurance costs then tend to drive where people will want to live into the future, and that must be good. Planning has got to take into account the extreme events over the long term and therefore the cost to government if people are allowed to build in places where they should not build, because at some point the builder will walk away. If the mitigation

71 Floodplain Management Association, *Submission 62*, p. 3.

72 Mr Malcolm Freeman, CGU Insurance Ltd, *Committee Hansard*, 10 April 2013, p. 16.

73 Mr Alex Sanchez, ICA, *Committee Hansard*, 10 April 2013, p. 14; see also Dr Sandra Schuster, *Submission 49*, Attachment 1, p. 5.

they have put in place on that building fails, it eventually becomes a problem for the landowner and, if they do not have money for insurance, then for the state government or the Territory government. I suppose you have that classic problem of those who can afford to insure do, but if they see other people being bailed out because they have not insured then why should they insure? Of course, insurance prices are going up dramatically all over Australia and, I presume, the world where these events occur.⁷⁴

3.47 Professor David King similarly described the problem, and put forward a case for compulsory insurance:

If [households] do not have insurance then either the government is going to be bailing them out or areas are going to be declared unsafe and people are going to be relocated. So the alternatives are pretty dire. What was mentioned by a lot of people when we were doing this research was that you have to have compulsory third-party insurance to drive a car, so why don't we have compulsory insurance for hazard protection for household and house insurance?...If we all paid insurance for hazard protection then the cost per household would be dramatically reduced...The counterargument to it is: why should people who have built in sensible places, who are not in a hazard zone, subsidise people who are living in hazardous areas? There are two very strong arguments both in favour of a move towards compulsory insurance and against it.⁷⁵

3.48 IAG suggested that the tax treatment of insurance should be addressed as part of the question of affordability:

...there are two parts to the question that we are addressing here. 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. For us we see tax as being a large component of the affordability discussion and we are trying to have a look at ways that we can make that more specific to each of the individual risks. That is our suggestion around land taxes and so on.⁷⁶

3.49 Suncorp agreed that:

State-based insurance taxes, levies and duties currently form a significant deterrent to obtaining insurance cover in all States, due to the impost on price. The current combination of an Emergency Services Levy, GST and Stamp Duty can increase the cost of insurance policies in New South Wales by more than 40%. The transition away from state-based insurance taxes to more equitable and efficient taxation systems will help support insurance

74 Mr Peter Davies, Acting Chief Information Officer, Northern Territory Police, Fire and Emergency Services, *Committee Hansard*, 7 March 2013, p. 4.

75 Associate Professor David King, Director, Centre for Disaster Studies, James Cook University, *Committee Hansard*, 22 February 2013, p. 9.

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

affordability and therefore improve economic resilience to extreme weather events.⁷⁷

Committee comment

3.50 The impact of extreme weather events can be ameliorated by appropriate insurance. However, as noted by some submitters during the course of the inquiry, non-insurance and under-insurance have been a significant hindrance to recovery from and adaptation to recent extreme weather events.⁷⁸

3.51 The committee is aware that both the Productivity Commission and the Treasury have recommended reform to Australia's taxation system as it applies to general insurance. The Productivity Commission found that state and territory insurance taxes and levies can distort the ways that households and businesses manage risks and that removing state and territory taxes and levies on general insurance would facilitate effective adaptation to climate change. The Productivity Commission stated that such reform would improve the affordability of insurance for some households and businesses, and ensure that premiums more closely reflect the level of risk faced, and that it may also reduce levels of non-insurance and under-insurance.⁷⁹ The Productivity Commission therefore recommended that:

State and territory taxes and levies on general insurance constitute a barrier to effective adaptation to climate change. State and territory governments should phase out these taxes and replace them with less distortionary taxes.⁸⁰

3.52 The Australia's Future Tax System Review (known as the 'Henry tax review') similarly argued in its final report that taxes on general insurance should be removed.⁸¹ The Henry tax review stated:

Australia has several other taxes that should be phased out over time, including insurance duties...Imposing specific taxes on insurance deters people from insuring their property and encourages them to bear unnecessary risks, rather than pooling risk with others. Rates of non-insurance (for building and content insurance) generally are higher at lower incomes, yet low-income people are less able to bear the risk.⁸²

3.53 And:

77 Suncorp, *Submission 77*, p. 3; see also ICA, *Submission 15*, p. 6.

78 See, for example, Dr Sandra Schuster, *Submission 49*, Attachment 1, pp 5–6; Australian Council of Social Services (ACOSS), *Submission 142*, p. 9.

79 Productivity Commission, *Barriers to effective climate change adaptation*, September 2012, pp 306–307.

80 Productivity Commission, *Barriers to effective climate change adaptation*, September 2012, p. 307.

81 The Treasury, *Australia's future tax system—Report to the Treasurer*, December 2009, pp xviii and 94.

82 The Treasury, *Australia's future tax system—Report to the Treasurer*, December 2009, p. 58.

The rates of non-insurance and under-insurance vary throughout Australia. While States with higher taxes on insurance do not always have higher rates of non-insurance and under-insurance, there are other reasons why differences in States may persist (such as differences in perceived levels of risk). Further, there is evidence that after Western Australia stopped basing its fire services levy on insurance, the level of non-insurance for both building and contents declined (Tooth & Barker 2007). Another study found that if the fire services levy, insurance duty and the insurance protection tax were removed, an additional 300,000 households across Australia would purchase contents insurance and an additional 69,000 households across Australia would purchase building insurance (Tooth 2007).

