Royal Commission
into National Natural
Disaster Arrangements

Royal Commission into National Natural Disaster Arrangements

Report

28 October 2020



The Royal Commission into National Natural Disaster Arrangements was established on 20 February 2020 in response to the extreme bushfire season of 2019-2020 which resulted in devastating loss of life, property and wildlife, and environmental destruction across the nation.

The Letters Patent for the Royal Commission set out the terms of reference and formally appoint Air Chief Marshal Mark Binskin AC (Retd), the Honourable Dr Annabelle Bennett AC SC and Professor Andrew Macintosh as Royal Commissioners.

The Royal Commission into National Natural Disaster Arrangements acknowledges the Traditional Owners and custodians of country throughout Australia and acknowledges their continuing connection to land, waters and community. We pay our respects to the people, the cultures and the elders past, present and emerging.

Published 28 October 2020

© Commonwealth of Australia 2020

ISBN: 978-1-921091-45-2 (Print)

ISBN: 978-1-921091-46-9 (Online)

With the exception of the Coat of Arms and where otherwise stated, all material presented in this publication is provided under a Creative Commons Attribution 4.0 International licence. For the avoidance of doubt, this means this licence only applies to material as set out in this document.



The details of the relevant licence conditions are available on the Creative Commons website as is the full legal code for the CC BY 4.0 licence <www.creativecommons.org/licenses>

The terms under which the Coat of Arms can be used are detailed on the Department of the Prime Minister and Cabinet website.

Artwork

Cover design features *Awelye Sugarbag,* an original artwork by Indigenous artist Annie Hunter Petyarre. Annie began painting in the late 80s. Her work is included in the *National Gallery of Australia* collection. Annie's paintings have also featured in exhibitions across Australia and in the United Kingdom. Annie comes from a family of renowned artists whose work reflects their story and Arawerre country.

The photograph showing regeneration after a bushfire was taken by Scott Gibbons in Coonabarabran, NSW.

After the letter of transmittal

The photograph of the memorial was taken by Ethan Jones in Horsley Park, NSW.

On the rear leaf

The photograph showing regeneration after a bushfire was taken by the Royal Commission on the South Coast, NSW.

Royal Commission
into National Natural
Disaster Arrangements

28 October 2020

His Excellency General the Honourable David Hurley AC DSC (Retd)
Governor-General of the Commonwealth of Australia
Government House
CANBERRA ACT 2600

Your Excellency

Report of the Royal Commission into National Natural Disaster Arrangements.

In accordance with the Letters Patent issued to us on 20 February 2020 and Amendment to the Letters Patent issued on 23 July 2020, we have the honour to present to you the Report of the Royal Commission into National Natural Disaster Arrangements. We also return herewith the Letters Patent.

We recommend that this report be tabled and published in full.

We are also submitting this Report to their Excellencies the Governors of New South Wales, Victoria, Queensland, Western Australia, South Australia and Tasmania, and to the Chief Ministers of the Northern Territory and Australian Capital Territory.

Yours sincerely

Air Chief Marshal Mark Binskin AC (Retd)
Chair

The Hon Dr Annabelle Bennett AC SC
Commissioner

Professor Andrew Macintosh
Commissioner

Phone: 1800 909 826 | Email: rcnda.enquiries@royalcommission.gov.au | Locked Bag 2000, Manuka ACT 2603


To those who lost
their lives fighting
to save our

Foreword

Unprecedented is a word used all too often to describe natural disasters. In the case of the 2019-2020 bushfires, it was a description used by many.

The 2019-2020 bushfires were the catalyst for, although not the sole focus of, our inquiry. The fires started in Australia's hottest and driest year on record, with much of the country that burnt already impacted by drought. The Forest Fire Danger Index was the highest since national records began.

We heard harrowing personal accounts of devastation and loss. Over 24 million hectares were burnt. Many Australians were impacted, directly or indirectly, by the fires. Tragically, 33 people died and extensive smoke coverage across much of eastern Australia may have caused many more deaths. Over 3,000 homes were destroyed. Estimates of the national financial impacts are over $10 billion. Nearly three billion animals were killed or displaced and many threatened species and other ecological communities were extensively harmed.

Every state and territory suffered fire to some extent. The fires did not respect state borders or local government boundaries. On some days, extreme conditions drove a fire behaviour that was impossible to control.

Thousands of Australians – locals and holidaymakers – became trapped. Communities were isolated, experiencing extended periods without power, communications, and ready access to essential goods and services, or access to cash or EFTPOS to pay for their most basic needs.

Australia wide, there was significant community loss, devastation of wildlife and adverse health impacts. These losses were exacerbated by severe hailstorms, and floods in some areas that were just starting to recover from the fires. Then COVID-19 hit.

Recovery will take years.

We heard stories of bravery and camaraderie – and luck. It was a true 'campaign season'. The season commenced in July 2019 and was not declared over until 31 March 2020. The tremendous professionalism of Australia's firefighters and emergency services personnel, both career and volunteer, demonstrated true Australian spirit in responding to the bushfires. Likewise, local communities pulled together in relief and recovery efforts.

Our task – looking to the future

Although born out of the 2019-2020 bushfires, this Royal Commission did not focus solely on that natural disaster. We also looked at natural disasters more generally – that is, naturally occurring, rapid onset events that cause serious disruption to a community or region, such as floods, bushfires, earthquakes, storms, cyclones, storm surges, landslides and tsunami.

Our task was to consider national natural disaster coordination arrangements. It required us to look to the future. A future where such events will, regrettably, be more frequent and more severe. Consecutive and compounding natural disasters will place increasing stress on existing emergency management arrangements.

As the events of the 2019-2020 bushfire season show, what was unprecedented is now our future.

Although informed by the existing national arrangements, we took a deliberate decision not to find fault, 'point fingers' or attribute blame. Rather, we focused on what should be done to improve arrangements, with a view to ensuring that Australia's national natural disaster coordination arrangements are the best that they can be. Australia's alarming disaster outlook requires these improvements. This opportunity should not be lost.

Other inquiries conducted in parallel with our Royal Commission focused on jurisdiction-specific issues, and related to the actions of state and territory agencies and organisations during the 2019-2020 summer. Recommendations from these and other reviews are already being implemented. We welcome these actions.

Our report focuses on broader questions of national arrangements and responsibilities in relation to all phases of natural disasters – before, during and after. Our inquiry required us to consider whether these existing arrangements are as effective as they can be in a future of more frequent, more severe, compounding natural disasters.

Our method of inquiry

We received extensive evidence, from more than 270 witnesses, almost 80,000 pages of tendered documents and more than 1,750 public submissions. Our recommendations do not address every matter raised with us, but are instead intended to inform the development of a national approach that, if in place, will be capable of building our resilience, and better addressing future preparation for, response to, and recovery from, natural disasters.

We have taken a principled approach that entrusts the implementation of our recommendations to the respective stakeholders. This approach ensures those who are best placed to effect improvements can do so.

A clearer role for the Australian Government

As we note many times throughout our report, state and territory governments have primary responsibility – and accountability – for emergency management. We do not propose this should change.

Nevertheless, during the 2019-2020 bushfires, the Australian public expected greater Australian Government action. For that reason, our inquiry required us to consider the roles and responsibilities of all levels of governments in relation to natural disasters.

This aspect of our task raised the constitutional division of powers in the Australian federation in the context of natural disasters. This division of responsibility impacts upon the robustness of emergency management frameworks and systems, and the timeliness of assistance being sought from other jurisdictions, including the Australian Government. The Australian Government has at its disposal valuable capabilities and capacity, including those provided by the Australian Defence Force, to support the efforts of the states and territories in responding to, and recovering from, natural disasters.

We consider there is an important role for all levels of government in relation to managing natural disasters, including, significantly, national leadership from the Australian Government.

How do we best prepare for the future?

Achieving an effective national approach to natural disasters requires a clear, robust and accountable system capable of both providing a comprehensive understanding of, and responding to, the aggregated risks associated with mitigation, preparation for, response to and recovery from natural disasters.

Such a system must have unbroken linkages in place from the highest levels of government to individuals in the community; provide decision makers with timely, consistent and accurate information; be structured for decisions to be made at the most appropriate level; allow decision makers to understand and mitigate *all* risks so far as reasonably practicable; enable stakeholders to understand the residual risk and inform others so that they may take appropriate actions; and it must be resourced to fulfil these functions.

We were pleased that many stakeholders, including the Australian, state and territory governments, supported, at least in principle, improvements to national natural disaster arrangements. Of course, support is one thing – action is another. The national natural disaster arrangements Australians deserve require unity, not just of commitment or purpose, but of action. Only then can Australians have confidence that the arrangements are the best they can be. The time to act to improve arrangements is now.

Unprecedented is not a reason to be unprepared. We need to be prepared for the future.

I commend this report to all Australians. There are lessons for us all. Governments, essential service providers, insurers, charities, communities and individuals should consider what steps they must take across all phases of natural disasters to improve national natural disaster arrangements. It is undoubtedly in the national interest to do so.



Mark Binskin
Chair

28 October 2020

Table of contents

Foreword 5

Overview 19

List of recommendations 34

Chapter 1 Introduction 47

Chapter 2 Natural disaster risk 54

- Summary 55
- Australia is prone to natural hazards 56
  - The Australian experience 56
  - Natural hazards have already increased and intensified 57
  - Climate-driven natural hazards are expected to become more frequent and intense 59
- Outlooks for different natural hazards 62
  - Individual natural hazard outlooks 62
- When natural hazards become disasters 65
  - Disaster impacts are extensive, complex and long-term 67
- Australia's disaster outlook is alarming 68
  - Exposure 70
  - Vulnerability and resilience 70

Chapter 3 National coordination arrangements 73

- Summary 74
- Effective national coordination 75
- Existing arrangements for national coordination 76
  - National frameworks, strategies and plans 76
  - National policy forums 77
  - Australian Government crisis response committees 78
  - Australia's disaster management organisation 80
  - National recovery agencies 81
  - A national body for fire and emergency services 81
- The effectiveness of existing national arrangements 84
  - Beneficial growth to fill a void 84
  - Tensions between interests 88
  - AFAC's contribution to policy development 89
  - Authorised national response coordination arrangements 91
  - Accountability and transparency 92
- Clear, robust and accountable national arrangements 94

Australia's future challenge 94
Strategic leadership and advice 95
An enhanced national coordination mechanism 99

Chapter 4 Supporting better decisions 110

Summary 111
Informed decisions for natural disaster arrangements 112
Data and information to understand disaster risk 112
Nationally consistent and nationally comparable data 115
Pursuing consistent data: harmonisation versus standardisation 117
Moves toward better data and information are occurring 118
Improving climate, disaster risk and impact information 122
Climate science capabilities 122
Climate data for adaptation, risk assessments and scenario planning 124
Natural hazard risk information 126
Exposure information 128
Vulnerability information 129
Disaster impact assessments 130
Consistency of impact information 131
Platform for collecting and sharing information 133

Chapter 5 Declaration of national emergency 135

Summary 136
A challenging future 137
An enhanced Australian Government role 138
Existing arrangements 138
What would the declaration do? 140
Sources of constitutional power 143
Referral of power from states 143
Legislative power 144
Executive power 145
Proposed declaration model 146
Relevant considerations for the making of a declaration 146
Interaction with state and territory frameworks 149
State and territory declaration frameworks 149
Declarations in the 2019-2020 bushfire season 150
Potential interaction 151

Chapter 6 National emergency response capability 152

Summary 153
Planning for future demands on capability 154

Existing fire and emergency services capability 156
Capability development for the future 157
Resource sharing 158
Arrangements for resource sharing 159
A national register of personnel and equipment 161
National interoperability 164
Responding to natural disasters at the border 165
Interoperability of private firefighters and primary producers 166
Communication interoperability 167
Public Safety Mobile Broadband 170
National training standards 172
National-level exercises 177
Supporting the volunteer workforce 179

Chapter 7 Role of the Australian Defence Force 185

Summary 186
Defence's role in natural disasters 187
Public perceptions 187
ADF and Defence roles 187
Role of the ADF in the 2019-2020 bushfires 189
Call-out of the Reserves 190
Other assistance provided by Defence 192
Awareness of ADF role and capabilities 192
Importance of planning 193
Current processes for obtaining ADF assistance 194
Use of DACC process during 2019-2020 bushfires 196
Improvements to existing arrangements for obtaining ADF assistance 197
Legal basis for DACC 199
Financial considerations relevant to ADF assistance 200
Legal protections for ADF assistance 200
Call-out of the ADF Reserves 201

Chapter 8 National aerial firefighting capabilities and arrangements 203

Summary 204
Roles performed by aircraft 205
Aircraft used 205
Fixed-wing aircraft 206
Helicopters 209
Remotely Piloted Aircraft Systems 209
Effectiveness of aerial firefighting 210
Limitations 210

Benefits of aerial firefighting 210
Research into effectiveness of aerial firefighting 211
The National Aerial Firefighting Centre 212
Funding arrangements for aerial firefighting 212
Aircraft procurement 213
Development of an Australian aerial firefighting industry 214
Australian Defence Force 215
Tasking and deployment of aircraft 216
Pre-determined dispatch 217
Supporting systems 217
Sharing aircraft and aviation services between states and territories 218
Competition for aviation services 219
Overlapping fire seasons in the northern and southern hemispheres 219
Increasing length and intensity of bushfire seasons in Australia 220
Sourcing aircraft from overseas 220
Civil Aviation and Safety Authority 221
A sovereign aerial firefighting capability 222
Chapter 9 Essential services 225
Summary 226
The importance of essential services 227
The impact of natural disasters on essential services 227
The causes of outages during the 2019-2020 bushfires 229
Shared responsibilities 230
Supply chains risks 231
Availability of essential goods 232
Reliance on international supply chains for essential resources 233
Transport corridors 233
Critical infrastructure risks 236
Awareness of risks to critical infrastructure 236
How critical infrastructure risks are mitigated 239
Critical infrastructure coordination 240
Improving coordination between critical infrastructure operators 240
Improving coordination between government and critical infrastructure operators 242
Chapter 10 Community education 245
Summary 246
Learning to survive natural disasters 247

Chapter 11 Emergency planning 252
Summary 253
A collective, collaborative approach to natural disaster planning 253
Local government disaster management capabilities 257
Chapter 12 Evacuation planning and shelters 263
Summary 264
Planning for evacuations 265
Local involvement in planning 265
Seasonal populations 266
Evacuations and access routes 268
Essential service outages and compounding events 271
Inability to evacuate 272
Sheltering facilities 274
Improving sheltering terminology 274
Adequacy of evacuation centre facilities 277
Planning for evacuations across boundaries 281
Evacuation messaging and education 283
Chapter 13 Emergency information and warnings 284
Summary 285
The importance of emergency information and warnings 286
Roles in emergency information and warnings 287
Understanding your fire danger risk 289
The current Fire Danger Rating System 289
Progressing the Australian Fire Danger Rating System 291
The Bushfire Warning System 295
Problems with the Bushfire Warning System 296
The development of the Australian Warning System 296
The long road to consensus 297
Watch and Act 297
Sources of emergency information and warnings 299
The Emergency Alert System 299
Bushfire warning mobile applications 301
Is a national all-hazard app the solution? 304
The importance of having a radio 306
The Australian Broadcasting Corporation 307
Community radio stations 308
Media engagement with emergency management agencies 308

Chapter 14 Air quality 310
Summary 311
Natural disasters and poor air quality 312
Air quality information 314
Air quality monitoring 315
Air quality information systems 316
Near real-time reporting 319
Health advice related to air quality 319
Public health interventions 323
Expansion of air quality monitoring networks 325
Air quality forecasting 326
Knowledge gaps 327
Chapter 15 Health 330
Summary 331
Health and natural disasters 332
Australia's health system during natural disasters 332
National health arrangements and capabilities 333
Australian Medical Assistance Teams 336
Jurisdictional arrangements 340
Primary healthcare and access to healthcare during disasters 340
Primary healthcare providers and Primary Health Networks 340
Access to healthcare and medications 343
Mental health and natural disasters 345
Mental health effects of natural disasters 345
Delivery of mental health services 346
Health and environmental outcomes data 350
Chapter 16 Wildlife and heritage 352
Summary 353
Australia's wildlife and heritage 354
Government responsibilities for environmental protection 354
Environmental impacts from the 2019-2020 bushfires 354
Emergency response and recovery for the environment 355
Integration of non-government organisations in emergency response and recovery 357
Development of guidelines 360
Volunteer training 360
Data and information for wildlife management and species conservation 361
Gaps in data and information 362

Wildlife and species protection under national environmental law 363

Chapter 17 Public and private land management 365

Summary 366

Land management in Australia 367

Australia's land managers 367

Land management and natural hazards 368

Bushfires and land management 369

Bushfire hazard reduction measures 371

Effectiveness of fuel management 372

No single national fuel management strategy or technique 374

State and territory fuel management strategies 375

Fuel management on private land 379

Improving fuel data and information 383

Chapter 18 Indigenous land and fire management 386

Summary 387

Indigenous land management 388

The significance of local knowledge 388

Indigenous fire management 389

Mitigating the effects of bushfires 389

Recognition and support for Indigenous land and fire management 391

Engagement and sharing of knowledge from Indigenous land and fire managers 391

Initiatives supporting Indigenous-led land and fire management 395

Supporting community resilience 396

Chapter 19 Land-use planning and building regulation 398

Summary 399

How and where we build and the impact of natural hazards 400

Land-use planning influences exposure 400

Building regulations influence vulnerability 400

Existing risk to the built environment 401

Identifying natural hazard risk 402

Communicating natural hazard risk 404

Incentivising proportionate action to reduce risk 406

Future land-use planning decisions 410

The role of data in land-use planning 410

The effectiveness of building standards 411

Chapter 20 Insurance 415

Summary 416

The role of insurance in managing natural disasters 417
Maintaining adequate insurance coverage 418
Data, information and insurance pricing 420
Consumer understanding of insurance 421
Insurance taxes and insurance pricing 422
Previous and ongoing insurance inquiries 424
Guidance on debris clean-up 424