As well as being inefficient by leading to under-insurance or non-insurances, insurance taxes can also be inequitable. Rates of non-insurance (for building and content insurance) generally decline with higher incomes, and non-insurance can also be higher for certain demographic groups, such as retirees with mortgages and single parents (Tooth & Barker 2007). Because of their financial positions, people in these groups may be more vulnerable in the case of loss.⁸³

3.54 The Henry tax review also recognised that insurance taxes acting as a deterrent to insurance may also lead to an increase in government expenditure in the event of a disaster. The final report cited the ACT government's experience following the Canberra bushfires in 2003:

...after the 2003 Canberra bushfires the ACT Government provided an additional \$5,000 to each affected household that did not have contents insurance, in addition to the \$5,000 provided to all whose homes were destroyed.⁸⁴

3.55 Ultimately, the Henry tax review recommended that 'inefficient State consumption taxes, such as insurance taxes' should be abolished⁸⁵ and:

All specific taxes on insurance products, including the fire services levy, should be abolished. Insurance products should be treated like most other services consumed within Australia and be subject to only one broad-based tax on consumption.⁸⁶

3.56 With respect to subsidising insurance, the Productivity Commission recommended against government subsidy of household or business property insurance, whether directly or by underwriting risks, because in the Commission's view:

83 The Treasury, *Australia's future tax system—Report to the Treasurer*, December 2009, p. 473.

84 The Treasury, *Australia's future tax system—Report to the Treasurer*, December 2009, p. 473.

85 The Treasury, *Australia's future tax system—Report to the Treasurer*, December 2009, p. 91.

86 The Treasury, *Australia's future tax system—Report to the Treasurer*, December 2009, p. 94.

...subsidies would not reduce the physical risks that individual properties face, but would mean that governments bear some of the losses to these properties.

Government intervention would be more effective when closely targeted at a well-defined market failure or equity objective, supported by clear evidence. Alternative reform options may be more appropriate ways to meet policy objectives. For example, there would be net benefits for the community from phasing out taxes and levies on insurance, ensuring land-use and building regulation can facilitate adaptation, or by appropriately providing information and disaster-mitigation infrastructure to reduce exposure to risks...Addressing barriers to adaptation in these areas may largely address community concerns about the provision, affordability and uptake of insurance.⁸⁷

3.57 In its response to the Productivity Commission report, the Commonwealth government agreed that 'governments should not subsidise household or business property insurance, either directly or by underwriting risks'.⁸⁸ In its response, the government also noted that, following the series of extreme weather events in late 2010 and early 2011, it had commissioned the Natural Disaster Insurance Review. The response indicated that the government has implemented a number of recommendations from that review, including to enhance consumer awareness of flood risk and flood insurance and to establish a National Insurance Affordability Council (NIAC) to manage the national coordination of flood and other disaster risk management.⁸⁹ It further noted that:

The Government's policies announced or implemented in response to the Review, including funding of \$100 million over 2 years for mitigation works and the establishment of NIAC, broadly reflect the Productivity Commission's recommendations that phasing out taxes and levies on insurance, ensuring land-use and building regulation facilitate risk management and appropriately providing information and disaster mitigation infrastructure to reduce exposure to risks may be more appropriate ways to meet policy objectives with respect to the provision, affordability and uptake of insurance.⁹⁰

3.58 The committee supports the findings of both the Productivity Commission's report on barriers to effective climate change adaptation and the Henry tax review that disincentives to insurance, such as the taxes and levies applied to insurance by the states and territories should be addressed. Removing these disincentives and

87 Productivity Commission, *Barriers to effective climate change adaptation*, September 2012, p. 321.

88 Australian Government response to the Productivity Commission report: *Barriers to Effective Climate Change Adaptation*, March 2013, p. 13.

89 Australian Government response to the Productivity Commission report: *Barriers to Effective Climate Change Adaptation*, March 2013, pp 13–14.

90 Australian Government response to the Productivity Commission report: *Barriers to Effective Climate Change Adaptation*, March 2013, p. 14.

encouraging households to insure their property should alleviate some of the costs to all levels of government in the event of damage to private property caused by an extreme weather event.

3.59 The committee acknowledges that the loss of revenue from abolition of these taxes and levies would create a budgetary issue for the states and territories. The committee therefore recognises that such reform may best be achieved nationally with Commonwealth government involvement through a Council of Australian Governments (COAG) reform process.

Recommendation 4

3.60 The committee recommends that disincentives to insurance, such as taxes and levies applied by the states and territories, should be removed as part of a national reform process.

Impacts on industry

3.61 Extreme weather events can have significant impacts on industry and business through direct and indirect means. Floods, storms, droughts and fires have the potential to destroy crops, decimate agricultural land, damage forestry plantations and reduce availability of water supply. Extreme weather events may indirectly affect industry through road closures, the shutting down of factories and the loss of essential services, such as electricity and water. Ultimately, the costs incurred by industry due to extreme weather events will be passed on to consumers or the lost production from such events will result in reduced economic activity and fewer local jobs.

3.62 The Centre for Policy Development asserted that 'without action to adapt to more variable and extreme weather, by 2050 Australia could lose \$6.5 billion in agricultural production'.⁹¹ In its report, *Farming smarter, not harder*, the Centre noted that Australia is ranked in the top five exporters of commodities like wheat, beef, dairy, mutton and lamb.⁹² Farm products account for over 10 per cent of Australia's exports worth \$3.59 billion.⁹³

3.63 The report observed that extreme weather events could have the greatest impacts on global agricultural production and prices:

Periods of volatility have recently coincided with droughts and floods in major supply regions, with extreme weather a driver of each of three price

91 Centre for Policy Development, *Submission 56*, p. 1.

92 Laura Eadie and Christopher Stone, *Farming smarter, not harder: Securing our agricultural economy*, Centre for Policy Development, November 2012, p. 5, http://cpd.org.au/wp-content/uploads/2012/10/cpd_land_report_EMBARGOED_UNTIL_1_NOV.pdf (accessed 30 May 2013).

93 Laura Eadie and Christopher Stone, *Farming smarter, not harder: Securing our agricultural economy*, Centre for Policy Development, November 2012, p. 5.

spikes in the last 5 years. Changes in weather patterns will also increase the pressure of weeds, pests and disease on agricultural production.⁹⁴

3.64 The report noted that despite the acknowledged and perceived effect of extreme weather on agricultural prices, current price forecasts have not considered the impact of a potential shift in the frequency of extreme weather events on regional production or on global prices.⁹⁵ The report further recognised that early action will be necessary to reduce the risk of agricultural price spikes.⁹⁶

3.65 The Centre for Policy Development advised that investment in research and development of more resilient crop varieties and mitigation needs to start immediately.⁹⁷

3.66 The CRCS estimated the total cost to the Victorian economy of bushfire damage to the agricultural industry at \$92 million per annum.⁹⁸ With no adaptive change, by 2050 increases in bushfire damage to the agricultural industry due to climate change will have cost the Victorian economy an additional \$1.4 billion.⁹⁹

3.67 The Australian Forest Products Association (AFPA), representing the forest, wood and paper products industry, acknowledged that extreme weather events and a changing climate will impact on forestry businesses.¹⁰⁰ In particular, a hotter drier environment with increased risk of bushfires and cyclonic activity, greater variability and intensity of rainfall and soil erosion will affect forestry operations.¹⁰¹

3.68 According to AFPA, the forestry industry is one of Australia's largest manufacturing industries with an annual turnover of \$21 billion.¹⁰² It contributes around 0.6 per cent to Australia's gross domestic product, 6.7 per cent of manufacturing output and employs approximately 76 800 people. The industry is predominantly based in regional areas and is socio-economically important to those areas.¹⁰³

94 Laura Eadie and Christopher Stone, *Farming smarter, not harder: Securing our agricultural economy*, Centre for Policy Development, November 2012, p. 19.

95 Laura Eadie and Christopher Stone, *Farming smarter, not harder: Securing our agricultural economy*, Centre for Policy Development, November 2012, p. 20.

96 Laura Eadie and Christopher Stone, *Farming smarter, not harder: Securing our agricultural economy*, Centre for Policy Development, November 2012, p. 20.

97 Laura Eadie and Christopher Stone, *Farming smarter, not harder: Securing our agricultural economy*, Centre for Policy Development, November 2012, p. 10.

98 CRCS, *Submission 59*, p. 8.

99 CRCS, *Submission 59*, p. 8.

100 Australian Forestry Products Association (AFPA), *Submission 37*, p. 2.

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

102 AFPA, *Submission 37*, p. 1.

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

3.69 The CRCS estimated that the current total cost to the Victorian economy due to bushfire damage to the timber industry (including business disruption costs) is \$185 million per annum.¹⁰⁴ Furthermore, the CRCS claimed that, with no adaptive change, by 2050 increases in bushfire damage to the timber industry will have cost the Victorian economy an additional \$2.85 billion over and above a 'no climate change' scenario.¹⁰⁵

3.70 The Australian National Retailers Association (ANRA), which represents retailers who employ around 500 000 people and account for more than \$100 billion in annual turnover, highlighted some of the indirect costs associated with extreme weather events.¹⁰⁶ ANRA noted that the 2011 Queensland floods closed roads and destroyed infrastructure, resulting in delays to stock reaching affected areas and increases in cost.¹⁰⁷ The ANRA stated:

In many instances the changed delivery methods involved a significant increase in transport and logistics costs (estimated at multiple times the cost for delivery under more normal circumstances). However, none of these additional costs were passed on in the form of higher prices for Queensland consumers.¹⁰⁸

Impacts on infrastructure

3.71 Major infrastructure (such as roads, bridges, rail lines, ports, electricity networks and water supplies) is vulnerable to extreme weather events. Damage to infrastructure is generally immediate and costly, and as noted above, has subsequent ramifications for people and business.¹⁰⁹ Repair of infrastructure is accepted as a high priority, as it is essential to recovery efforts and getting people's lives and industry back up and running.

3.72 In 2012 the Climate Institute published its report, *Coming ready or not: Managing climate risks to Australia's infrastructure*, identifying the effect of weather events on Australia's infrastructure.¹¹⁰ The report noted that:

...infrastructure...is a critical enabler for activity across all sectors of the economy, and because its exposure to climate change puts other parts of society at risk. Infrastructure sectors are interdependent; when one is

104 CRCS, *Submission 59*, p. 8.

105 CRCS, *Submission 59*, p. 9.

106 Australian National Retailers Association (ANRA), *Submission 110*, p. 1.

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

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

109 The Climate Institute, *Submission 105*, p. 4.

110 The Climate Institute, *Coming ready or not: Managing climate risks to Australia's infrastructure*, 2012, http://www.climateinstitute.org.au/verve/resources/TCI_ComingReadyorNot_ClimateRiskstoInfrastructure_October2012.pdf (accessed 31 May 2013).

damaged others may be impaired. Climate impacts to infrastructure cascade through the economy and are felt throughout the community.¹¹¹

3.73 Modelling for the 2008 Garnaut Review conservatively estimated that the annual cost of unmitigated climate change on Australia's infrastructure would reach 0.5 per cent of gross domestic product (GDP) (about \$9 billion) in 2020 and 1.2 per cent of GDP (\$40 billion) in 2050.¹¹²