Chapter 21 Coordinating relief and recovery 426

Summary 427
Objectives and priorities of recovery 428
Recovery process 429
Locally-led recovery 430
Recovery roles 433
Capacity to undertake locally-led recovery 436
Recovery coordination and planning 436
Recovery coordination 436
Recovery planning 437
Recovery plans need to be clear and effectively implemented 437
Standing recovery plans allow for an understanding of capabilities 439
Non-government organisations and charities 439
Planning and coordination 439
Donated goods 440
Fundraising and distribution of donated funds 442
Regulation of charities and fundraising 443
Recovery volunteerism 446
Volunteer coordination 446
Volunteer capacities 448
National recovery management 448
Governance arrangements 448
National coordination groups 449
National frameworks 450
Recovery workforce and resource sharing 451
Recovery exercises and training 452
Exercises 452
Training 453

Chapter 22 Delivery of recovery services and financial assistance 454

Summary 455
Recovery support for disaster affected communities 456

Resilience and recovery 456
Recovery support 457
Financial assistance 458
Accessing financial assistance for recovery 461
Delivery of recovery assistance 463
Recovery centre model 463
Self-mobilised community responses 465
Information sharing in recovery 466
Privacy arrangements 466
Emergency declarations and consent 467
Improvements to sharing of personal information 468
Disaster Recovery Funding Arrangements 470
Funding under the DRFA 474
Thresholds and activation of the DRFA 474
Consistency in financial assistance measures 476
Pre-agreed recovery programs 478
Betterment and resilience 481
DRFA process and eligible expenditure 484
Interaction between recovery and insurance 486
Insurance for government assets 486

Chapter 23 National research and emerging technology 488

Summary 489
Driving the development of expertise and technology 490
Australia has a strong research base 490
National research capabilities 491
Practical application of research 496
National research and investment priorities 497

Chapter 24 Assurance and accountability 501

Summary 502
National accountability for disaster risk and emergency management 503
The importance of accountability 503
Accountability in strategies and frameworks for disaster risk, resilience and climate adaptation 505
Assurance, continuous improvement and best practice 509
The value of independent assurance bodies 509
A public record of national significance 513

Endnotes 519

Overview

The 2019-2020 disaster season

1. The 2019-2020 bushfires started in Australia's hottest and driest year on record. Much of the country was in drought, and the first bushfire started in the middle of winter. Over the following months, fires burnt across tens of millions of hectares of land, threatening and displacing hundreds of communities. Many thousands of volunteers and professional emergency responders worked tirelessly and made great sacrifices to save lives, homes and precious natural landscapes.

2. Thirty-three people died, including six Australian firefighters and three American aerial firefighters. Thousands of homes were destroyed or damaged. Smoke blanketed much of Australia, including capital cities, and contributed to hundreds of deaths. Nearly three billion animals were killed or displaced, and the fires harmed many threatened species and ecological communities. Overall, the fires caused billions of dollars of damage.

3. For many communities, the bushfires were not the only disaster they faced that summer. After the drought and the fires came storms and floods, and before the last fire was extinguished, Australia announced its first case of COVID-19. Australia's ability to coordinate nationally, learn and adapt, in the face of deep uncertainties and rising risks, had been tested.

4. We provide here an overview of our report. Our recommendations are listed up-front, but to be properly understood, they should be read in the context of the chapters in which they appear.

Our inquiry

5. Our inquiry was announced in February 2020. The terms of reference were broad and directed us to examine, among other things:

    - the responsibilities of, and coordination between, Australian, state, territory and local governments relating to natural disasters
    - Australia's arrangements for improving resilience and adapting to changing climatic conditions
    - what actions should be taken to mitigate the impacts of natural disasters, and
    - whether changes are needed to Australia's legal framework for the involvement of the Commonwealth in responding to national emergencies.

6. Our central task was to inquire into, and report on, *national* natural disaster arrangements – that is, arrangements involving all levels of government, the private and not-for-profit sectors, communities, families, and individuals. These arrangements concern all phases of disaster management: mitigation, preparedness, response, and recovery.

7. The expression ‘natural disaster’ is something of a misnomer, in part because some naturally-occurring hazards (such as fires and earthquakes) may only turn into a disaster because of what humans do and fail to do. The expression ‘natural disaster’, while common and used in this report, should not be taken to suggest that there is nothing we can do.

A clear role for governments

8. Few doubt that governments have a significant role in disaster mitigation, preparedness, response and recovery. Many of the measures that are needed to manage the risk of disasters are matters for government.

9. Governments also own and manage land, property and other assets, including state forests and national parks, government buildings, and some critical infrastructure. Governments must manage risks to these assets, just as businesses and individuals must manage risks to their own assets.

10. Individuals and communities play a role, but governments should educate people and provide accessible information to help them make informed decisions and take appropriate action. This is necessary because managing disaster risk is inherently complex.

States and territories have primary responsibility

11. In Australia, state and territory governments have primary responsibility for the protection of life, property and the environment, within their jurisdictions. With responsibility comes accountability.

12. State and territory governments are primarily responsible for disaster response, including for police, ambulance, and fire and emergency services. State and territory governments manage roads and most public land, including state forests and most national parks; provide or regulate essential services; regulate land-use, development, and building construction; and manage native vegetation and wildlife. State and territory governments also lead emergency relief and recovery efforts.

13. State and territory governments delegate some of their responsibilities to local governments. For example, local governments play a central role in land-use planning and the management of local roads, as well as the coordination of emergency centres and the provision of emergency relief. Ultimately, state and territory governments remain accountable, and should therefore ensure local governments have the support and resources they need to carry out their responsibilities.

14. There are compelling reasons for state and territory governments to continue to be responsible for disaster management. They have considerable experience, capacity and capability to manage natural disasters. Our witnesses did not call for the Australian Government to ‘take over’ this work. Many praised state and territory agencies, and the Australian Government acknowledged that it should ‘enhance and support, not supplant’ the capabilities of the states and territories.

15. While there is clearly scope and power under the Constitution for the Australian Government to play a complementary or supporting role, and a greater role than it has played in the past, disaster management is not a matter expressly assigned to the Commonwealth in the Australian Constitution.

Local knowledge and the principle of subsidiarity

16. Perhaps the strongest policy reason why state and territory governments should retain primary responsibility stems from the principle of subsidiarity. This principle suggests that risk should be managed by the lowest level of government that is capable of managing it, and emphasises the importance of local knowledge, which is vital to managing natural disasters.

17. Many policies and services should be 'tailored to meet the needs of people and communities they directly affect' and account for differences in climate, geography, ecosystems, demography, culture, and resources. While natural disasters on a national scale are likely to become more common, all disasters large and small require a local response.

18. The importance of local knowledge to disaster management, and particularly to disaster response, was emphasised by many people we heard from, including firefighters and the public. State, territory and local governments expressed strong support for the principle, and stressed the need for 'deep engagement' with affected communities. A locally-led response was described as 'one of the strengths of the disaster management system' and a 'foundational principle'.

19. We heard that recovery efforts after disasters must also be 'locally led' and alert to the particular needs of affected communities. Local governments are usually best placed to do this work, but they should be guided and supported by state and territory governments.

Indigenous land management

20. Indigenous land management is an example of how local knowledge has successfully informed land management, and it has done so for tens of thousands of years. Indigenous land management draws on a deep knowledge of Australia's landscapes. It is based on cultural understandings of Country, is tailored to specific places, and engages local people in development and implementation. Partly for these reasons, Indigenous land management differs widely across Australia.

21. There is a growing recognition of the value of Indigenous land and fire management practices as a way to mitigate the effects of bushfires and improve disaster resilience. Governments should continue to engage with Traditional Owners to explore the relationship between Indigenous land management and disaster resilience.

Disasters have changed

22. Natural disasters have changed, and it has become clear to us that the nation's disaster management arrangements must also change.

23. Extreme weather has already become more frequent and intense because of climate change; further global warming over the next 20 to 30 years is inevitable. Globally, temperatures will continue to rise, and Australia will have more hot days and fewer cool days. Sea levels are also projected to continue to rise. Tropical cyclones are projected to decrease in number, but increase in intensity. Floods and bushfires are expected to become more frequent and more intense. Catastrophic fire conditions may render traditional bushfire prediction models and firefighting techniques less effective.

Compounding disasters

24. Natural disasters are expected to become more complex, more unpredictable, and more difficult to manage. We are likely to see more compounding disasters on a national scale with far-reaching consequences. Compounding disasters may be caused by multiple disasters happening simultaneously, or one after another. Some may involve multiple hazards – fires, floods and storms. Some have cascading effects – threatening not only lives and homes, but also the nation's economy, critical infrastructure and essential services, such as our electricity, telecommunications and water supply, and our roads, railways and airports.

25. Australia needs to be better prepared for these natural disasters. They may not happen every year, but when they happen, they can be catastrophic. The summer of 2019-2020 – in which some communities experienced drought, heatwaves, bushfires, hailstorms, and flooding – provided only a glimpse of the types of events that Australia may face in the future.

We need to act on multiple fronts

26. To make Australia more resilient to natural disasters demands action on multiple fronts. We need to do much more than put out fires. A resilient nation will seek to mitigate the risk of disasters through a wide range of measures, and it will attend to all of the complex and sometimes long-term consequences.

27. The extent of damage and harm caused by natural disasters depends not only on the intensity of the hazard itself, but also on a range of other factors, such as where people choose to live, how they build their homes, how public and private land is managed, and how well people and communities are prepared, supported and cared for during and after disasters.

28. Government measures will be necessary across land-use planning, infrastructure, emergency management, social policy, agriculture, education, health, community development, energy and the environment.

29. A resilient nation will plan thoroughly for disasters, and seek to manage and mitigate all of the attendant risks. It will build the capacity of communities to prepare for, adapt to, and recover from disasters.

We need a national approach

30. We have concluded that Australia needs a national approach to natural disasters. This does not mean that the Australian Government should 'take over' from state and territory governments. Rather, it means that we need 'whole-of-nation', 'whole-of-government' and 'whole-of-society' cooperation and effort.

31. More will be required of all. Neither individuals nor any one level of government will be able to cope alone.

Shared responsibility

32. It has long been necessary, and is now widely recognised and accepted, that governments, businesses, communities and individuals each play a role in various aspects of natural disaster mitigation, preparedness, response and recovery. National cooperation is essential to make Australia resilient to natural disasters.

More cooperation and coordination

33. A national approach calls for greater cooperation and coordination across governments and agencies; a greater sharing of resources across jurisdictions; an agile emergency response and recovery capability, with skills and technology that can be used across the country; and the data, systems and research to help us manage and mitigate disaster risk, efficiently and effectively. These and other national measures are outlined below, and explored more fully throughout the report.

34. Action and cooperation will increasingly be required across all levels of government. The community expects governments to work together to build our social and economic resilience. A 'pluralism of governmental actors, with complementary capabilities' has been called a 'defining feature of Australian democracy'.

35. A number of our recommendations reflect the importance of effective cooperation across multiple levels of government, supported by timely, informed and effective intergovernmental decision-making.

Accountability and assurance mechanisms

36. Two Australian states have dedicated institutional arrangements to promote a culture of continuous improvement within the emergency management sector and to monitor whether recommendations of past inquiries have been implemented. Other states and territories should introduce similar arrangements, and the Australian Government should also have robust accountability and assurance mechanisms to support the national effort.

A greater role for the Australian Government

37. A national approach to natural disasters calls for the Australian Government to play a greater role than it currently plays. Generally, the Australian Government should complement, enhance and support the role of the states and territories. It should continue to be focused primarily on areas in which national consistency, coordination

and cooperation across jurisdictions would help the states and territories to manage natural disasters more effectively.

38. However, as discussed further below, the Australian Government also has capabilities and capacities not available to the states and territories. It can play a greater role in assisting the states and territories to respond to and recover from natural disasters on a national scale – for which a declaration of a state of national emergency, assistance from the Australian Defence Force, and other national measures and resources, may be necessary.

39. For example, the Australian Government can provide logistical support, help transport personnel and equipment during and after disasters, assist in large-scale evacuations, and provide food, water and medical assistance to emergency responders and communities.

40. National disaster plans set out how and when state and territory governments can request assistance from the Australian Government and the Australian Defence Force. However, the thresholds for requesting assistance under these plans are unclear, and precisely how the Australian Defence Force can help is not always well understood. This has caused unnecessary delay and confusion.

41. The thresholds should be clarified and the Australian Defence Force should be more involved when state and territory governments plan and prepare for natural disasters.

Declaration of national emergency

42. For some disasters, the assistance of the Australian Government will be particularly necessary and pressing. We have concluded that the Australian Government has the power to, and should, play a greater role in relation to natural disasters on a national scale. For such disasters, the Australian Government should be able to declare a state of national emergency.

43. The declaration should be made by the Prime Minister, and legislation should be clear about the circumstances in which a declaration may be made, and the actions that the Australian Government can then take to support state and territory governments.

44. A declaration would provide an important formal signal to communities and individuals about the severity of a disaster, and signal to Australian Government agencies, including the Australian Defence Force, that they need to be on high-alert, ready to help the states and territories in their response and recovery efforts.

45. A declaration should be the catalyst for a more ‘coherent, pre-emptive and expeditious’ mobilisation of Australian Government resources. It should not purport to give the Australian Government the power to determine how the resources of states and territories are to be used or allocated, without their consent.

46. In most cases, a state or territory government will have requested assistance when needed. However, in some limited circumstances, the Australian Government should be able to take action in response to a natural disaster, whether or not a state has requested assistance. A higher threshold should be required to be met before the Australian Government can take such unilateral action.

We need strategic leadership directed at resilience

47. Making the nation more resilient to natural disasters calls for 'strategic imagination' and 'big country thinking' – a national response and national strategic leadership.

48. The Australian Government should lead in the development and coordination of long-term, national strategic policy directed at making Australia resilient to natural disasters. It is uniquely placed to see the national picture, the national risks, and the impacts on all Australians. However, like all governments, it should also increase its capacity to address the complex and long-term strategic problems in disaster risk management and resilience.

Senior ministerial leadership across the nation

49. National strategic decision-making about disaster management calls for the attention of the Prime Minister and state and territory Premiers and Chief Ministers – perhaps through a forum such as the National Cabinet.

50. We consider that the authority of the Prime Minister, Premiers and Chief Ministers is critical for high-level strategic decision-making concerning disasters that have national implications. Certain strategic decisions concerning national natural disasters should be made by the nation's most senior ministers – by those clearly accountable to the Australian public.

51. Australian, state and territory governments should also establish a senior ministerial forum, supporting National Cabinet, to make strategic decisions about national natural disaster arrangements. This forum should consider both long-term strategic policy matters directed at making Australia more resilient, and shorter-term strategic matters concerning specific national disasters, like the 2019-2020 bushfires.

52. These ministerial forums should not, of course, be responsible for the day-to-day operational and tactical decisions about how to respond to disasters. However, they may at times need to make strategic decisions about, for example, how finite resources might be best shared across jurisdictions; how to communicate with the public about a disaster; and how and when financial assistance should be provided.

An advisory body

53. These ministerial forums should be supported and informed by an authoritative advisory body of senior officials from Australian, state and territory governments. The advisory body would draw on advice from across government agencies, industry, experts and practitioners.

54. This should be a standing advisory body that helps develop strategic advice across all phases of disaster management. It should not be limited to operating in times of crisis or disaster. A new advisory body would take a holistic approach to all disasters and disaster risk. In response to a particular disaster, it would draw on additional, specialist expertise.

A standing national resilience and recovery entity

Resilience

55. As emphasised above, there needs to be a fundamental shift in strategic thinking about national natural disaster management. If there were one word that encapsulates this shift, it would be 'resilience'.

56. To think broadly about how to make the nation more resilient to natural disasters is to think about all of the different hazards we might face, all of the complex consequences of natural disasters, and all of the interrelated policy measures necessary to mitigate, prepare for, respond to, and recover from disasters. A narrow focus on response and recovery will leave Australia vulnerable.

57. A national entity dedicated to championing resilience across the nation should be established. Its remit should be to think broadly about all of the measures necessary to make the country resilient to natural disasters, and plan and respond accordingly. It should focus on reducing long-term disaster risk and harmonising approaches across Australia. It should be accountable to ministers and, in turn, the Australian public.

58. The work of this Australian Government body will involve long-term thinking, planning and cooperation across multiple government departments and agencies at all levels of government, including local government, and extensive engagement with the private sector, non-government organisations and Australian communities. No one government or organisation controls all the levers that can be used to reduce the risk of natural disasters.