3.74 The CSIRO emphasised that the impact of extreme weather events on Australia's infrastructure will be exacerbated by the accelerated deterioration of the structural reliability of infrastructure due to a changing climate and increasing carbon concentration.¹¹³ The CSIRO explained that increasing carbonation of the atmosphere and rising sea levels will increase cracking and corrosion of concrete, timber and steel structures.¹¹⁴ Heatwaves which last for several days also have significant impacts on how buildings and infrastructure perform: for example, how well buildings maintain temperature for comfort, safety and reduction of fire hazards may be affected by increasing extreme weather events.¹¹⁵

Health impacts of extreme weather events

3.75 The effects of extreme weather events have a significant impact on society as a whole and the health of Australians. Storms, floods and bushfires present a real danger to people's lives, causing death and serious injury. Communities affected by disasters may also experience stress and emotional anguish during the event and for a significant period of time afterwards. Rises in average temperatures and more frequent heatwaves are also considered to present a substantial threat to human health.¹¹⁶

3.76 The Australian Medical Association (AMA) identified that changes in the frequency, intensity and duration of future weather events will expose growing numbers of Australians to hazards that affect their health. According to the AMA, extreme weather events will have both direct and indirect impacts on human health:

...it is predicted that Australia will experience more heat waves, extreme fire weather, severe storms, and drought across southern parts of the continent. Some of the health effects accompanying these changes will be direct, such as increases in mortality and morbidity associated with heat waves. Other health impacts will be indirect, including damage to health infrastructure, depression and post-traumatic stress disorder, increasing health inequities, and an erosion of the social determinants of good health.

111 The Climate Institute, *Coming ready or not: Managing climate risks to Australia's infrastructure*, 2012, p. 3.

112 R. Garnaut, *The Garnaut Climate Change Review, Final report and technical appendices*, Canberra, 2008, <http://www.garnautreview.org.au/2008-review.html> (accessed 5 July 2013), see also Climate Institute, *Submission 105*, p. 4.

113 CSIRO, *Submission 93*, p. 18.

114 CSIRO, *Submission 93*, p. 18.

115 CSIRO, *Submission 93*, pp 18–19.

116 CSIRO, *Submission 93*, p. 3.

When estimating the overall financial costs associated with extreme weather events, it is imperative that consideration is given to the significant costs arising from health impacts.¹¹⁷

3.77 The Climate and Health Alliance (CAHA) similarly noted that 'there are serious implications for human health and wellbeing and safety from extreme weather events', that are both direct and indirect.¹¹⁸ The CAHA stated:

The risks posed by the increasing frequency and severity of extreme weather events such as heatwaves, fires, floods and storms and the injuries, deaths and trauma cause physical, emotional, and financial harm, and leave a legacy of health disadvantage for those affected, and their communities.¹¹⁹

3.78 It was noted by the AMA that the nature of extreme weather events ensures that effects are unevenly distributed.¹²⁰ Where people live, their income level, as well as health and social contexts will be a factor in determining the effect that extreme weather events have on people. The AMA stated:

There is a growing recognition that the distribution of weather-related health impacts has been, and will continue to be, uneven, falling more heavily on low-income populations and those with chronic health conditions. Other factors associated with increased vulnerability include age, disability, homelessness, social isolation, poor English language skills, and residing in rural and remote communities.¹²¹

3.79 In Australia, the direct health effects of extreme weather events have recently been highlighted by:

- the south-east Australian heat wave in late January 2009 which resulted in 374 excess deaths in Victoria over what would be expected;
- the Victorian bushfires in early February 2009 which killed 173 people...; and
- the 2010–2011 Queensland floods which killed 33 people and affected ... over two and a half million people.¹²²

3.80 Historically, cyclones and bushfires have been some of the most deadly weather events in Australia. For example, Cyclone Mahina struck the Bathurst Bay region of far north Queensland in March 1899. This destructive Category 5 cyclone

117 AMA, *Submission 104*, p. 4.

118 CAHA, *Submission 52*, p. 5.

119 CAHA, *Submission 52*, p. 5.

120 AMA, *Submission 104*, p. 6.

121 AMA, *Submission 104*, p. 6.

122 CSIRO, *Submission 93*, p. 16.

destroyed a pearling fleet and resulted in approximately 400 lives lost.¹²³ In December 1974 Cyclone Tracy killed 71 people in Darwin.¹²⁴ Apart from the devastating Black Saturday bushfire in 2009, the most destructive fires have been the Black Friday bushfire in January 1939 which resulted in 71 deaths across southern Australia and the Ash Wednesday bushfire in February 1983 which resulted in 75 deaths in South Australia and Victoria.¹²⁵

3.81 In addition to the deaths attributable to extreme weather events, there are many other indirect health effects. Submitters to the inquiry identified some of the potential health impacts associated with heatwaves, bushfires and storms and flooding.

Heatwaves

3.82 Heatwaves are considered to be the 'silent killer' of extreme weather events and are the leading cause of weather related deaths in Australia.¹²⁶ The CAHA identified that a heatwave in Victoria from 26 January 2009 to 1 February 2009 resulted in excess deaths of 374 people over and above what would be expected—a 62 per cent increase in overall mortality.¹²⁷ The AMA noted that:

Heatwaves have a greater impact on population health in Australia than any other natural hazard, and are associated with significant increases in mortality and morbidity rates....[D]eaths associated with extreme heat are predicted to more than double if Australia does not improve the way these events are handled.¹²⁸

3.83 The effects of heatwaves include heat stroke, dehydration, raised body temperatures and impaired cognitive function.¹²⁹ Loss of power supply during a heatwave substantially increases the risk of people dying and is also associated with increased accidents.¹³⁰ It has also been shown that heatwaves lead to an increase in the

123 Emergency Management Australia website, 'Australian Emergency Management Knowledge Hub: Cyclone Mahina', <http://www.emknowledge.gov.au/resource/?id=42> (accessed 5 June 2013).

124 Emergency Management Australia website, 'Australian Emergency Management Knowledge Hub: Cyclone Tracy', <http://www.emknowledge.gov.au/resource/?id=386> (accessed 5 June 2013).

125 Emergency Management Australia website, 'Australian Emergency Management Knowledge Hub: Black Friday', <http://www.emknowledge.gov.au/resource/?id=350>; Emergency Management Australia website, 'Australian Emergency Management Knowledge Hub: Ash Wednesday', <http://www.emknowledge.gov.au/resource/?id=131> (accessed 5 June 2013).

126 AMA, *Submission 104*, p. 5; and Doctors for the Environment Australia (DEA), *Submission 108*, p. 5.

127 DEA, *Submission 108*, p. 8.

128 AMA, *Submission 104*, p. 5

129 DEA, *Submission 108*, p. 5.

130 CAHA, *Submission 52*, p. 9.

incidence of food-borne illnesses, as bacteria such as salmonella thrive in higher temperatures.¹³¹

3.84 The Australian Nursing Federation also observed that heatwaves result in increased doctor visitations, ambulance callouts and presentations to emergency departments and hospital admissions.¹³²

3.85 The risk of heat related health impacts is increased for the elderly, infants and people suffering from existing medical problems (such as heart and pulmonary disease, diabetes, alcoholism, spinal-cord injuries and mental illness). According to the AMA:

The risk of heat-related mortality and morbidity is increased for people with pre-existing illnesses, including cardiovascular disease, psychiatric, neurological and cognitive impairment, diabetes, cancer and obesity. Some medications used to [treat] these conditions may also increase vulnerability to heart-related health effects by compromising thermoregulation, thermal awareness, mobility, or the ability to adopt protective behaviours.¹³³

3.86 The CAHA also identified that the homeless and people who work outside or with minimal access to cooling systems are at an increased risk from heatwaves.¹³⁴

Bushfires

3.87 Bushfires cause injuries and fatalities, lead to people losing their homes and businesses, and communities losing schools and other services such as healthcare.¹³⁵ Some of the most severe health impacts of bushfires are from burns and heat exhaustion due to exposure to extremely high temperatures.¹³⁶ Bushfires also expose people to toxic smoke, particulate matter and increased levels of ground level ozone exposure which can cause respiratory illness and deaths.¹³⁷

3.88 The AMA identified that:

A particular risk in hot weather in Australia is bush fires [sic] and related health risks from smoke and burns. In addition to large scale loss of life and injury, the effects of increased air pollution can impact on respiratory disease among populations that are not directly affected by fire. Bushfire can damage local infrastructure, lead to the contamination of water supplies, and disrupt the delivery of health services. Long term health consequences include post-traumatic stress, depression and anxiety.¹³⁸

131 CAHA, *Submission 52*, p. 10.

132 Australian Nursing Federation, *Submission 20*, p. 6.

133 AMA, *Submission 104*, p. 5.

134 CAHA, *Submission 52*, p. 9.

135 CAHA, *Submission 52*, p. 7.

136 DEA, *Submission 108*, p. 6.

137 CAHA, *Submission 52*, p. 7.

138 AMA, *Submission 104*, p. 6.

3.89 The CAHA also identified longer term health problems associated with bushfires, including alcoholism:

There is also longer term health issues associated with bushfires. The 1983 Ash Wednesday fires were associated with subsequent increased general illness, significant increases in alcohol and drug abuse and an almost 300% increase in mental illness. Professional and volunteer fire fighters and other emergency services personnel are being exposed to unprecedented and likely worsening levels of physical and psychological stress and danger.¹³⁹

Storms and flooding

3.90 The major direct health impacts of floods and storms are associated with injury and death due to drowning and trauma. According to the CAHA, the most common injuries are sprains, lacerations and abrasions.¹⁴⁰ Floods may also be associated with electrical injuries and hypothermia as a result of contact with flood waters.

3.91 Storms and flooding can also impact on human health through an increased incidence of water-borne diseases, diarrhoeal disease, respiratory infection and skin infections.¹⁴¹ Longer-term impacts may include mould in houses that trigger respiratory problems, post-traumatic stress and depression.¹⁴² The damage that storms and flooding inflict on buildings may also result in reduced medical services and limit the ability of medical response teams to get to affected communities. The CAHA noted that:

Floods and cyclones disrupt normal services and can severely affect health care services: the 2011 Qld floods caused 1,396 surgical cases to be cancelled, which led to a 73% increase in waiting times for elective surgery. In addition the Queensland floods caused 33 deaths and destroyed over 36000 homes.¹⁴³

3.92 Doctors for the Environment Australia (DEA) remarked on the longer-term health effects of floods:

More frequent and/or intense storms and floods can result in injuries, diseases, mental health effects and death. Studies have indicated that 70% of people required to move out of homes due to flooding have reported health problems (both physical and mental with children being particularly susceptible to the latter), whilst almost 2/3 of those affected by floods reported that their health had been adversely affected.¹⁴⁴

139 CAHA, *Submission 52*, p. 7.

140 CAHA, *Submission 52*, p. 9.

141 DEA, *Submission 108*, p. 7.

142 DEA, *Submission 108*, p. 7.

143 CAHA, *Submission 52*, p. 9.

144 DEA, *Submission 108*, p. 6.

Psychological impacts

3.93 Mental health problems following a disaster are a key public health issue.¹⁴⁵ The Australian Psychological Society (APS) informed the committee that mental health impacts differ according to the type, suddenness and scale of the catastrophe, and the social, historical and cultural context in which it occurs.¹⁴⁶ Impacts are compounded by the vulnerability of individuals and communities, the appropriateness of emergency responses, and the resources available to provide support and rebuild.¹⁴⁷