Recovery

59. This national resilience entity should also be responsible for the Australian Government's disaster recovery work. Disaster recovery is a core part of resilience, particularly when it aims to 'build back better' – that is, recover in a way that makes the nation better prepared to withstand the next disaster. Indeed, the remit of the recently established National Bushfire Recovery Agency could well be expanded to encompass resilience.

60. The National Bushfire Recovery Agency provides a compelling illustration of the value of national coordination, and of the positive effects of bringing together stakeholders across jurisdictions, sectors and different levels of government. It should continue its work on disaster recovery arrangements, particularly to make recovery more responsive to local needs.

61. Rapidly establishing new recovery agencies after a disaster can cause confusion and uncertainty. A *standing* resilience and recovery body that can scale-up to meet the needs of a future disaster would allow for institutional knowledge and relationships to develop and mature. It would also allow it to plan for national recovery efforts well in advance of a disaster.

A standing national emergency management entity

62. The Australian Government should also expand its national preparedness and response functions, particularly as they relate to inter-jurisdictional cooperation, coordination and resource sharing.

63. We see a greater role for Emergency Management Australia in this work. Emergency Management Australia has been central to coordinating the Australian Government's activities during crises. It is responsible for providing situational awareness to the Australian Government and facilitating Australian Government assistance to state and territory governments. It should continue to perform these important functions, and also lead on national disaster preparedness and response initiatives.

64. Current resource sharing relies too much on 'goodwill'. Those making decisions about how people and resources might be shared between jurisdictions need to be accountable for those decisions. Emergency Management Australia's role should be expanded to facilitate the sharing of finite national resources. Some of this work is currently performed by the National Resource Sharing Centre, but would be more appropriate for government. State and territory governments should of course retain control over their own resources.

65. Emergency Management Australia should also be responsible for coordinating the procurement of aerial firefighting services, a function currently performed by the National Aerial Firefighting Centre, to supplement the services owned and managed directly by state and territory governments.

Sharing people and resources

66. Efforts to make Australia more resilient to natural disasters are likely to become increasingly costly, and therefore will call for more resources and a more effective and efficient use of resources. The Australian Government can find nationwide efficiencies and economies of scale through, for example, facilitating greater cooperation and the sharing of resources within and between states and territories.

67. There is little doubt that sharing people and resources across state borders is now critical to responding to national disasters. Each state and territory could, in theory, try to be self-sufficient, and resource their fire and emergency service agencies to meet peak demand in the worst disaster seasons. But a national approach to disaster management would use national emergency resources more effectively and efficiently across the nation.

Technology that works together

68. Differences across jurisdictions in equipment, technology, training, processes and protocols all make it more difficult for people to help to respond to disasters outside their home state. During the 2019-2020 bushfires, some fire and emergency responders working interstate struggled to communicate with other responders. Some even faced these difficulties when working within their own state or territory.

69. Fire and emergency services have for some time worked to make systems more interoperable, but challenges remain. Communications technology, for example, is

different in many states. While it is costly and takes time, making emergency response technologies work seamlessly across jurisdictions is an essential part of an effective national response to disasters. This work should be expedited, as should the delivery of a Public Safety Mobile Broadband capability, which will enable first responders to make better use of internet-based technologies and applications to access images, location tracking and other data.

Training, accreditation and joint exercises

70. A level of national consistency in training and competency standards also aids resource sharing, enabling someone trained in one state or territory to work effectively in another. There has been substantial progress towards this end, but there is further work to be done.

71. There should be a national register of personnel and equipment, which could be supported by a personnel accreditation scheme. These initiatives will enable available resources to be easily identified and deployed.

72. National-level exercises for natural disasters, including disasters that cross state borders, are also critical.

Sharing firefighting aircraft

73. Aircraft have unique capabilities that can be employed in response to natural disasters. They can deploy quickly and over great distances to gain situational awareness, access remote communities to deliver essential supplies or conduct evacuations, and transport emergency and recovery teams to remote areas.

74. The high demand for aircraft in the 2019-2020 bushfire season is unlikely to be rare. Longer and more severe fire seasons in the northern and southern hemispheres, and indeed within Australia, will make it increasingly difficult to access aviation services when we need them, particularly at short notice.

75. Australian, state and territory governments should develop a modest, Australian-based and registered, national aerial firefighting capability comprising more specialised platforms, to be tasked according to the greatest national need. This would supplement the aerial firefighting capability of the states and territories.

A national picture needs national data

76. There are significant inconsistencies across the nation in much of the information and data that governments and others need to make informed decisions about managing natural disaster risk. As discussed further below, there are confusing and unnecessary inconsistencies in some of the information provided to the public. Greater consistency in emergency warnings and air quality information, for example, is clearly necessary.

77. Inconsistent data also hamper the efforts of governments and other organisations to manage disaster risk. For example, there are fundamental differences in how information about the impact of past disasters, and about exposure and vulnerability to future hazards, is collected, stored and shared. To make Australia more resilient to *national* natural disasters requires a much clearer picture of where the nation stands as

a whole. This will also create efficiencies, improve situational awareness, and help evaluate our collective efforts to manage disaster risk.

78. The Australian Government should play a national leadership role in coordinating national data, information and standard setting. Having national standards and policy is not inconsistent with the principle of subsidiarity, provided that they are not overly prescriptive, and allow each jurisdiction to tailor appropriate matters to local conditions and circumstances.

79. However, this work should not be left to the Australian Government alone. All governments should prioritise the harmonisation of data governance, the creation of national data standards, and the sharing of common technologies. This will enable greater collaboration and build our nation's collective knowledge of climate and disaster risks.

80. For example, Australian, state and territory governments should agree to develop consistent and compatible methods and metrics to measure the health effects of disasters, including on mental health. They should also work together to collect and manage information about wildlife more consistently.

Individuals preparing for disasters and managing risk

81. It is widely recognised that individuals need to prepare for and manage the risk of natural disasters, to the extent that they are able to do so. They need to take steps to mitigate the risks they face and know what to do when disaster strikes. Individuals, like governments, need to consider disaster risk holistically and take action on multiple fronts. While individuals will have varying abilities to manage risk for themselves, and varying vulnerabilities, there are a number of things that most people can do.

82. Of course, many Australians already prepare for disasters and take steps to protect themselves, their families and their communities.

Some of the steps

83. This report is not a guide to the practical steps that people should take. However, the evidence we heard, and other reports, suggest that individuals should, among many other things, understand the environment in which they live; buy adequate home and contents insurance; know when and how to evacuate, and when it might be safe to 'stay and defend'; and understand emergency warnings and what to do in response. They should also consider carefully where to live and how they should build their homes, in light of the risk of natural disasters.

Danger of complacency

84. Complacency is always a danger. It tends to set in as memories of past disasters fade. Disaster planning is not a 'set and forget' exercise, nor should it only be considered immediately after a disaster, when the risks and dangers are fresh in people's minds. All Australians, and particularly those living in high-risk areas (a growing population), may well need to make disaster planning and preparation a part of their lives.

85. Some Australians may not appreciate the extent of the risk they face, the self-reliance they need, or the range of things that may be necessary to cope with natural disasters. Some have only recently moved to a high-risk area. As temperatures rise and landscapes change, others may find that the risk has moved to them. We heard that some Australians do not have the experience, knowledge and community ties necessary to manage disaster risk effectively.

In some disasters, it is impossible to protect everyone

86. It can be dangerous for people to assume that others will always be there to help during a natural disaster. Even the best prepared and resourced governments and fire and emergency services cannot entirely protect the public from the impact of natural disasters. Some bushfires, for example, will be too widespread; some Australians will live too remotely; and there are only so many firefighters, aircraft and trucks that can be deployed at the same time. Furthermore, governments and charities by no means cover the cost of rebuilding uninsured homes and replacing other property lost in natural disasters.

Practical and economic reasons for individuals to manage disaster risk

87. There are also practical and economic reasons for individuals to take some personal responsibility for their own risk exposure. They are best placed to make many decisions about how to manage risks to their own homes, health and wellbeing. They also have the legal authority to make many of these decisions, and the incentive to choose the options that most closely align with their 'risk appetite'.

Many things are outside the control of individuals

88. A person's exposure to natural disasters is not, however, entirely a matter of choice, but rather is affected by many factors outside their control. While responsibility for resilience and disaster risk management is shared between governments, individuals and others, it is often not shared equally. Individuals simply do not control many of the levers needed to reduce their exposure and vulnerability to natural disasters.

89. For example, while for many Australians, living in the bush or other high-risk areas might be a 'lifestyle choice', for others, the choice is not entirely free. Many people must live near where they work; farmers are an obvious example. Children who live with their parents may be exposed to the risks their parents assume. And some people will find that the risk of a natural disaster where they live has grown.

90. There are other differences in people's ability to mitigate the risks they face from disasters, aside from where they live. For example, some are better able to build or modify their homes to withstand disasters, or to afford adequate home insurance, or medical care. Some are better able to clear fuel from around their homes, to protect themselves during a disaster, and to recover afterwards.

91. The decisions people make concerning where they live and how they manage risk are also affected by government decisions and laws. An individual's decision about where to live, for example, is informed by how governments zone land; their decisions about how to build their homes are informed by government building codes; and the extent to

which they can clear fuel and manage their land is constrained by government regulations.

Supporting individuals to make good decisions

92. Governments have a vital role in educating communities and providing people with the information they need to make sound and informed decisions about how to manage the risks they face from natural disasters.

Community education

93. Community education about how to prepare for disasters is clearly an ongoing and pressing need. It has been recognised and emphasised in many inquiries, and its importance is similarly stressed in this report. State and territory governments should continue to deliver, evaluate and improve education and engagement programs aimed at promoting disaster resilience for individuals and communities.

94. We also heard of the need for community education about how Australians can best help others affected by natural disasters. The generosity of the Australian people after a disaster is heart-warming and no doubt greatly appreciated, but unfortunately, some donated goods are not really needed, and many are difficult to transport and store. Communities affected by disasters will often be better assisted by cash donations.

95. Other examples of the need for community education are highlighted in this report – including education about emergency warnings.

Inconsistencies in warnings, danger ratings, and other information

96. Throughout our inquiry we heard about the many ways in which governments can provide people with better information about how to manage disaster risk. Preparing for disasters and managing risk is complex, and should not be made more difficult by confusing, inconsistent or inadequate information from government agencies, or by slow and bureaucratic processes.

97. Inconsistency across jurisdictions is one notable obstacle that many individuals face. For example, there are inconsistencies across jurisdictions in bushfire warnings, fire danger ratings, and the names and functions of various types of evacuation centres and shelters. We have recommended national consistency for all of these. Past efforts to this end have been disappointingly slow.

98. For some people, consistency across jurisdictions might not seem important, but many Australians travel interstate or live close to state borders. Others pay close attention to how loved ones in other parts of the country are faring, particularly during disasters. For these people, inconsistencies across jurisdictions can be confusing, upsetting, and sometimes even dangerous.

Unnecessary complexity

99. The information provided to individuals is also sometimes unnecessarily complex. For example, we heard that the emergency warning ‘Watch and Act’, and the fire danger ratings system, are confusing to many people. Work to improve these should be expedited.

100. For those recovering from a natural disaster – perhaps claiming insurance, applying for support from governments and charities, rebuilding their homes, and attending to health and mental health concerns – we heard that navigating the recovery support system can be complex and exhausting. These processes should be designed with closer attention to the needs of these people.

101. Having to tell one's story multiple times to different recovery assistance providers may increase the trauma. Providers should be able to share people's personal information more easily for recovery purposes, when appropriate.

102. Insurance is another cause of confusion. We heard that some people do not understand what their insurance policies cover (with the cost of clearing debris after a disaster a common point of confusion), or what they might be able to do to their homes and properties to reduce their insurance premiums. The insurance industry should produce clear guidance for consumers about what they can do to mitigate the risk of natural hazards to their homes. These mitigation actions should be reflected in lower insurance premiums.

Unclear information about land management

103. Some information is also simply not available to the public, not available in sufficient detail, or difficult to access. For example, clear information about government fuel load management strategies can be difficult to obtain. This undermines public confidence and affects the broader public debate about this polarising topic. Information about fuel loads and fuel load management should be more accessible. State and territory governments should clearly communicate their fuel load management strategies to the public, report on the outcomes of those strategies, and educate the public about fuel and fuel management.

104. Australian, state and territory governments should also review their legislation and processes relating to vegetation management, bushfire mitigation and hazard reduction, to ensure that there is clarity about how and when land managers can undertake bushfire hazard reduction activities.

In the dark about risk exposure

105. Clear risk information can help people make better-informed decisions about, for example, where to buy and live, how to design and build homes, and how to manage land. Governments should develop ways in which natural hazard risk information can be better communicated to the public – particularly to people who are making decisions that will affect their exposure to those risks. For example, those selling a home might be required to disclose this type of information to prospective purchasers.

Whole-of-nation effort required

106. 'Whole-of-nation' effort and cooperation is necessary to make Australia more resilient to natural disasters. This calls for action, not only by governments and individuals, but also by industry, businesses, charities, volunteers, the media, community groups and others.

107. Emergency planning should involve a wider range of stakeholders, such as primary healthcare providers, wildlife organisations and infrastructure operators.

108. Recognising the vital role of the media, particularly in communicating disaster warnings and other information to the public, state and territory governments should explore how to improve the engagement between emergency managers and media representatives before, during and after natural disasters, and ensure that timely warnings and public information are provided to appropriate media.

109. Recovery planning would be similarly assisted by broader cooperation and consultation. For example, the non-government sector should be better incorporated in recovery planning processes – at the local, regional, jurisdictional and national levels.

110. Charities play a crucial role in disaster recovery efforts, but their value is sometimes not fully understood. While larger non-government organisations and charities are generally included in recovery arrangements and planning, many smaller organisations and charities are not. We recommend that there be regular and ongoing national forums for charities, non-government organisations and volunteer groups with a role in natural disaster recovery.

Our recommendations

111. Many of our recommendations identify *what* needs to be done, rather than *how* it should be done. This provides flexibility to governments in implementing recommendations to take into account jurisdictional and local needs. It does not, however, diminish the importance of implementation.

112. Australia has a history of more than 240 inquiries about natural disasters. Many of these inquiries would have been time consuming and costly, and great care and consideration was no doubt invested in them. While many recommendations have been faithfully implemented and have led to significant improvements, others have not.

113. Our recommendations should be implemented, some as a matter of urgency. Several will take time to achieve the intended outcome, but meaningful steps should be taken now towards timely implementation. Each recommendation would improve our national natural disaster arrangements, but taken as a whole, they will have greatest effect.

114. Implementing our recommendations calls for a cohesive and unified national effort. National natural disaster arrangements are a shared responsibility. Failure by governments to act on our recommendations will shift risk to others.

115. It is plain to us that the shortcomings that we have identified must be addressed. Progress on implementing our recommendations should be monitored and communicated nationally. If a recommendation is not accepted, reasons should be given, so that others know that they may need to act. Governments need to commit to action and cooperate, and hold each other to account. They should not prevaricate.

116. Australians need confidence in our national natural disaster arrangements. Implementing our recommendations will help to deliver this and make Australia safer. Australians expect no less.

List of recommendations

Chapter 3 National coordination arrangements 73

Recommendation 3.1 Forum for ministers 99

Australian, state and territory governments should restructure and reinvigorate ministerial forums with a view to enabling timely and informed strategic decision-making in respect of:

(1) long-term policy improvement in relation to natural disasters

(2) national preparations for, and adaptation to, natural disasters, and

(3) response to, and recovery from, natural disasters of national scale or consequence

including, where appropriate, through the National Cabinet or equivalent intergovernmental leaders' body.

Recommendation 3.2 Establishment of an authoritative disaster advisory body 99

Australian, state and territory governments should establish an authoritative advisory body to consolidate advice on strategic policy and relevant operational considerations for ministers in relation to natural disasters.

Recommendation 3.3 Revise COMDISPLAN 105

The Australian Government should revise the COMDISPLAN thresholds to provide that a request for Australian Government assistance, including Defence assistance, is able to be made by a state or territory government when:

(1) it has exhausted, or is 'likely to exhaust', all government, community and commercial resources

(2) it cannot mobilise its own resources (or community and commercial resources) in time, or

(3) the Australian Government has a capability that the state or territory does not have.

Recommendation 3.4 Integrating disaster management of the Australian Government 108

Australian Government agencies should work together across all phases of disaster management.

Recommendation 3.5 Establishing a standing resilience and recovery entity 109

The Australian Government should establish a standing entity that will enhance national natural disaster resilience and recovery, focused on long-term disaster risk reduction.

Recommendation 3.6 Enhanced national preparedness and response entity 109

The Australian Government should enhance national preparedness for, and response to, natural disasters, building on the responsibilities of Emergency

Management Australia, to include facilitating resource sharing decisions of governments and stress testing national disaster plans.

Chapter 4 Supporting better decisions 110

Recommendation 4.1 National disaster risk information 121

Australian, state and territory governments should prioritise the implementation of harmonised data governance and national data standards.

Recommendation 4.2 Common information platforms and shared technologies 121

Australian, state and territory governments should create common information platforms and share technologies to enable collaboration in the production, analysis, access, and exchange of information, data and knowledge about climate and disaster risks.

Recommendation 4.3 Implementation of the National Disaster Risk Information Services Capability 121

Australian, state and territory governments should support the implementation of the National Disaster Risk Information Services Capability and aligned climate adaptation initiatives.