3.94 The APS stated:

Mental health problems following a disaster include not only the direct psychological impact of the disaster itself, but also difficulties with managing the emotional difficulties arising from confronting the secondary stressors that disasters generate, like subsequent displacement, unstable housing, and lack of access to support services and employment.¹⁴⁸

3.95 The APS raised concerns that large numbers of people may also suffer from a range of psychological and social problems that are not severe enough to constitute significant mental health problems requiring specialist intervention, but are distressing enough to cause disruptions to work, family life, relationships and everyday life.¹⁴⁹ These impacts may include displacement and relocation, loss of social connections, increased stress and feelings of hopelessness, increased conflict and increased family stress.¹⁵⁰

Social impacts of extreme weather events

3.96 A number of communities around Australia have experienced the devastating effects of extreme weather events in recent years, such as southern Queensland and northern NSW from floods and parts of Victoria from brushfire and heatwaves. These events have destroyed homes, caused people to lose their jobs and placed families under financial stress. The Australian Council of Social Service (ACOSS) highlighted that:

While Australia is a resilient nation, emergencies can have a significant impact on the wellbeing of individuals and communities, having the potential to cause great physical, financial and emotional hardship, as well as loss of life. As such, it is important that consideration of the total cost of the impacts of extreme weather events, which are likely to become more frequent and intense as a result of climate change, include consideration of their social costs, particularly their impact on communities, those more

145 Australian Psychological Society (APS), *Submission 22*, p. 6; see also Department of Health and Ageing, *Submission 126*, pp 2–3.

146 APS, *Submission 22*, p. 6.

147 APS, *Submission 22*, p. 6.

148 APS, *Submission 22*, pp 6–7.

149 APS, *Submission 22*, p. 7.

150 APS, *Submission 22*, p. 7.

vulnerable and disadvantaged within them and the services that support them.¹⁵¹

3.97 People experiencing poverty and inequality are affected first and worst by both direct and indirect exposure to extreme weather events.¹⁵² ACOSS observed that people on low incomes, the unemployed, the elderly, people with disabilities and single parents are often those who suffer the most.¹⁵³ Studies conducted by ACOSS following the 2011 Queensland floods showed that these groups were disproportionately affected as a result of a lack of insurance (or under-insurance), loss of employment through disruptions to and closure of local businesses, loss of rental tenancies and the inability to meet higher bond payments, increased pressure on public housing waiting lists and increased living costs.¹⁵⁴

3.98 During disasters and immediately after, communities are also affected by losses of electricity and water supplies leaving people without heating, cooling, lights and lifts. ACOSS noted that following Hurricane Sandy in New York (2012), the loss of electricity stranded the elderly and disabled and endangered their health:

Without power, lifts and lights in the affected buildings could not cooperate, effectively stranding tens of thousands of residents—many of whom were elderly or living with a disability or chronic health problem—in freezing and pitch black apartments. People in wheelchairs were unable to evacuate, diabetics were left without access to insulin and residents attempting to heat their homes using their stoves suffered carbon monoxide poisoning.¹⁵⁵

Commonwealth government assistance

3.99 In certain natural disasters the Commonwealth government may provide some additional assistance to individuals at the request of the states and territories (which have primary responsibility for the protection of life and property).¹⁵⁶ The respective roles and responsibilities of the Commonwealth, state and territory governments are outlined in further detail in Chapter 5.

3.100 As noted in paragraph 3.21, for certain severe events, the Commonwealth government may provide assistance directly to individuals in addition to the assistance available from the states and territories under the NDRRA.¹⁵⁷ The Australian Government Disaster Recovery Payment (AGDRP) provides a one-off payment to individuals affected by a major disaster to assist with their recovery.¹⁵⁸ The

151 Australian Council of Social Services (ACOSS), *Submission 142*, p. 8.

152 ACOSS, *Submission 142*, p. 8.

153 ACOSS, *Submission 142*, p. 8.

154 ACOSS, *Submission 142*, pp 8–9.

155 ACOSS, *Submission 142*, p. 9.

156 AGD, *Submission 64*, p. 17.

157 AGD, *Submission 64*, p. 17.

158 AGD, *Submission 64*, p. 17.

Commonwealth government expenditure on AGDRP in recent years is detailed in Table 3.3 below.

Table 3.3: Australian Government Disaster Recovery Payment (\$ million)¹⁵⁹

Year	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust
2012–13	2.3	...	0.7	...	...	...	...	...	3.0
2011–12	45.1	7.9	20.0	0.2	...	...	...	...	73.3
2010–11	13.4	39.1	767.2	8.1	...	...	...	...	827.7
Total	60.8	47.0	787.9	8.3	0.0	0.0	0.0	0.0	904.0

3.101 Ex gratia assistance may also be made available for certain severe disasters including the Disaster Income Recovery Subsidy (DIRS). The DIRS is generally an equivalent payment to the Newstart Allowance and made available for up to 13 weeks. For example, the Attorney-General's Department stated:

Following the flooding that occurred in many states across Australia during 2010–11, an ex gratia DIRS payment was made available to individuals, small businesses and farmers who had been impacted by the flooding and could demonstrate a loss of income.¹⁶⁰

Community organisations

3.102 ACOSS highlighted that, despite the severity of extreme weather impacts on communities, national and state-based emergency management and other relevant policy frameworks do not adequately resource community service organisations to fulfil the critical role they can and do play in supporting communities and individuals responding to and recovering from emergencies.¹⁶¹ ACOSS stated:

Community service organisations are embedded within their communities, deliver key services across local communities, have in-depth knowledge of local people, history, risks and vulnerabilities and are best placed to understand and identify their support needs. The services they provide are a critical feature of Australian society, complementing the income support system as well as health and education systems. As such, community service organisations comprise an essential component of the social infrastructure in human settlements. Indeed, for many people experiencing poverty, disadvantage and social exclusion, these organisations are often the primary source of connection to the broader community and form the basis of their resilience to everyday adversity as well as in times of crisis.¹⁶²

¹⁵⁹ AGD, *Submission 64*, p. 18.

¹⁶⁰ AGD, *Submission 64*, p. 18.

¹⁶¹ ACOSS, *Submission 142*, pp 9–10.

¹⁶² ACOSS, *Submission 142*, p. 9.

3.103 In 2013 the National Climate Change Adaption Research Facility (NCCARF), Climate Risk and ACOSS released a report on the community sector's preparedness for climate change and extreme weather events.¹⁶³ The report—*Adapting the community sector for climate extremes*—found that community service organisations (CSOs) are 'highly vulnerable and not well prepared to respond to climate change or extreme weather events'.¹⁶⁴ Many small and medium-sized organisations are at risk of permanent closure as a result of major damage to physical infrastructure and disruptions to critical services.¹⁶⁵

3.104 The authors of the report conducted a survey of CSOs to determine the impacts they and their client groups would suffer as a result of physical infrastructure failure and the inherent capacity within organisations to support community resilience to impacts.¹⁶⁶ The report found that one week after an extreme weather event, 50 per cent of organisations that sustain serious damage to their premises would still be out of operation and 25 per cent might never provide services again.¹⁶⁷

3.105 The report concluded that despite the problem of CSO vulnerability and the severity of its consequence, the community sector has been overlooked in climate change adaption policy settings and research agendas. Furthermore, the report stated that:

At present, CSOs perceive an overwhelming range of barriers to action. Key amongst these is a lack of financial resources and skills and the concern that adaption is 'beyond the scope' of the sector's core business.¹⁶⁸

3.106 The report recommended that the Commonwealth government establish a Community Sector Adaption Fund to support capacity and resilience building projects for CSOs and their clients.¹⁶⁹ It also recommended that the community services sector be resourced and supported.¹⁷⁰

163 K. Mallon, et al., *Adapting the community sector for climate extremes*, National Climate Change Adaption Research Facility (NCCARF), Gold Coast, 2013, available at: http://www.nccarf.edu.au/sites/default/files/attached_files_publications/Mallon-Adapting-Community-Sector-Climate-Extremes.pdf (accessed 4 June 2013).

164 K. Mallon, et al., *Adapting the community sector for climate extremes*, NCCARF, Gold Coast, 2013, p. 4.

165 K. Mallon, et al., *Adapting the community sector for climate extremes*, NCCARF, Gold Coast, 2013, p. 4.

166 K. Mallon, et al., *Adapting the community sector for climate extremes*, NCCARF, Gold Coast, 2013, p. 3.

167 K. Mallon, et al., *Adapting the community sector for climate extremes*, NCCARF, Gold Coast, 2013, p. 4.

168 K. Mallon, et al., *Adapting the community sector for climate extremes*, NCCARF, Gold Coast, 2013, p. 4.

169 K. Mallon, et al., *Adapting the community sector for climate extremes*, NCCARF, Gold Coast, 2013, p. 134.

170 K. Mallon, et al., *Adapting the community sector for climate extremes*, NCCARF, Gold Coast, 2013, pp 134–135.

Committee comment

3.107 The committee commends CSOs for their significant contribution during and after extreme weather events. It is the committee's view that the important role of CSOs in assisting communities and individuals during times of natural disaster should be recognised and supported.

3.108 The committee urges authorities to give due regard to CSOs in both planning responses to and responding to extreme weather events, in particular those organisations that provide vital services to vulnerable groups.

Recommendation 5

3.109 The committee recommends relevant authorities work with community service organisations in both planning responses to and responding to extreme weather events, in particular those organisations that provide vital services to vulnerable groups.

Impacts on natural ecosystems

3.110 Extreme weather events can also have significant impacts on natural ecosystems, including biodiversity and water resources. Several submissions expressed concern, for example, about the impacts of bushfires on native species and their habitat.¹⁷¹ However, the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) advised that 'different species may respond in opposite ways to the same extreme weather event', and that while bushfires may destroy populations, even whole species, at the same time they can 'result in the rejuvenation or overpopulation of others'.¹⁷²

3.111 Others expressed concern about the impacts of extreme weather events on southwest Western Australia (WA), a known global biodiversity 'hotspot'.¹⁷³ For example, WWF-Australia submitted that a 'number of recent extreme weather events have provided a worrying insight into the potential impacts of climate change on some of the region's most important species', including the endangered:

- Carnaby's black cockatoo, found only in southwest WA, where an extreme heatwave left over 145 cockatoos dead;¹⁷⁴ and
- black-footed rock wallaby, which has been adversely impacted by recent droughts reducing their food supplies: 'the drought of 2010 is believed to have

171 Wildlife Preservation Society of Queensland - Gold Coast and Hinterland, *Submission 122*, p. 1; Gecko-Gold Coast and Hinterland Environment Council Association, *Submission 121*, p. 6; Environment East Gippsland, *Submission 146*, p. 2.

172 SEWPaC, *Submission 61*, p. 2.

173 WWF-Australia, *Submission 124*, p. 9; Mr Piers Verstegen, Director, CCWA, *Committee Hansard*, 7 March 2013, p. 7; CCWA, *Submission 100*, p. 2.