Recommendation 4.4 Features of the National Disaster Risk Information Services Capability 121

The National Disaster Risk Information Services Capability should include tools and systems to support operational and strategic decision making, including integrated climate and disaster risk scenarios tailored to various needs of relevant industry sectors and end users.

Recommendation 4.5 National climate projections 126

Australian, state and territory governments should produce downscaled climate projections:

(1) to inform the assessment of future natural disaster risk by relevant decision makers, including state and territory government agencies with planning and emergency management responsibilities

(2) underpinned by an agreed common core set of climate trajectories and timelines, and

(3) subject to regular review.

Recommendation 4.6 Consistent impact data standards 134

Australian, state and territory governments should work together to develop consistent data standards to measure disaster impact.

Recommendation 4.7 Collection and sharing of impact data 134

Australian, state and territory governments should continue to develop a greater capacity to collect and share standardised and comprehensive natural disaster impact data.

Chapter 5 Declaration of national emergency 135

Recommendation 5.1 Make provision for a declaration of a state of emergency 149

The Australian Government should make provision, in legislation, for a declaration of a state of national emergency. The declaration should include the following components:

(1) the ability for the Australian Government to make a public declaration to communicate the seriousness of a natural disaster

(2) processes to mobilise and activate Australian Government agencies quickly to support states and territories to respond to and recover from a natural disaster, and

(3) the power to take action without a state or territory request for assistance in clearly defined and limited circumstances.

Chapter 6 National emergency response capability 152

Recommendation 6.1 Assessment of the capacity and capability of fire and emergency services in light of current and future natural disaster risk 158

State and territory governments should have a structured process to regularly assess the capacity and capability requirements of fire and emergency services, in light of both current and future natural disaster risk.

Recommendation 6.2 A national register of fire and emergency services personnel and equipment 164

Australian, state and territory governments should establish a national register of fire and emergency services personnel, equipment and aerial assets.

Recommendation 6.3 Interoperable communications for fire and emergency services across jurisdictions 170

State and territory governments should update and implement the National Framework to Improve Government Radio Communications Interoperability, or otherwise agree a new strategy, to achieve interoperable communications across jurisdictions.

Recommendation 6.4 Delivery of a Public Safety Mobile Broadband capability 172

Australian, state and territory governments should expedite the delivery of a Public Safety Mobile Broadband capability.

Recommendation 6.5 Multi-agency national-level exercises 178

Australian, state and territory governments should conduct multi-agency, national-level exercises, not limited to cross-border jurisdictions. These exercises should, at a minimum:

(1) assess national capacity, inform capability development and coordination in response to, and recovery from, natural disasters, and

(2) use scenarios that stress current capabilities.

Recommendation 6.6 Employment protections for fire and emergency services volunteers **184**

The Australian Government should consider whether employment protections under the *Fair Work Act 2009* (Cth) are sufficient to ensure that fire and emergency services volunteers will not be discriminated against, disadvantaged or dismissed for reasons associated with their volunteer service during natural disasters.

Chapter 7 Role of the Australian Defence Force 185

Recommendation 7.1 Improve understanding of Australian Defence Force capabilities **194**

State and territory governments should take steps to ensure that there is better interaction, planning and ongoing understanding of Australian Defence Force capabilities and processes by state and territory fire and emergency service agencies and local governments.

Recommendation 7.2 Review of Defence Assistance to the Civil Community manual **199**

The Australian Government should review the content of the Defence Assistance to the Civil Community manual to ensure consistency of language and application with a revised COMDISPLAN.

Recommendation 7.3 Legal protections for Australian Defence Force members **201**

The Australian Government should afford appropriate legal protections from civil and criminal liability to Australian Defence Force members when conducting activities under an authorisation to prepare for, respond to and recover from natural disasters.

Chapter 8 National aerial firefighting capabilities and arrangements 203

Recommendation 8.1 A sovereign aerial firefighting capability **223**

Australian, state and territory governments should develop an Australian-based and registered national aerial firefighting capability, to be tasked according to greatest national need. This capability should include:

(1) a modest, very large air tanker/large air tanker, and Type-1 helicopter capability, including supporting infrastructure, aircrew and aviation support personnel, and

(2) any other aerial firefighting capabilities (eg Light Detection and Ranging (LiDAR), line-scanning, transport, and logistics) that would benefit from a nationally coordinated approach.

Recommendation 8.2 Research and evaluation into aerial firefighting **223**

Australian, state and territory governments should support ongoing research and evaluation into aerial firefighting. This research and evaluation should include:

(1) assessing the specific capability needs of states and territories, and

(2) exploring the most effective aerial firefighting strategies.

Recommendation 8.3 Developing the aerial firefighting industry's capability 224

Australian, state and territory governments should adopt procurement and contracting strategies that support and develop a broader Australian-based sovereign aerial firefighting industry.

Chapter 9 Essential services 225

Recommendation 9.1 Supply chains – government review 233

Australian, state and territory governments, in consultation with local governments and the private sector, should review supply chain risks, and consider options to ensure supply of essential goods in times of natural disasters.

Recommendation 9.2 Comprehensive information 236

State and territory governments should include road closure and opening information on all roads within their borders on public apps.

Recommendation 9.3 Provision of information 236

State and territory governments should provide information to the public on the closure and opening of roads. Information should be provided in real-time, or in advance based on predictions, where possible.

Recommendation 9.4 Collective awareness and mitigation of risks to critical infrastructure 240

The Australian Government, working with state and territory governments and critical infrastructure operators, should lead a process to:

(1) identify critical infrastructure

(2) assess key risks to identified critical infrastructure from natural disasters of national scale or consequence

(3) identify steps needed to mitigate these risks

(4) identify steps to make the critical infrastructure more resilient, and

(5) track achievement against an agreed plan.

Recommendation 9.5 Improving coordination arrangements between critical infrastructure sectors and with government 244

The Australian Government should work with state and territory governments and critical infrastructure operators to improve information flows during and in response to natural disasters:

(1) between critical infrastructure operators, and

(2) between critical infrastructure operators and government.

Chapter 10 Community education 245

Recommendation 10.1 Disaster education for individuals and communities 251

State and territory governments should continue to deliver, evaluate and improve education and engagement programs aimed at promoting disaster resilience for individuals and communities.

Chapter 11 Emergency planning 252

Recommendation 11.1 Responsibility for local government disaster management capability and capacity 262

State and territory governments should take responsibility for the capability and capacity of local governments to which they have delegated their responsibilities in preparing for, responding to, and recovering from natural disasters, to ensure local governments are able to effectively discharge the responsibilities devolved to them.

Recommendation 11.2 Resource sharing arrangements between local governments 262

State and territory governments should review their arrangements for sharing resources between their local governments during natural disasters, including whether those arrangements:

(1) provide sufficient surge capacity, and

(2) take into account all the risks that the state or territory may face during a natural disaster.

Chapter 12 Evacuation planning and shelters 263

Recommendation 12.1 Roadside vegetation management 271

State and territory governments, working with local governments and fire and emergency service agencies, should ensure that there are appropriate arrangements for roadside vegetation management that take into account, among other things:

(1) priority access and egress routes

(2) road priority, utility and strategic value

(3) cost, and

(4) residual risk to national natural disasters.

Recommendation 12.2 Evacuation planning – Evacuation routes and seasonal populations 272

State and territory governments should ensure that those responsible for evacuation planning periodically review those plans, and update them where appropriate, including in relation to:

(1) roles and responsibilities of state and territory governments, local governments and local communities

(2) education and signage about evacuations and evacuation routes, including education of seasonal populations

(3) the adequacy of evacuation routes; including contingencies if evacuation routes or centres are assessed as not being able to cope, and

(4) the potential inability to evacuate, either by reason of circumstances or personal characteristics.

Recommendation 12.3 Evacuation planning – Essential services and supplies 272

State and territory governments should ensure that those responsible for evacuation planning periodically review those plans, and update them where appropriate, including in relation to:

(1) key risks that essential service outages have on communities during a severe or catastrophic natural disaster (particularly communications and power)

(2) availability of essential supplies, including food and water, and

(3) consequence management and compounding events such as the loss of essential services or health impacts.

Recommendation 12.4 Sheltering terminology should be made nationally consistent 277

State and territory governments should, as a priority, adopt nationally consistent terminology and functions for the different sheltering facilities, including evacuation centres, Neighbourhood Safer Places, places of last resort and natural disaster shelters.

Recommendation 12.5 National community education 277

State and territory governments should provide further community education on the function and limitations of different sheltering facilities, including evacuation centres, Neighbourhood Safer Places, places of last resort and natural disaster shelters. This education should be nationally consistent.

Recommendation 12.6 Evacuation planning – Evacuation centres 281

State and territory governments should ensure those responsible for evacuation planning periodically review these plans, and update them where appropriate, to account for the existence and standard of any evacuation centres and safer places (however described) in the community, including:

(1) the capacity of a centre to handle seasonal population variation

(2) the suitability of facilities to cater for diverse groups, including vulnerable people, and those evacuating with animals, and

(3) the existence of communications facilities and alternate power sources.

Recommendation 12.7 Evacuation planning – Planning for evacuations across boundaries 283

State and territory governments should ensure those responsible for evacuation planning periodically review those plans, and update where appropriate, to provide for coordination between states and territories in cross-border areas and to provide cross-border access to evacuation centres.

Chapter 13 Emergency information and warnings 284

Recommendation 13.1 Development and implementation of the Australian Fire Danger Rating System 294

State and territory governments should expedite the development and implementation of the Australian Fire Danger Rating System. It should ensure that

there is national consistency in the visual display of the AFDRS and action to be taken in response to each rating.

Recommendation 13.2 Education on the Australian Fire Danger Rating System **295**

State and territory governments should deliver education to ensure that the public understands the new Australian Fire Danger Rating System ratings, the potential danger attached to each rating, and the action that should be taken in response to each rating.

Recommendation 13.3 The Australian Warning System **299**

State and territory governments should urgently deliver and implement the all-hazard Australian Warning System.

Recommendation 13.4 An education campaign on the Australian Warning System **299**

State and territory governments should ensure that the implementation of the Australian Warning System is accompanied by a carefully developed national education campaign that considers the needs of all Australians.

Recommendation 13.5 The development of national standards for mobile applications **306**

The Australian Government should facilitate state and territory governments working together to develop minimum national standards of information to be included in bushfire warnings apps.

Recommendation 13.6 Exploring the development of a national, all-hazard warning app **306**

Australian, state and territory governments should continue to explore the feasibility of a national, all-hazard emergency warning app.

Chapter 14 Air quality 310

Recommendation 14.1 Nationally consistent air quality information, health advice and interventions **323**

Australian, state and territory governments should:

(1) develop close to real-time, nationally consistent air quality information, including consistent categorisation and public health advice

(2) greater community education and guidance, and

(3) targeted health advice to vulnerable groups.

Recommendation 14.2 National Air Quality Forecasting Capability **327**

Australian, state and territory governments should develop national air quality forecasting capabilities, which include broad coverage of population centres and apply to smoke and other airborne pollutants, such as dust and pollen, to predict plume behaviour.

Chapter 15 Health 330

Recommendation 15.1 Australian Medical Assistance Teams 340

Australian, state and territory governments should review Australian Medical Assistance Team capabilities and procedures and develop necessary training, exercising and other arrangements to build capacity for domestic deployments.

Recommendation 15.2 Inclusion of primary care in disaster management 343

Australian, state and territory governments should develop arrangements that facilitate greater inclusion of primary healthcare providers in disaster management, including: representation on relevant disaster committees and plans and providing training, education and other supports.

Recommendation 15.3 Prioritising mental health during and after natural disasters 350

Australian, state and territory governments should refine arrangements to support localised planning and the delivery of appropriate mental health services following a natural disaster.

Recommendation 15.4 Enhance health and mental health datasets 351

Australian, state and territory governments should agree to:

(1) develop consistent and compatible methods and metrics to measure health impacts related to natural disasters, including mental health, and

(2) take steps to ensure the appropriate sharing of health and mental health datasets.

Chapter 16 Wildlife and heritage 352

Recommendation 16.1 Environmental data 363

Australian, state and territory governments should ensure greater consistency and collaboration in the collation, storage, access and provision of data on the distribution and conservation status of Australian flora and fauna.

Chapter 17 Public and private land management 365

Recommendation 17.1 Public availability of fuel load management strategies 378

Public land managers should clearly convey and make available to the public their fuel load management strategies, including the rationale behind them, as well as report annually on the implementation and outcomes of those strategies.

Recommendation 17.2 Assessment and approval processes for vegetation management, bushfire mitigation and hazard reduction 381

Australian, state and territory governments should review the assessment and approval processes relating to vegetation management, bushfire mitigation and hazard reduction to:

(1) ensure that there is clarity about the requirements and scope for landholders and land managers to undertake bushfire hazard reduction activities, and

(2) minimise the time taken to undertake assessments and obtain approvals.

Recommendation 17.3 Classification, recording and sharing of fuel load data 385

Australian, state and territory governments should develop consistent processes for the classification, recording and sharing of fuel load data.

Chapter 18 Indigenous land and fire management 386

Recommendation 18.1 Indigenous land and fire management and natural disaster resilience 396

Australian, state, territory and local governments should engage further with Traditional Owners to explore the relationship between Indigenous land and fire management and natural disaster resilience.

Recommendation 18.2 Indigenous land and fire management and public land management 396

Australian, state, territory and local governments should explore further opportunities to leverage Indigenous land and fire management insights, in the development, planning and execution of public land management activities.

Chapter 19 Land-use planning and building regulation 398

Recommendation 19.1 Communication of natural hazard risk information to individuals 406

State and territory governments should:

(1) each have a process or mechanism in place to communicate natural hazard risk information to households (including prospective purchasers) in 'hazard prone' areas, and

(2) work together, and with the Australian Government where appropriate, to explore the development of a national mechanism to do the same.

Recommendation 19.2 Guidance for insurer-recognised retrofitting and mitigation 410

The insurance industry, as represented by the Insurance Council of Australia, working with state and territory governments and other relevant stakeholders, should produce and communicate to consumers clear guidance on individual-level natural hazard risk mitigation actions insurers will recognise in setting insurance premiums.

Recommendation 19.3 Mandatory consideration of natural disaster risk in land-use planning decisions 411

State, territory and local governments should be required to consider present and future natural disaster risk when making land-use planning decisions for new developments.

Recommendation 19.4 National Construction Code 414

The Australian Building Codes Board, working with other bodies as appropriate, should:

(1) assess the extent to which AS 3959:2018 Construction of buildings in bushfire-prone areas, and other relevant building standards, are effective in reducing risk from natural hazards to lives and property, and

(2) conduct an evaluation as to whether the National Construction Code should be amended to specifically include, as an objective of the code, making buildings more resilient to natural hazards.

Chapter 20 Insurance 415

Recommendation 20.1 Debris clean-up arrangements 425

Governments should create and publish standing policy guidance on whether they will or will not assist to clean-up debris, including contaminated debris, resulting from natural hazards.

Chapter 21 Coordinating relief and recovery 426

Recommendation 21.1 Arrangements for donated goods 441

State and territory governments should develop and implement efficient and effective arrangements to:

(1) educate the public about the challenges associated with donated goods, for example, the storage and distribution of donated goods, and

(2) manage and coordinate donated goods to ensure offers of support are matched with need.

Recommendation 21.2 Reform fundraising laws 446

Australian, state and territory governments should create a single national scheme for the regulation of charitable fundraising.

Recommendation 21.3 National coordination forums 450

The Australian Government, through the mechanism of the proposed standing national recovery and resilience agency, should convene regular and ongoing national forums for charities, non-government organisations and volunteer groups, with a role in natural disaster recovery, with a view to continuous improvement of coordination of recovery support.

Recommendation 21.4 National recovery resource sharing arrangements 452

Australian, state and territory governments should establish a national mechanism for sharing of trained and qualified recovery personnel and best practice during and following natural disasters.

Recommendation 21.5 National level recovery exercises 453

Australian, state and territory governments should work together to develop a program for national level recovery exercises, building on the work currently underway through the Community Outcomes and Recovery Subcommittee of the Australia-New Zealand Emergency Management Committee.

Chapter 22 Delivery of recovery services and financial assistance 454

Recommendation 22.1 Evaluation of financial assistance measures to support recovery 463

Australian, state and territory and local governments should evaluate the effectiveness of existing financial assistance measures to inform the development of a suite of pre-effective pre-determined recovery supports.

Recommendation 22.2 Appropriate sharing of personal information 469

Australian, state and territory governments should ensure that personal information of individuals affected by a natural disaster is able to be appropriately shared between all levels of government, agencies, insurers, charities and organisations delivering recovery services, taking account of all necessary safeguards to ensure the sharing is only for recovery purposes.

Recommendation 22.3 Review the thresholds and activation process for the Disaster Recovery Funding Arrangements 475

In reviewing the Disaster Recovery Funding Arrangements, Australian, state and territory governments should examine the small disaster criterion, and financial thresholds generally.

Recommendation 22.4 Nationally consistent Disaster Recovery Funding Arrangements assistance measures 478

Australian, state and territory and local governments should develop greater consistency in the financial support provided to individuals, small businesses and primary producers under the Disaster Recovery Funding Arrangements.