174 See also Climate Commission, *The Critical Decade: Extreme weather*, April 2013, p. 16 for more discussion of the impacts of extreme heat on terrestrial ecosystems.

been the major underlying cause of the population crash that appeared to occur in that year'.¹⁷⁵

3.112 The Conservation Council of Western Australia (CCWA) was particularly concerned about the impacts of extreme weather events, including drought, heatwaves and bushfires, on the forests of southwest Western Australia.¹⁷⁶ They told the committee that 'huge areas of forests' have died or gone into ecological collapse due to drought events.¹⁷⁷ They argued that extreme weather events would make natural ecosystems more vulnerable to impacts of other activities such as forestry.¹⁷⁸

3.113 Extreme weather events can also have an impact on marine ecosystems. For example, WWF-Australia submitted that extreme weather events have had a particularly severe impact on the Great Barrier Reef, including:

- extensive coral bleaching from high sea surface temperatures;¹⁷⁹
- damage from storms and cyclones—for example, Cyclone Yasi in 2011 caused damage to approximately 15 per cent of the Great Barrier Reef and its ecological effects are likely to be evident for decades;¹⁸⁰
- increased sediment and nutrient loads from heavy rainfall and flooding, which can contribute to coral mortality and adversely impacts on seagrass and turtles.¹⁸¹

3.114 Mr Piers Verstegen from the CCWA also discussed the impacts of extreme weather events, particularly ocean current and temperature changes, on marine ecosystems and fisheries:

Australia's most valuable fishery, the rock lobster fishery, has collapsed. A lot of science is now pointing to the fact that that is due to ocean current and temperature changes. An ocean heatwave has been identified and that has had a significant ecological impact on those marine environments that we rely on for our productive fisheries.¹⁸²

175 WWF-Australia, *Submission 124*, p. 9.

176 Mr Piers Verstegen, CCWA, *Committee Hansard*, 7 March 2013, p. 7; CCWA, *Submission 100*, p. 2.

177 Mr Piers Verstegen, CCWA, *Committee Hansard*, 7 March 2013, pp 2, 7, 11–12; CCWA, *Submission 100*, p. 2.

178 Mr Piers Verstegen, CCWA, *Committee Hansard*, 7 March 2013, p. 7; CCWA, *Submission 100*, pp 2 and 11.

179 WWF-Australia, *Submission 124*, p. 8; see also Climate Commission, *The Critical Decade: Extreme weather*, April 2013, p. 17.

180 WWF-Australia, *Submission 124*, p. 8; see also Climate Commission, *The Critical Decade: Extreme weather*, April 2013, p. 54.

181 WWF-Australia, *Submission 124*, p. 8.

182 Mr Piers Verstegen, CCWA, *Committee Hansard*, 7 March 2013, p. 8 and see also pp 13–14.

3.115 In terms of the costs of extreme weather events as they relate to natural ecosystems, SEWPaC submitted that:

Extreme weather events can also result in complete changes in ecosystem functionality, an outcome that would have significant financial, economic and social impacts for the management of that ecosystem into the future. Costing these impacts is a challenging proposition, even if only the cost of physical restoration is considered.¹⁸³

3.116 SEWPaC further advised that:

Due to the significant costs involved in restoring natural ecosystems following extreme weather events, the Australian Government is generally called on to provide funding support. For example, the Caring for our Country initiative invested \$10.5 million following the 2009 Victorian bushfires and \$9.9 million after the floods and cyclones of 2010.¹⁸⁴

3.117 Concern was also expressed that climate change and extreme weather events 'will exacerbate pre-existing threats to Australia's natural environment'.¹⁸⁵ Professor Lesley Hughes from the Wentworth Group of Concerned Scientists agreed:

Our ecosystems are potentially in dire need of assistance with climate change simply adding to the existing stresses that we have already put upon them... We are already seeing species reacting to climate change by shifting their distributions, by having alterations in their life cycles and by increased mortality during heatwaves and other extreme events.¹⁸⁶

3.118 For this reason, several submissions highlighted the need to build resilience in natural ecosystems.¹⁸⁷ For example, the Wentworth Group of Concerned Scientists argued that more frequent and intense extreme weather events will have significant environmental consequences, and that there is a need to build resilience in natural ecosystems:

The most important response is for the Commonwealth government to support no regrets actions to restore the health of our soils, vegetation and waterways so that these assets are best placed to adapt to these impacts.¹⁸⁸

3.119 SEWPaC advised that there are a number of policies and programs aimed at improving the resilience of natural ecosystems to the impacts of climate change and extreme weather events, including the Biodiversity Fund; Caring for our Country;

183 SEWPaC, *Submission 61*, p. 2.

184 SEWPaC, *Submission 61*, p. 2.

185 WWF-Australia, *Submission 124*, p. 6; see also Mr Piers Verstegen, CCWA, *Committee Hansard*, 7 March 2013, p. 7; CCWA, *Submission 100*, pp 2 and 11.

186 Professor Lesley Hughes, Wentworth Group of Concerned Scientists, *Committee Hansard*, 11 April 2013, p. 29.

187 See, for example, Mr Piers Verstegen, CCWA, *Committee Hansard*, 7 March 2013, pp 8 and 14.

188 Mr Peter Cosier, Wentworth Group of Concerned Scientists, *Committee Hansard*, 11 April 2013, p. 29.

National Wildlife Corridors Plan; and Australia's Native Vegetation Framework.¹⁸⁹ Other relevant initiatives cited by SEWPaC included the National Water Initiative.¹⁹⁰ Finally, SEWPaC noted that one of the core objectives of the Murray-Darling Basin Plan and the Water for the Future programs is to 'improve the resilience of the environmental and community systems of the basin'.¹⁹¹

189 SEWPaC, *Submission 61*, p. 5.

190 SEWPaC, *Committee Hansard*, 11 April 2013, p. 64; SEWPaC, *Submission 61*, pp 5–6.

191 SEWPaC, *Committee Hansard*, 11 April 2013, p. 64; SEWPaC, *Submission 61*, pp 5–6.