Recommendation 22.5 Develop nationally consistent, pre-agreed recovery programs 479

Australian, state and territory governments should expedite the development of pre-agreed recovery programs, including those that address social needs, such as legal assistance domestic violence, and also environmental recovery.

Recommendation 22.6 Better incorporate 'build back better' within the Disaster Recovery Funding Arrangements 483

Australian, state and territory governments should incorporate the principle of 'build back better' more broadly into the Disaster Recovery Funding Arrangements.

Recommendation 22.7 Disaster Recovery Funding Arrangements recovery measures to facilitate resilience 484

Australian, state and territory governments should broaden Category D of the Disaster Recovery Funding Arrangements to encompass funding for recovery measures that are focused on resilience, including in circumstances which are not 'exceptional'.

Recommendation 22.8 Streamline the Disaster Recovery Funding Arrangements processes 486

Australian, state and territory governments should create simpler Disaster Recovery Funding Arrangements application processes.

Chapter 24 Assurance and accountability 501

Recommendation 24.1 Accountability and assurance mechanisms at the Australian Government level 510

The Australian Government should establish accountability and assurance mechanisms to promote continuous improvement and best practice in natural disaster arrangements.

Recommendation 24.2 An independent accountability and assurance mechanism for each state and territory **511**

Each state and territory government should establish an independent accountability and assurance mechanism to promote continuous improvement and best practice in natural disaster arrangements.

Recommendation 24.3 A public record of national significance **513**

The material published as part of this Royal Commission should remain available and accessible on a long-term basis for the benefit of individuals, communities, organisations, businesses and all levels of government.

Chapter 1 Introduction

Terms of reference 48

Timeframe 49

The Bushfire History Project 49

Engagement 49

Hearings 50

Other inquiries 51

Royal Commission papers 52

The Office of the Royal Commission 52

Our report 53

Terms of reference

1.1 On 20 February 2020, His Excellency General the Honourable David Hurley AC DSC (Retd) issued Letters Patent establishing the Royal Commission and appointing three Commissioners as a Commission of inquiry:

- Air Chief Marshal Mark Binskin AC (Retd) (Chair)
- The Hon Dr Annabelle Bennett AC SC, and
- Professor Andrew Macintosh.

1.2 Complementary Letters Patent were issued by each state government.

1.3 The Letters Patent set out terms of reference, which outline the scope of our inquiry.[1] Our central task was to inquire into, and report on, *national* natural disaster arrangements – that is, arrangements involving all levels of government, the private and not-for-profit sectors, communities, families, and individuals. These arrangements concern all phases of disaster management: mitigation, adaptation, preparedness, response, and recovery.

1.4 The terms of reference were broad and directed us to examine, among other things:

- the responsibilities of, and coordination between, Australian, state, territory and local governments relating to natural disasters
- Australia's arrangements for improving resilience and adapting to changing climatic conditions
- what actions should be taken to mitigate the impacts of natural disasters, and
- whether changes are needed to Australia's legal framework for the involvement of the Commonwealth in responding to national emergencies.

1.5 We were directed to make any recommendations that we consider appropriate, including recommendations about any policy, legislative, administrative or structural reforms.

1.6 Our terms of reference suggested to us that our inquiry should not be conducted in an adversarial manner, or with a view to apportioning blame for any particular shortcomings in the response to the recent bushfires. Accordingly, we focused on identifying improvements to our national arrangements, to make Australia more resilient to natural disasters. Our approach has been aptly described as 'appreciative',[2] and we sought to gather the best and most useful information available from those with the requisite expertise and insights.

1.7 While many inquiries have examined particular disasters or emergency management arrangements within one state, this is the first Royal Commission to focus on natural disasters from a national perspective, and in particular, national natural disaster coordination and accountability arrangements.

Timeframe

1.8 Our Letters Patent originally set a reporting deadline of 31 August 2020, but this was later extended to 28 October 2020. The extended reporting date recognised the impact of the COVID-19 pandemic, as a result of which many interested parties prioritised their response to the global health emergency.

1.9 Our timeframe has been short, illustrating the urgency of the need to identify improvements to Australia's natural disaster arrangements. Our timeframe and public health measures have influenced how we have conducted our inquiry.

1.10 We sought to engage quickly but comprehensively, to inform our work. We adopted innovative approaches to reach the broad range of individuals and communities interested in our work, and, as our terms of reference required, have focused on what could be done better.

The Bushfire History Project

1.11 We launched the *2019-20 Bushfire History Project* to encourage people to record their personal experience of the 2019-2020 bushfires, and to share their photos and videos from the bushfires and the ongoing recovery, so that these stories are not forgotten.

1.12 These are available on the Royal Commission's website, and a selection have been made available to the National Museum. A number of the photos that appear in this report were contributed to the *2019-20 Bushfire History Project*. See Appendix 13: Bushfire History Project for further details.

Engagement

1.13 In March 2020, we travelled across Australia to hear the stories of people affected by the 2019-2020 bushfires, from the organisations that responded during and immediately after the fires, and to observe firsthand the effects of the fires on properties and the environment. We visited communities in SA, Victoria, NSW, Queensland, the NT and WA; other visits, including to Tasmania, were planned, but could not proceed due to COVID-19 public health measures.

1.14 In April, we visited fire grounds throughout the Canberra, the south coast and Southern Highland regions, accompanied by representatives of emergency agencies and public land managers. Counsel Assisting the Commission visited communities in NSW and Victoria to take evidence and hear the stories of people affected by the bushfires. These visits provided the opportunity for us to engage directly with affected communities and hear about the challenges they faced. A full list of the communities we visited and our other public engagement measures is at Appendix 3: Public Engagement.



Figure 1: Members of the South Australian Country Fire Service illustrating the bushfire progression on Kangaroo Island for Commissioners, March 2020[3]

1.15 To inform various lines of inquiry, we held a series of informal forums, seeking views on a number of topics, including aerial firefighting, health, Constitutional law, charities and insurance. We appreciate that not all experts were able to be consulted through these forums and thank those who were able to participate.

1.16 On 2 March 2020, we called for public submissions to assist us in our inquiry. We used the local and regional radio and print media in all areas affected by the 2019-2020 bushfires to call attention to our inquiry. We accepted submissions orally by telephone and in writing, from any individual or organisation, and we sought to ensure that anyone affected by the recent fires (some of whom may have had limited access to the internet) had an opportunity to contribute.

1.17 We received 1,772 submissions, many of which provided invaluable insights into the lived experience of Australians directly affected by the bushfires, and others that shared the knowledge and expertise of individuals and organisations who work to protect Australia from natural disasters. Each submission was reviewed and summarised. The insights they contain have been invaluable contributions to our work.

1.18 We also sent notices seeking information from a variety of people, government agencies and other organisations.[4] In all, 3,317 documents, totalling 78,270 pages, were tendered in evidence.

Hearings

1.19 The conduct of our hearings was shaped by our terms of reference, but also the evolving pandemic and public health measures. We adopted an innovative hearing model with a view to ensuring that we were able to hear from relevant witnesses. Our electronic hearing model allowed witnesses to give evidence remotely, while ensuring that all Commission proceedings were broadcast and accessible to the

public. The evidence of some individuals directly affected by natural disasters was pre-recorded, providing a trauma-informed means for those community members to share, and often visually illustrate, their experience.

1.20 All witnesses were offered support and assistance, including support from professional counsellors. We were particularly mindful of the need to ensure that people directly affected by the bushfires were not unnecessarily distressed by recounting their stories.

1.21 Over the course of our hearings, conducted over 35 days between May and September 2020, there were 301 witness appearances. Witnesses included:

- individuals directly affected by the 2019-2020 bushfires
- current and former representatives of state and territory fire and emergency management agencies
- experts in a broad range of fields – for example, climate science, fire prediction, and the health impacts of bushfire smoke
- representatives of state and territory national parks and wildlife services
- representatives of charities, industry peak bodies, and consumer groups, and
- senior officials from the Australian, state, territory and local governments.

1.22 A complete list of witnesses appears at Appendix 10: Witnesses. Transcripts of hearings are published on our website.

1.23 Much of our inquiry concerned governmental arrangements. The Australian, state and territory governments were each granted leave to appear throughout our hearings, to ensure that they had every opportunity to present their views.

Other inquiries

1.24 A number of reports of state and territory operational inquiries into the recent bushfires and other hazard events were released in 2020. Many agencies also conducted internal 'after-action' reviews of their own emergency response.

1.25 There have also been over 240 formal inquiries and reviews in Australia in relation to natural disasters since 1927. Collectively, these reports have made thousands of recommendations and findings.[5]

1.26 In conducting our inquiry, we considered the valuable work of other inquiries, while seeking not to duplicate their efforts. In this report, where the evidence before us has suggested the need for a particular reform, we have often sought to highlight similar recommendations made by other inquiries.

1.27 We also acknowledge the work of other current Royal Commissions that may consider, among other things, emergency arrangements as they relate to the aged care sector and people with disability.

1.28 The Royal Commission into Violence, Abuse, Neglect and Exploitation of People with Disability published an issues paper about emergency planning and response, which

invited comment on the difficulties people with disability and their families and carers may have experienced during the 2019-2020 bushfires and other emergencies. It also conducted hearings in August 2020 about the experiences of people with disability during the COVID-19 pandemic. That Royal Commission is due to report in April 2022.

1.29 The Royal Commission into Aged Care Quality and Safety has heard about how the aged care sector prepares for crises, and has published a special report, 'Aged care and COVID-19'. Given the particular focus of the Aged Care Royal Commission, and the matters canvassed in its terms of reference, we referred the evidence we received relating to the evacuation of aged care facilities to that inquiry. That Royal Commission is due to report in February 2021.

Royal Commission papers

1.30 We published issues papers and background papers on a number of topics, including health arrangements in natural disasters; firefighting and emergency services personnel and equipment; and the Constitutional framework for the declaration of a state of national emergency. These papers are listed in appendices 5 and 6, and are available on our website. We received over 170 responses to these issues papers.

1.31 On 31 August 2020, we published our Interim Observations to guide those interested in our work and to address some of the more pressing issues before us. As we commenced the final stages of our inquiry, Counsel Assisting the Commission also prepared draft propositions, which were published on 4 September 2020, and on which comment and submissions were accepted until 17 September 2020. These propositions played an important role in testing issues before the Royal Commission. We thank Counsel Assisting for their efforts, not only in this regard, but also for their diligent support and unwavering commitment throughout our inquiry.

1.32 State and territory governments and others were given an opportunity to respond to and comment on each proposition. Each government was also invited to propose additional evidence related to the propositions, and to make written and oral submissions about any of the responses, propositions and our Interim Observations. We were greatly assisted by the constructive and considered views we received.

1.33 The response to our Interim Observations and Counsel's draft propositions was overwhelmingly positive. Many of these observations and propositions are reflected to some degree in this report. However, our Interim Observations and Counsel's draft propositions did not reflect our concluded views. We have since received further evidence, including in hearings and in written responses to the draft propositions, and we have given further consideration to all the evidence and submissions. Our concluded views are reflected in this final report.

The Office of the Royal Commission

1.34 We cannot present this report without acknowledging the excellent work of the Office of the Royal Commission and, in particular, Ms Anna Harmer, our Official Secretary. We were exceptionally well assisted by a team of policy, enabling services and community engagement officers, and supported by Solicitors Assisting from King

& Wood Mallesons. We could not have conducted our inquiry without them. Their outstanding commitment and professionalism was evident throughout the Royal Commission. Our team is listed at Appendix 2: Commission Team. We extend our unreserved thanks for the level of assistance we received.

Our report

1.35 Our recommendations are clearly identified throughout this report, and are listed separately at the front of the first volume. Our observations are presented in green bold text and offer key insights. The report features an overview, and each chapter begins with a summary. However, to properly understand our recommendations and observations, they should be read in the context of the chapter in which they appear.

1.36 We understand that some readers may be particularly interested in only parts of the report, so we have attempted to make the chapters, at least to some extent, stand alone.

1.37 Supporting evidence has been cited largely by way of example. Given the quantity of evidence before us, we have not comprehensively cited all relevant evidence. The material cited in this report represents a fraction of the evidence and submissions we have carefully considered in forming our views.

1.38 Similarly, where we have made specific reference to a particular jurisdiction (for example, a particular state, territory or local government), in many cases, the jurisdiction is referenced by way of example, and the comment may well apply to other jurisdictions.

1.39 We also synthesised a range of material where we found it helpful to do so. These syntheses appear in the Appendices to our report where they may also be helpful to others.

1.40 A number of times we record that 'we heard from' a particular person or organisation, and by this we mean we either heard from them in a hearing, or received from them a submission or other written material in response to a notice.

1.41 Some chapters of this report particularly relate to one part of our terms of reference. For example, Chapter 5: Declaration of national emergency particularly relates to paragraph (c); Chapter 17: Public and private land management to paragraph (f)(i); Chapter 16: Wildlife and heritage to paragraph (f)(ii); Chapter 11: Emergency planning to paragraph f(iii); Chapter 18: Indigenous land and fire management to paragraph (g).

1.42 However, these and most other chapters of the report relate to paragraphs (a) and (b) of our terms of reference, which are framed broadly, and concern, among other matters, the nation's arrangements relating to 'preparedness for, response to, resilience to, and recovery from, natural disasters' and actions that should be taken to 'mitigate the impacts of natural disasters'.

Chapter 2 Natural disaster risk

Summary 55

Australia is prone to natural hazards 56

The Australian experience 56

Natural hazards have already increased and intensified 57

Climate-driven natural hazards are expected to become more frequent and intense 59

Outlooks for different natural hazards 62

Individual natural hazard outlooks 62

When natural hazards become disasters 65

Disaster impacts are extensive, complex and long-term 67

Australia's disaster outlook is alarming 68

Exposure 70

Vulnerability and resilience 70

Summary

2.1 Australia has a long history of disasters that are linked to natural hazards.

2.2 Natural disasters are more than just natural hazards. Disaster risk is a product of the type and intensity of the natural hazard event, the extent to which communities and other assets are exposed to a natural hazard event, and the vulnerability or ability of communities and other systems to cope with and recover from the impacts of the natural hazard event.

2.3 The extent of damage and harm caused by natural disasters depends on a wide range of factors, such as the intensity of the disaster, where people choose to live, how they build their homes, how both public and private land is managed, and how well people and communities are prepared, supported and cared for during and after disasters.

2.4 Climate change has already increased the frequency and intensity of extreme weather and climate systems that influence natural hazards.

2.5 Further global warming over the next two decades is inevitable. As a result, sea-levels are projected to continue to rise. Tropical cyclones are projected to decrease in number, but increase in intensity. Floods and bushfires are expected to become more frequent and intense.

2.6 The 2019-2020 bushfire season demonstrated that bushfire behaviour is becoming more extreme and less predictable. Catastrophic fire conditions may become more common, rendering traditional bushfire prediction models and firefighting techniques less effective.

2.7 We can also expect more concurrent and consecutive hazard events. For example, in the last 12 months there was drought, heatwaves and bushfires, followed by severe storms, flooding and a pandemic. Concurrent and consecutive hazard events increase the pressure on exposed and vulnerable communities. Each subsequent hazard event can add to the scale of the damage caused by a previous hazard event. There are likely to be natural disasters that are national in scale and consequence.

2.8 As 2020 has shown, some communities will have to cope with the effects of multiple nature hazard events at once, with the prospect of being affected by further hazard events before the recovery efforts have been completed.

2.9 To properly manage natural disasters of national scale and consequence, it is no longer suitable or appropriate to assess disaster risk at an individual hazard level. We must assess the risk of multiple hazard events occurring concurrently or consecutively. We must look for opportunities to reduce the exposure of communities to natural hazard events and increase the capacity of communities to prepare for and recover from their impacts.

Australia is prone to natural hazards

2.10 Australia's variable climate, geography and environment place Australian communities, infrastructure, ecosystems and cultural and heritage values in the path of frequent and high-energy natural hazard events.

2.11 Natural hazards are driven primarily by weather and geology. Examples of weather-driven natural hazards include bushfire, flood, heatwave, cyclones, landslides, east coast lows and thunderstorms. Geological-driven hazards include earthquakes and tsunami.

The Australian experience

2.12 Australia has a naturally variable climate,[1] with temperature and rainfall fluctuating from season to season and year to year. It is common for large parts of the country to move from hot, dry conditions (heatwaves and droughts) to cool, wet conditions (often associated with floods). Natural hazards, including bushfires, floods and heatwaves, are linked to these drought and flood cycles.

2.13 While the focus of our inquiry has been the devastating 2019-2020 bushfire season, Australia has no shortage of significant weather events. For example, since the commencement of our inquiry in late February 2020 Australia has experienced the following significant weather events:

- In March 2020, Victoria, Queensland and WA felt the effects of ex-tropical cyclone Esther, experiencing daily rainfall records, flooding and building damage. Melbourne had its wettest March day since 1929, affecting infrastructure services.[2]
- In April 2020, NSW, Victoria and the ACT were confronted by strong cold fronts, wind and rain, with some sites experiencing their coldest April days since the 1950s. Tasmania also had stronger than average winds, with gusts up to 146km/h.[3]
- In May 2020, across the country rainfall was, on the whole, below average, but the effects of this were concentrated in the southern parts of the country. Most of the north experienced above average rainfall.[4]
- In June 2020, across the country, but particularly in WA and the north, it was much warmer than average. WA was buffeted by storms and damaging winds in the latter half of the month, causing property damage across the state and loss of power to over 3,000 properties.[5]
- In July 2020, two low pressure systems in the Tasman Sea brought heavy rain, isolated flash flooding and high seas along the NSW coast, and snow in its alpine regions. An extensive dust storm swept across Australia's interior, with visibility severely reduced – many locations reporting less than 200 metres.[6]
- In August 2020, a strong cold front produced severe wind gusts along the west coast of WA, with wind gusts raising dust, bringing down trees and causing roof damage. Snow settled in Launceston, Tasmania, with the most comparable event

likely from 1921. A few stations in WA and the NT had their highest August mean daily maximum temperature on record.[7]

2.14 In September 2020, the Bureau of Meteorology identified the return of La Niña and forecast above average rainfall over eastern and northern Australia in the coming spring and summer. We also heard evidence that the return of La Niña has seen a 'very active' hurricane season for the United States and Mexico and 'multiple typhoons' through East Asia, which may relate to 'an early onset and more active tropical cyclone season' for Australia.[8]

2.15 Australia also experiences concurrent and consecutive natural hazard events. Concurrent and consecutive hazard events increase the pressure on exposed and vulnerable communities. Each subsequent hazard event can add to the scale of the damage caused by the previous hazard event. This was the case over the 2019-2020 summer, during which communities experienced successive conditions of drought, heatwaves, bushfires, hailstorms, and flooding; compounding the destructive impact on the affected communities.

2.16 Geological seismic events also frequently occur in Australia. Approximately 100 earthquakes, with a magnitude of three or more, occur in Australia each year.[9] Australia's largest recorded earthquake was in 1988 at Tennant Creek in the NT, with an estimated magnitude 6.6, but it occurred in a sparsely populated area.[10] By contrast, the Newcastle earthquake in 1989 had a magnitude of 5.4, claimed 13 lives and caused widespread damage to building and facilities.[11]

2.17 Each state and territory varies in its experience of natural hazards. Each has its own climate, geography and environment that influence the type, frequency, intensity and severity of hazards experienced. As a result, the resourcing and arrangements in mitigating and responding to natural hazards also varies in each jurisdiction.

Natural hazards have already increased and intensified

2.18 We heard from the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia's national science research agency, that climate change is adding to Australia's natural climate variability, driving changes in average and extreme weather, and increasing climate impacts on our water resources, ecosystems, health, infrastructure and economy, both now and continuing into the future.[12]

2.19 Clear trends have emerged in recent decades beyond the 'noise' of Australia's natural climate variability.[13] Warming is an ongoing trend – Australia has warmed by approximately 1.4 degrees since 1910.[14] As shown in Figure 2, 2019 was Australia's hottest year on record.[15]

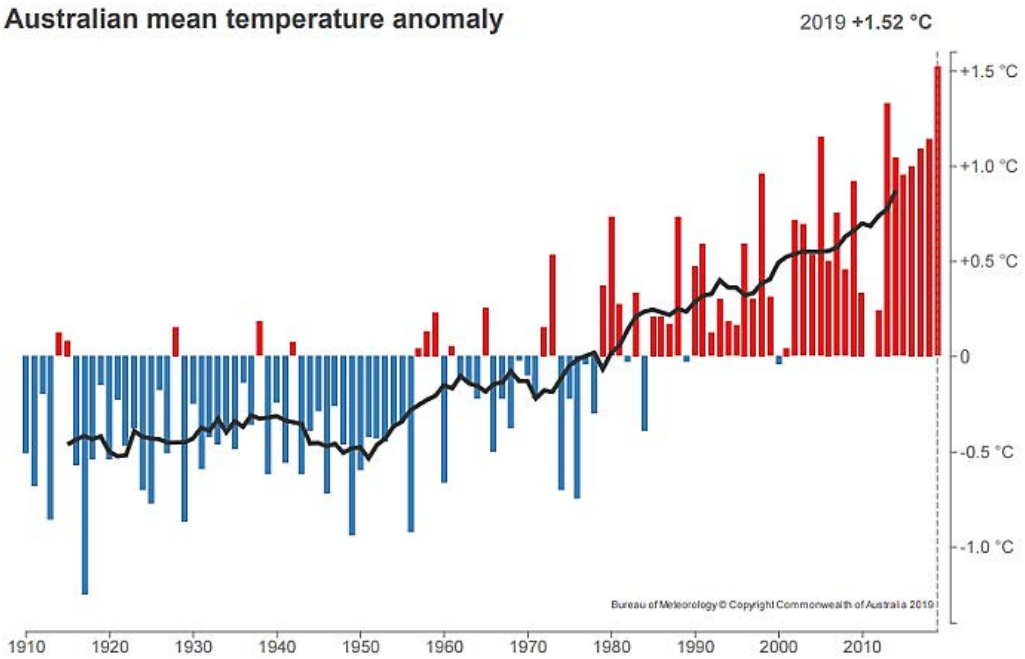


Figure 2: Australian mean temperature anomaly, 1910-2019[16]

2.20 There is also a drying trend across much of the southern half of Australia, particularly in the south west and particularly in the winter months.[17] Over the last 20 years, the southern half of Australia experienced below average rainfall.[18] This is the most sustained large-scale change in rainfall since national records began in 1900.[19]

2.21 These trends are influencing fire seasons, heatwaves, rainfall and flood risk.[20] Observed changes that are being influenced by background climate trends include:

- increased frequency of heatwaves and record high temperatures
- longer fire seasons with more extreme fire danger days
- increase in marine heatwaves, and
- reduced annual average rainfall in some regions.[21]

2.22 Events that are starting to be influenced by climate trends include:

- an increase in heavy rainfall, and
- increased frequency of coastal storm surge inundation.[22]

2.23 In some regions, there may also be a trend towards more weather-dominated fire events. In weather-dominated events, fires interact with the atmosphere resulting in unpredictable and extreme fire behaviour.[23] The most extreme of these are known as firestorms or pyrocumulonimbus (pyroCb) events,[24] which can be associated with extraordinarily destructive fire behaviour. Figure 3 shows the occurrence of pyroCb events in Australia, including the highest annual record of pyroCb events in 2019.

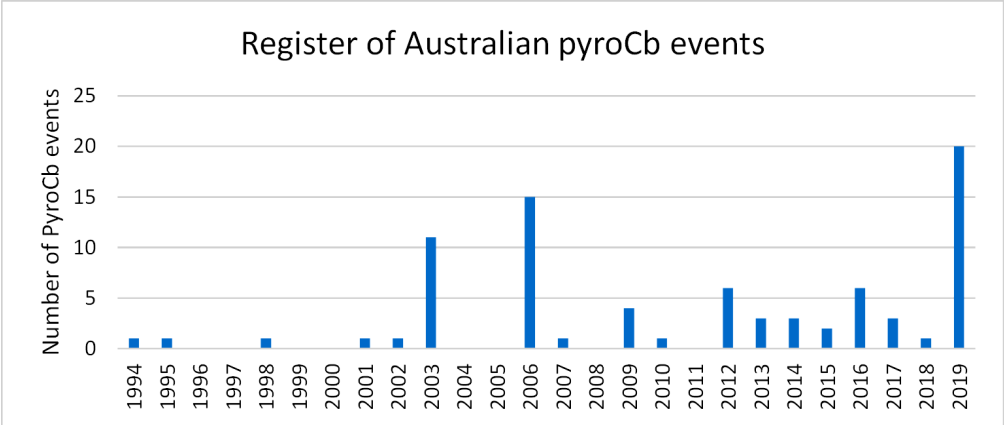


Figure 3: Register of Australian pyrocumulonimbus wildfire (pyroCb) events: 1994-2019[25]

2.24 Professor Jason Sharples, University of NSW, said that the number of these thunderstorms, which form in the smoke plume of a fire, in the 2019-2020 bushfires was 'unprecedented'.[26] We heard evidence of 'multiple' pyroCb events during the 2019-2020 bushfires.[27] Professor David Bowman, University of Tasmania, told us:

> *… this last summer there was a near doubling of the record of these events in one event, and that assembly of data goes back about 30 years. So something happened this last summer which is truly extraordinary because - what we would call statistically a black swan event - we saw a flock of black swans. That just shouldn't have happened.*[28]

Climate-driven natural hazards are expected to become more frequent and intense

2.25 We heard that Australia's climate is 'virtually certain' to get warmer.[29] Ongoing drying of the climate of much of southern and eastern Australia is likely. Other threats include ongoing sea-level rise and an increase in extreme weather events such as short-duration heavy rainfall.[30]

2.26 To assess climate risk, governments, businesses and others rely on multiple lines of evidence, including climate models that provide projections of the likely changes in the climate in the future. Climate models are continuously being updated and developed as different modelling groups around the world incorporate new computing technologies, higher spatial resolution, and new information on physical and biogeochemical processes.

2.27 There are significant projected changes from the present for many hazards. Figure 4 shows the projected changes for Australia's climate-driven natural hazards over coming decades. It is drawn from the climate scenario analyses released in September 2020 as part of the Climate Measurement Standards Initiative, an industry-led collaboration between insurers, banks, scientists, regulators, reporting standard professionals, service providers and supporting parties. The analyses assessed and synthesised multiple lines of evidence and the existing scientific literature. We discuss the Climate Measurement Standards Initiative further in Chapter 4: Supporting better decisions.

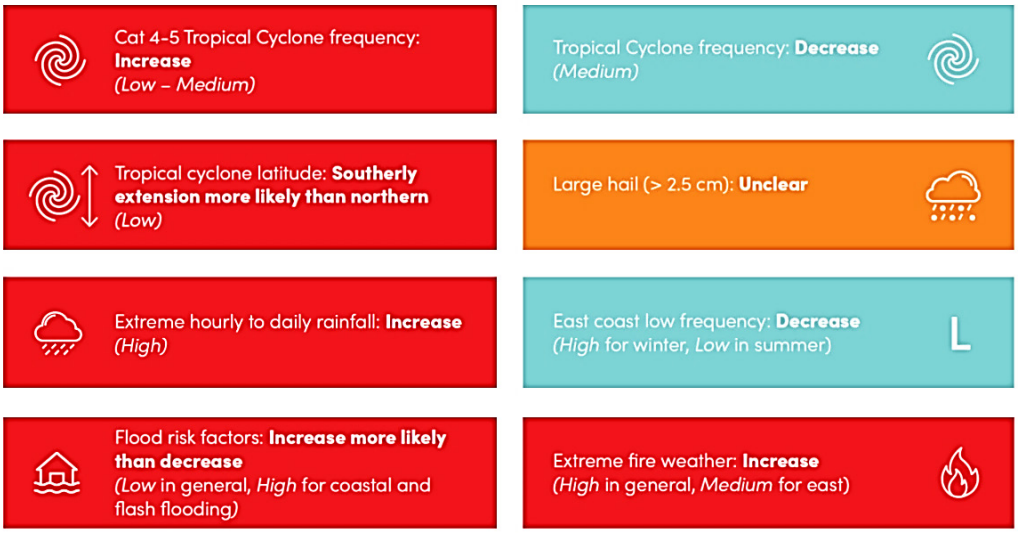


Figure 4: Projected changes in climate-driven natural hazards. Confidence estimates are provided in brackets.[31]

2.28 There are three factors that determine the climate, and hence climate risks, in future scenarios: ongoing natural climate variability; global socio-economic development and the resulting emissions of greenhouse gases and aerosols; and how the climate responds at a regional level to these emissions.[32]

2.29 The 2018 *State of the Climate Report,* issued by the CSIRO and the Bureau of Meteorology (BoM) stated that the 'amount of climate change expected in the next decade or so is similar under all plausible global emissions pathways'.[33] Globally, temperatures will continue to increase, and Australia will have more hot days and fewer cool days.[34]

2.30 Climate projections, such as those from CSIRO and the Bureau of Meteorology often draw on an 'ensemble' (or collection) of models from around the world called the Coupled Model Intercomparison Project (CMIP), which includes the Australian model ACCESS. CMIP5 is the current global ensemble. The future climate information in the 2018 *State of the Climate Report* used CMIP5 modelling.[35] CMIP6 is part of updated climate modelling, intended to improve on CMIP5, and is being undertaken to inform the 2021 Intergovernmental Panel on Climate Change sixth assessment report (AR6).[36]

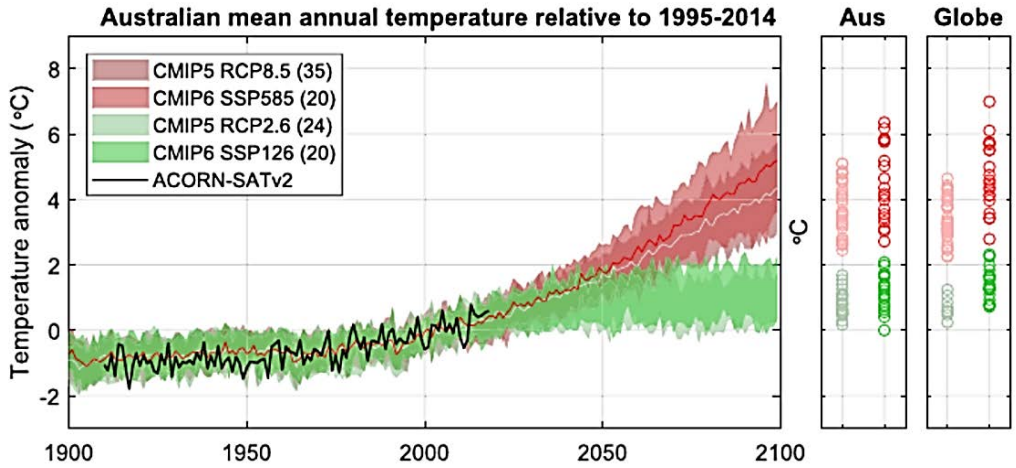


Figure 5: Climate projections for Australia[37]

2.31 Figure 5 shows the projected change in average temperature in Australia using CMIP5 and CMIP6. It shows the projections using CMIP5 and CMIP6 across 'low' (green) and 'high' (red) greenhouse gas emission scenarios.

2.32 An initial assessment of the CMIP6 is that it improves the confidence of the current CMIP5 projections and may provide for greater precision at a regional level, and many results from both sets of modelling are consistent with each other.[38]

2.33 The climate response under both emission pathways are very similar in the next 20 years but then diverge after that.[39] We heard from the BoM that further 'warming over the next two decades is inevitable'[40] and that over the next 20 to 30 years, 'the global climate system is going to continue to warm in response to greenhouse gases that are already in the atmosphere'.[41] We heard from CSIRO that some further climate change is 'locked in', 'because of emissions we've already had'.[42]

2.34 We heard from CSIRO that even under the low emissions scenario, which goes to net negative emissions, the climate does not return to a preindustrial or recent baseline type climate immediately. It takes a very long time for that to occur, and would require CO_2 to be removed from the atmosphere.[43] According to CSIRO, it is 'more a matter of stabilising rather than returning'. Australia 'need[s] to adapt to further changes in the climate no matter what happens with emissions and we will have inevitable changes in the climate coming through for decades to come, no matter what pathway we take forward'.[44]

2.35 **Strong adaptation measures are necessary to respond to the impacts of climate change.**

2.36 Warming beyond the next 20 to 30 years is largely dependent on the trajectory of greenhouse gas emissions.[45]

Outlooks for different natural hazards

Individual natural hazard outlooks

2.37 The outlook for changes in frequency and intensity of hazards varies. The sections below summarise outlooks for common natural hazards in Australia based on current information.

Tropical cyclones

2.38 Climate models project a future decrease in the total number of tropical cyclones, but an increase in their intensity.[46] However, large natural variability and data limitations make it difficult to be entirely confident about long-term trends in tropical cyclones.[47] Despite this, coastal impacts from tropical cyclones are likely to become worse, due to rising sea levels and increases in cyclone-related extreme rain and wind events.[48]

2.39 Additionally, the latitude at which tropical cyclones reach their maximum lifetime intensity may be shifting poleward (in Australia, towards the south), and a further movement poleward is possible in future. This could have serious consequences for south-eastern Queensland and north-eastern NSW which are reasonably densely populated areas.[49] In the west coast, south of Shark Bay, the consequences of a poleward shift are likely to be smaller, yet still significant for the central west and lower west coasts of WA due to the interactions of tropical lows and mid-latitude weather systems.[50]

Storms and rainfall events

2.40 Extreme rainfall events are projected to increase in intensity, potentially resulting in an increase in flood risks.[51]

2.41 Already, there is evidence that the proportion of total annual rainfall coming from heavy rain days has increased.[52]

2.42 In some areas in southern Australia, particularly south west WA, the increased risk of extreme rainfall events may be partly offset by the projected decrease in average rainfall.[53]

Coastal flooding and inundation

2.43 By 2090, the Australian sea level is projected to rise by between 26 and 82 cm depending on the level of emissions and how relevant systems respond.[54] A greater sea level rise is possible if ice sheets melt faster than projected.[55]

2.44 The consequences of sea level rise for Australia will include the flooding of low lying coastal and tidal areas with increased regularity.[56] It is also likely to result in coastal erosion, loss of beaches and higher storm surges that will affect coastal communities, infrastructure, industries and the environment.[57]

Earthquakes and tsunami

2.45 Australia's earthquake prone regions extend from the southern highlands down to Gippsland in Victoria, the Mount Lofty and Flinders Ranges in SA, the WA wheat belt and north-west of WA.[58]

2.46 Earthquakes, as well as landslides and volcanic activity, can cause tsunami – waves that are generated when the ocean is disturbed over a broad area in a short period.

2.47 In 2018, Geoscience Australia conducted a National Seismic Hazard Assessment, with contributions from experts on seismology. It provides an improved understanding of earthquakes in Australia. Under the National Seismic Hazard Assessment, it is forecast that over a 50 year period, on average, 10% of Australia is likely to experience earthquakes exceeding the expected peak intensity for a given location, though the magnitude of these earthquakes may still be relatively low.[59]

Heatwaves

2.48 Heatwaves are commonly defined as three or more days of consistently high temperatures that are unusual for a region. Other heat indices include overnight minimum temperatures, and other factors relating to human comfort (eg humidity). Heatwaves are Australia's deadliest natural disaster, accounting for almost five times more fatalities than bushfires.[60]

2.49 Heatwave events have increased in intensity, frequency and duration across Australia in recent decades.[61] Hot temperatures are occurring earlier in spring, and later in autumn. 2019 was Australia's hottest year on record, with a record 42 days when Australia's area-averaged daily mean temperature was above the 99th percentile.[62]

2.50 Further warming over the next two decades is inevitable, in response to past and future greenhouse gas emissions. Hot days, warm spells and heatwaves are all projected to occur more often and with increased intensity. Extreme hot days that now occur every 20 years are expected to occur every two to five years by 2050.[63]

Bushfires

2.51 Fire weather is primarily a function of temperatures, humidity and winds.[64] There has been a long-term increase in dangerous fire weather, and in the length of the fire season, across large parts of Australia.[65] There has been a reduction in the time between the catastrophic bushfire events of Australian history.[66]

2.52 In Australia, changes in fire danger risk are often assessed using trends in the Forest Fire Danger Index (FFDI), which uses temperature, humidity, wind speed and rainfall to assess fire danger. In southern and eastern Australia, the length of the fire season, as measured using the FFDI, has increased in recent decades.[67] The fire weather season now arrives more than three months earlier than in the mid-twentieth century in some parts of Australia.[68] The lengthening of the fire season is reducing the opportunities to undertake prescribed burning, and this is likely to get worse in the future.

2.53 There has been an increase in the frequency and severity of fire weather since 1950 in southern and eastern Australia, and this trend is projected to continue.[69]

2.54 Fire danger is very likely to increase in the future for many regions of Australia.[71] The increased frequency of days with a high FFDI is likely to result in reduced intervals between fire events, and increase fire intensities, which could make fighting fires harder.[72]

2.55 In northern and central Australia, monsoonal rainfall and the spread of invasive weeds (such as gamba grass) has increased in recent decades, resulting in increased fuel growth. This may also lead to more dangerous fire conditions during the dry season.[73]

2.56 Projections for changes in fire conditions in northern and central Australia are less certain than for southern and eastern Australia, as the incidence of fire is strongly related to fuel availability and the occurrence of episodic rain events, however, predictions indicate that dry season fires will be more dangerous.[74]

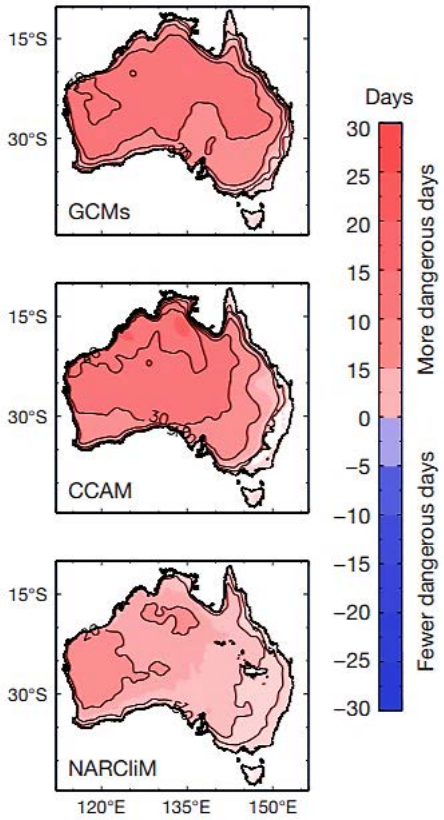


Figure 6: Future projections of fire weather conditions show increasing fire danger days[70]

GCMs = Global Climate Models.

CCAM = conformal Cubic Atmospheric Model (CSIRO regional climate modelling).

NARCLiM = NSW and ACT regional climate modelling project.

2.57 Climate projections show that more dangerous weather conditions for bushfires are very likely to occur throughout Australia in the future due to a warming climate. The change in climate is also likely to result in changes to the amount, structure and type of bushfire fuel.[75] Climate models also indicate a future increase in dangerous pyro-convection conditions for many regions of southern Australia.[76]

2.58 Pyro-convection can lead to the formation of pyroCb clouds and fire-generated thunderstorms, as shown in Figure 7. Compared to previous fire seasons, they were relatively common across the 2019-2020 bushfire season.[77] Fire-generated thunderstorms can cause a rapid and dangerous escalation of fire, which becomes highly dynamic and unpredictable in its behaviour. They can increase fire spread by lofting embers and creating destructive wind gusts and tornadic vortices. These fire-generated thunderstorms also generate lightning, which can start new fires.[78] For

example, during the Black Saturday fires (Victoria, 2009), lightning generated in the fire plume ignited a new fire about 100kms ahead of the main area of the fire front.[79]

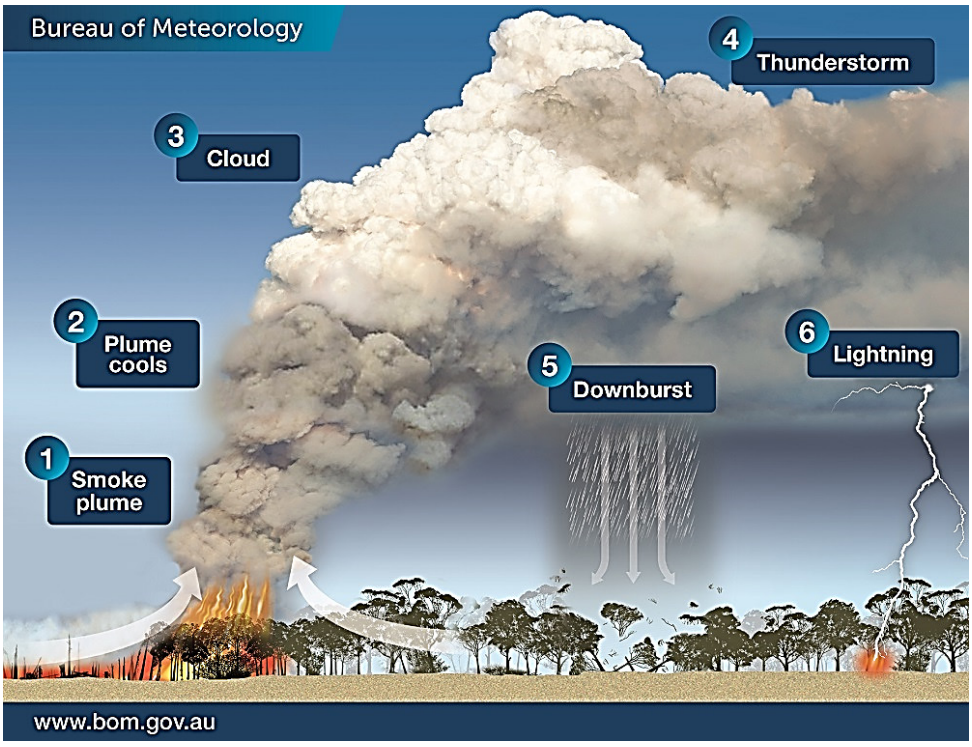


Figure 7: Formation of pyrocumulonimbus clouds and fire-generated thunderstorms[80]

When natural hazards become disasters

2.59 Natural hazards on their own are not disasters – they are merely earth systems in operation. Disaster occurs when natural hazards intersect with people and things of value, and when impacts of hazards exceed our ability to avoid, cope or recover from them.

2.60 In 2015, Australia and other members of the United Nations adopted the *Sendai Framework for Disaster Risk Reduction 2015 – 2030* (the Sendai Framework). Through the Sendai Framework, countries around the world recognise the importance of managing all aspects of disaster risk:

> *Over the last twenty years thinking about how to reduce disaster losses has greatly expanded beyond a simple focus on disaster management to consideration of all the other elements that contribute to increasing the risk of loss of life, injury, damage to critical infrastructure and economic losses when disaster strikes.*[81]

2.61 As we have heard, there are three factors that contribute to disaster risk:

- natural hazards – a natural process or phenomenon that may cause loss of life, injury or other adverse impacts, including on mental and physical health, property, the economy, communities, and environmental assets[82]

- exposure – people, property or other assets present in hazard areas that are subject to potential losses, and
- vulnerability – the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, community, assets or systems to the impacts of hazards.[83]

2.62 Disaster risk can, therefore, be managed by focusing efforts toward each of these factors. These risk factors can be managed at each of the 'before', 'during' and 'after' stages of natural disasters: see Figure 8.

2.63 **The recovery phase from one disaster can also be the mitigation and preparedness phases of the next.**

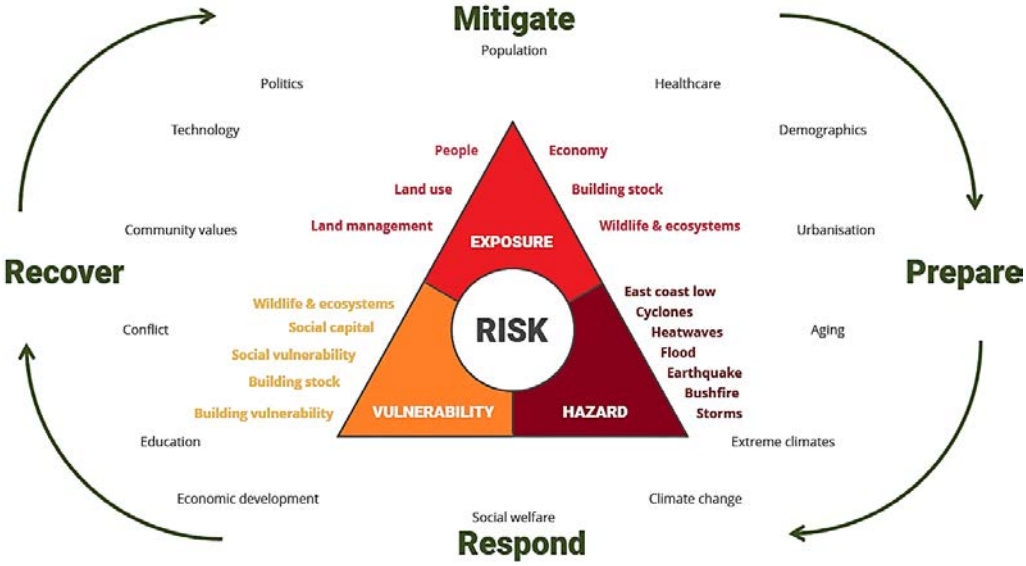


Figure 8: Elements of disaster risk associated with natural hazards[84]

2.64 In 2018, a *National Disaster Risk Reduction Framework* (NDRRF) was developed by the Australian Government with representatives from all levels of government, business and the community sector. In March 2020, the Prime Minister and first ministers of the Australian, state and territory governments endorsed the NDRRF.

2.65 The NDRRF states that all sectors of society must work together to reduce disaster risk, and sets out approaches for doing so across four priority areas: understanding disaster risk; ensuring accountable decisions; enhancing investment; and providing governance, ownership and responsibility. The NDRRF concludes that, although a shared responsibility, disaster risk is often not shared equally. It notes that institutional decision-making often places the risk on communities and individuals, who have varying capacity to manage it:

> *While individuals and communities have their roles to play, they do not control many of the levers needed to reduce some disaster risks. Governments and industry in particular must take coordinated action to reduce disaster risks within their control to limit adverse impacts on communities.*[85]

2.66 **As disaster risk increases, the capacity of communities and systems to be resilient is diminished.**

Disaster impacts are extensive, complex and long-term

2.67 Disasters involving natural hazards mark Australian history – through lives taken; physical and psychological injuries caused; homes destroyed; animals killed and injured; ecosystems damaged; and heritage and cultural sites damaged or destroyed.

Table 1: Fatalities in Australia between 1900 and 2015 resulting from natural hazards[86]

Natural hazard	Fatalities (1900-2015)
Extreme heat	4,555
Flood	1,911
Tropical cyclone	1,216
Bushfire	974
Lightning	562
Gust	527
Landslide	96
Tornado	53
Earthquake	17
Hail	3

2.68 In late 2017, Deloitte Access Economics estimated that, for the preceding decade, natural disasters have cost Australia $18.2 billion per year on average, taking into account both tangible and intangible costs.[87]

2.69 Figure 9 shows insured losses across the decade from 2010-2020. We recognise that there are broader direct and indirect costs from these events, but nonetheless insured losses usefully illustrate the significant toll disasters have taken in Australia.

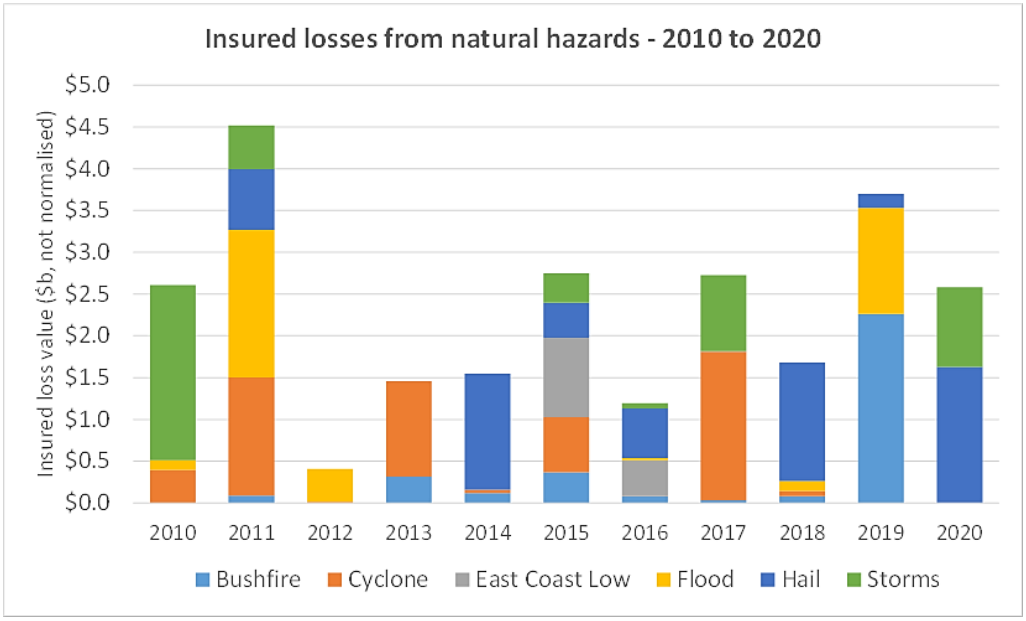


Figure 9: Insured losses from natural hazards – 2010 to 2020[88]

2.70 Fatalities and economic loss are common measures of impact. However, the full impacts of natural disasters are difficult to capture in quantifiable metrics.

2.71 The 2019-2020 bushfires illustrate the significant challenges posed to individuals, communities, businesses and governments to withstand and rebuild from natural disasters. We heard that the impacts of disasters can be long-term, complex and intangible. See Chapter 21: Coordinating relief and recovery.

2.72 Australia's recent and still unfolding history is a useful illustration of how resilience can be stretched or exceeded due to consecutive events and compounding impacts. Australian individuals, communities and businesses have been impacted by fire, flood, drought and a global pandemic within the last 12 months – and, for many, the impacts have been concurrent or consecutive.

Australia's disaster outlook is alarming

2.73 CSIRO's recent Climate and Disaster Resilience Technical Report to the Prime Minister concluded:

> *Climate and disaster risks are growing across Australia. This is due to intensifying natural hazards under a changing climate and increasing exposure and vulnerability of people, assets, and socio-economic activities in expanding hazard areas.*[90]

The COVID-19 pandemic is a timely reminder of how hazards within the complex and changing global risk landscape can affect lives, livelihoods and health. It provides a compelling case for an all-hazards approach to achieve risk reduction as a basis for sustainable development.[89]

2.74 Direct and indirect disaster costs in Australia are projected to increase from an average of $18.2 billion per year to $39 billion per year by 2050, even without accounting for climate change.[91] The costs associated with natural disasters include significant, and often

long-term, social impacts, including death and injury and impacts on employment, education, community networks, health and wellbeing.

2.75 A recent analysis by Risk Frontiers, Macquarie University and the Bushfire and Natural Hazards Cooperative Research Centre (BNHCRC) examined Australia's history of 'compound disasters'. It identified disasters occurring with other societal stressors such as wars, recessions and pandemics further exacerbating their consequences. The analysis defined these as a 'compound disaster', the 'combining of numerous drivers and/or hazards that add to societal or environmental risk' (see Figure 10).[92]

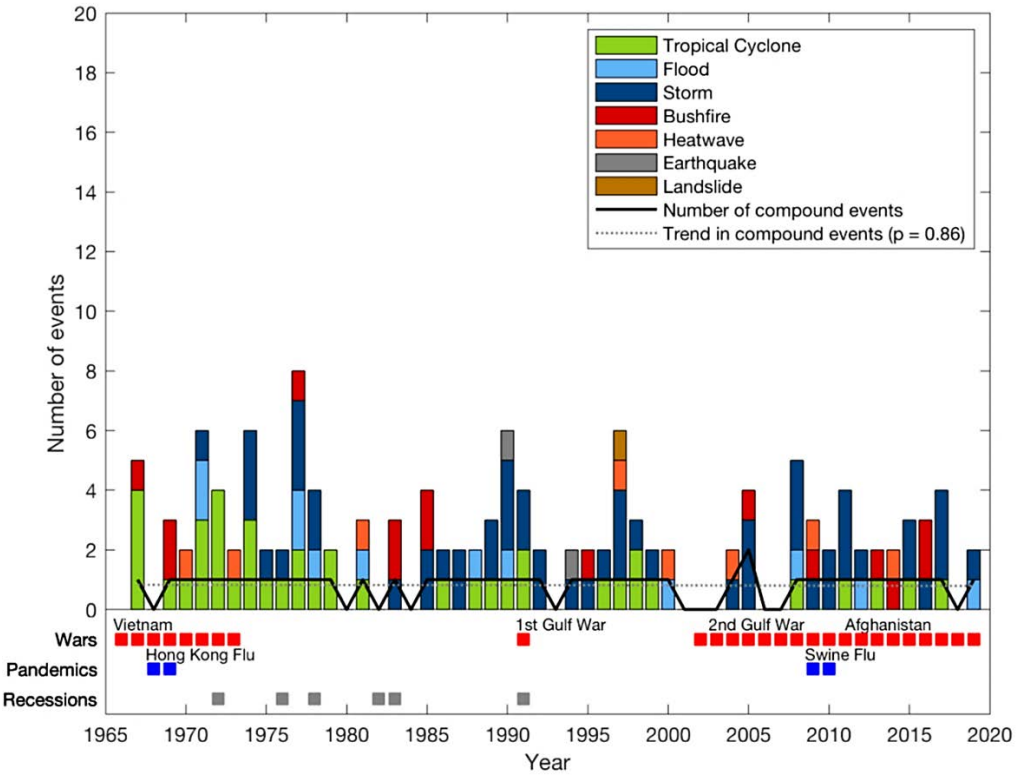


Figure 10: Compound disasters from 1966-1967 to 2018-2019 within a three-month window, and at least ten normalised deaths and/or $100 million normalised losses.[93]

2.76 The analysis concluded:

> *The occurrence of compound disasters at the time of societal stressors would further amplify impacts and result in complex emergency management challenges. Consideration of the coincidence of other societal stressors at the time of compound disasters has not received attention before the current COVID-19 pandemic.*[94]

2.77 **It is no longer suitable to assess disaster risk at an individual hazard level, without taking account other possible natural hazards and broader societal pressures that impact resilience.**

2.78 As hazards become more frequent and intense, measures to prevent or mitigate hazards will become more difficult.[95]

2.79 For example, floods can be mitigated by levees and dams; the intensity and rate of spread of bushfires can, in some but not all circumstances, be reduced through fuel management; and the severity of heatwaves in residential areas can be reduced by good urban design. For other natural hazards such as storms, cyclones and earthquakes, our ability to influence them is limited or non-existent.

Exposure

2.80 Climate and hazard risk analysts at Cross Dependency Initiative assessed disaster risk across 15 million addresses in 544 local government areas, looking across 2020 and 2100, analysing data for five hazards across Australia. The analysis indicates that there are a large number of current and projected assets exposed to natural hazards:

> *There are 383,300 addresses in 2020 which would be classified as High Risk Properties. This number is projected to increase to 735,654 in 2100 for existing development only. This figure does not account for new development occurring in high hazard areas, or continued use of inadequate building standards, which unabated will substantially increase this number.*[96]

2.81 Land-use planning is the primary mechanism that governments can use to manage exposure to natural hazards. Land-use planning governs how land can be used, where built assets can be located, and how they are designed.

2.82 Land-use planning decisions have far-reaching and long-lasting consequences as to how exposed and vulnerable the community will be to future natural hazards. Where land-use planning decisions do not effectively incorporate natural hazard risk, future impacts of natural disasters will be higher. We discuss land-use planning decisions further in Chapter 19: Land-use planning and building regulation.

Vulnerability and resilience

2.83 Vulnerability can be physical and relate to the susceptibility to damage of the built environment. This includes the vulnerability of infrastructure systems where damage to components disrupt service delivery. Vulnerability also includes the vulnerability of people and the likelihood of injury or death in a natural hazard event.[97]

2.84 Vulnerability is closely related to the concept of resilience, which is the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management.[98]

2.85 For the most part, the lifestyles and daily activities of Australians are heavily dependent on interconnected systems for the delivery of essential services (eg energy, water, food, health and education services, transport, and communications).[99] These systems support communities and influence their vulnerability and resilience to disasters.[100]

2.86 The National Resilience Taskforce noted that the changing nature of many hazards, coupled with growing and ageing populations and infrastructure in exposed areas, is leading to increased exposure and vulnerability.[101]

2.87 In July 2020, the University of New England (UNE) and the BNHCRC launched the *National Disaster Resilience Index*. The index measures resilience through a combination of social, economic, natural environment, built environment, governance and geographical factors (for example, access to information and availability of emergency services).

2.88 The index assesses disaster resilience according to a set of coping and adaptive capacities:

> *Coping capacity is the means by which available resources and abilities can be used to face adverse consequences that could lead to a disaster. Adaptive capacity is the arrangements and processes that enable adjustment through learning, adaptation and transformation.*[102]

2.89 The work by UNE and the BNHCRC found that there is a general pattern of higher capacity for disaster resilience across the populated south east areas of Australia, and around metropolitan and major regional centres (Figure 11). Their research findings included:

- most of the population of Australia live in areas assessed as having 'moderate' capacity for disaster resilience
- a 'low' capacity for disaster resilience is associated with remote and very remote areas, comprising a total of about 435,000 people
- areas with 'low' disaster resilience comprise over 93% of Australia's land surface area, and
- almost 50% of non-metro areas have a 'low' capacity for resilience; less than 10% of metro areas have a 'low' capacity for resilience.

2.90 Disaster resilience is a complex interplay of factors, including social and economic characteristics, the provision of government and other services, community capital and governance regimes.

2.91 **Managing disaster risk and resilience will require a greater focus on managing the factors that contribute to them and, in particular, those factors over which we have some control.**

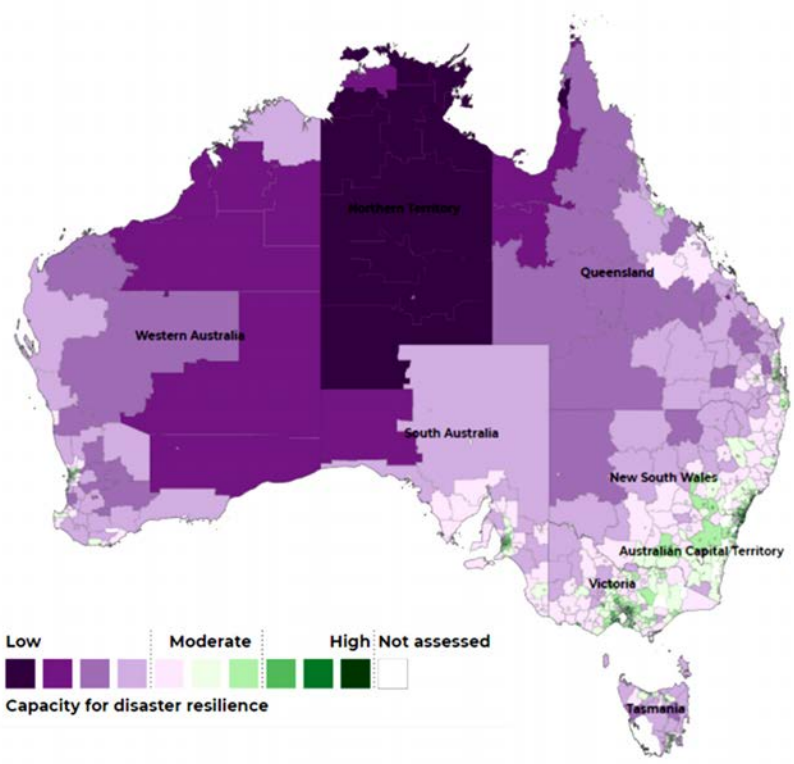


Figure 11: Australia's capacity for disaster resilience[103]

Chapter 3 National coordination arrangements

Summary 74

Effective national coordination 75

Existing arrangements for national coordination 76

- National frameworks, strategies and plans 76
- National policy forums 77
- Australian Government crisis response committees 78
- Australia's disaster management organisation 80
- National recovery agencies 81
- A national body for fire and emergency services 81

The effectiveness of existing national arrangements 84

- Beneficial growth to fill a void 84
- Tensions between interests 88
- AFAC's contribution to policy development 89
- Authorised national response coordination arrangements 91
- Accountability and transparency 92

Clear, robust and accountable national arrangements 94

- Australia's future challenge 94
- Strategic leadership and advice 95
- An enhanced national coordination mechanism 99

Summary

3.1 Australia's national arrangements for coordinating disaster management are complicated — there is a plethora of frameworks, plans, bodies, committees and stakeholders, with significant variation and different degrees of implementation. National coordination, in relation to both operational and policy considerations, is necessary because disaster management is a shared responsibility in our federation.[1]

3.2 Effective national coordination will be a critical capability in managing natural disasters on a national scale or with national consequences. Arrangements need to be clear, robust and accountable.

3.3 Existing arrangements have grown organically over time to fill a void, and have largely served Australia well. The Australasian Fire and Emergency Service Authorities Council (AFAC), a not-for-profit company, has led on specific areas related to fire and emergency services. AFAC represents the Australian and New Zealand fire and emergency services sector, and is primarily comprised of state and territory government fire and emergency services agencies.

3.4 National arrangements for coordinating disaster management require an overhaul so that they are equipped to cope with increasing disaster risks. Australia's natural disaster arrangements and decision-making need to be supported by informed, strategic leadership, timely policy advice to elected officials, and a robust and accountable national coordination mechanism.

3.5 The changes to Australia's national arrangements for coordinating disaster management that are contemplated in this chapter are substantive and structural. It has therefore been necessary to set out the current arrangements in detail. It is also necessary to do so because much of the detail was not on the public record.

Effective national coordination

3.6 Australia's national arrangements for coordinating disaster management are complicated. In addition to significant variation in the distribution of responsibilities across different natural hazards, the structures and forums for coordination vary considerably within, and across, the Australian, state and territory, and local governments at each phase of disaster management: mitigation, preparedness, response and recovery.

3.7 National coordination, in relation to both operational and policy considerations, is necessary because disaster management is a shared responsibility in our federation. *Effective* national coordination is a critical capability in managing natural disasters on a national scale or with national consequences.

3.8 In the context of national disaster management, strategic policy requires forward thinking to drive holistic improvement in the way Australia manages disaster risk across the four phases. The manner and extent to which disaster management is carried out has significant implications for Australians. As shown by the experiences of the 2019-2020 bushfires and the COVID-19 pandemic, disasters can have impacts that extend beyond the immediate community, and can have social and economic implications over extended periods.

3.9 Strategic policy making to reduce and manage disaster risk is a role for senior leaders within government, and must be supported by advice from a broad range of sources within and outside government. Limiting advice to within government or, worse, within one area or 'silo', restricts the ability of all governments to consider and address broader national vulnerabilities and implications of disaster risk.

3.10 The operational aspects of disaster management are the 'frontline' in responding to the immediate impact of a disaster. These aspects are the most visible to the public and are primarily led by state and territory fire and emergency services – which are, in that context, often referred to as 'combat' agencies. These agencies make decisions about matters like when to evacuate, where to deploy firefighters and how to respond to a flood. These operational decisions directly affect people's lives, property and livelihoods.

3.11 Operational considerations and strategic policy must be combined for effective coordination of disaster management, taking into account Australia's finite resources. Disaster management involves a delicate balance between operational aspects of emergency response and long-term strategic policy. Both are needed to successfully mitigate and adapt to, prepare for, respond to and recover from natural disasters.

3.12 Governments should be accountable for their disaster management responsibilities. This requires clarity in the delineation of responsibilities for decision-making authority, functions, advice and information sharing. Accountability is a core component of effective governance, made up of four key elements – transparency, answerability, enforcement and responsiveness.

3.13 National coordination requires a holistic approach to natural disaster risks, while remaining clear and robust to allow effective and flexible coordination, particularly in times of crisis.

Existing arrangements for national coordination

National frameworks, strategies and plans

3.14 Australia has several frameworks and strategies that guide the national arrangements across all phases of natural disaster management. These can be broadly categorised as follows:

- national approaches to mitigating and adapting to disaster risk and improving resilience, now and into the future (*National Disaster Risk Reduction Framework*[2] (NDRRF), *National Strategy for Disaster Resilience*[3] and *National Climate Resilience and Adaptation Strategy*[4])
- a national approach to enhancing disaster preparedness for effective response and recovery (*Australian Disaster Preparedness Framework*[5])
- national approaches to promote interoperability between and within jurisdictions of equipment, data, information and more (for example, the *National Framework to Improve Government Radio Communications Interoperabilit*y[6]), and
- national disaster recovery funding arrangements[7] providing financial support for disaster recovery of a certain scale (such as the *Disaster Recovery Funding Arrangements* (DRFA)).

3.15 These national frameworks and strategies were developed by consensus – that is, each was only adopted with the endorsement of each of the Australian, state and territory governments. They are 'national' frameworks and strategies, rather than 'Australian Government' frameworks or strategies.

3.16 Each state and territory government has slightly different disaster governance and crisis management arrangements, which integrate and implement these national frameworks and strategies differently. Most state and territory governments have a ministerial level committee responsible for emergency management. These ministerial committees enable elected government officials to make strategic, and sometimes operational, decisions about the management of natural disaster risk.[8] They allow ministers to provide strategic policy oversight of measures to prevent, prepare for, respond to and recover from national emergencies.

3.17 These bodies are typically supported by a strategic policy and/or operational decision making committee, which, in most instances, is referred to as an 'emergency management committee'.[9] These committees are often the principal bodies that allow state and territory governments to consider planning, investment and policy frameworks for natural disasters. Their membership often comprises all emergency chiefs, all government departments, and representatives, such as representatives of local government associations. These committees are also often responsible for the

development and implementation of jurisdictions' emergency management plans and/or frameworks.

National arrangements for crisis management

3.18 The *Australian Government Crisis Management Framework*[10] (AGCMF) is the overarching policy for coordinated, whole-of-government crisis management. It describes the standing arrangements for the Australian Government's response to all crises, including natural disasters.[11]

3.19 Australia has national plans for response to, and recovery from, emergencies that support the AGCMF.[12] The AGCMF itself identifies a number of 'relevant national plans and arrangements' for domestic natural disasters, which are:

- *National Catastrophic Disaster Plan* (NATCATDISPLAN)[13]
- *Australian Government Disaster Response Plan* (COMDISPLAN)[14]
- *Domestic Response Plan for Mass Casualty Incidents of National Consequence* (AUSTRAUMAPLAN)[15]
- *Australian Contingency Plan for Radioactive Space Re-entry Debris* (AUSPREDPLAN)[16]
- *Defence Assistance to the Civil Community* (DACC Policy and Manual),[17] and
- the *Disaster Recovery Funding Arrangements* (DRFA).[18]

3.20 We consider a number of these plans throughout our report and here focus on two of them — the NATCATDISPLAN and the COMDISPLAN.

3.21 The NATCATDISPLAN is the national coordination plan for the Australian, state and territory governments in response to catastrophic natural disasters. NATCATDISPLAN 'functions as a contingency plan for the provision of coordinated support by the Commonwealth and State and Territory Governments to a State(s)[19] where its Government and/or its capability to manage the response to and recovery from a catastrophic natural disaster has been significantly incapacitated'.[20] It was endorsed by the Council of Australian Governments (COAG) on 12 July 2010.

3.22 The COMDISPLAN is 'the plan for the provision of Australian Government non-financial assistance to Australian states and territories in an emergency or disaster'.[21] COMDISPLAN has a long history of activation. In contrast, NATCATDISPLAN has never been activated.[22]

National policy forums

3.23 The Australian, state and territory governments develop, agree and communicate the overarching principles that guide operational plans and procedures through various policy forums.

3.24 COAG has been the forum for deliberation and decisions by the Prime Minister, State Premiers and Territory Chief Ministers (first ministers) on national disaster policies and capabilities.[23] COAG endorsed most of the national frameworks described above.

3.25 On 13 March 2020, National Cabinet was formed,[24] and on 29 May 2020, the Prime Minister, the Hon Scott Morrison MP, announced that COAG will cease, and that the National Cabinet will be the centre of a new National Federation Reform Council.[25]

3.26 Previously, a number of intergovernmental councils supported the work of COAG, progressing COAG priorities and referrals of work, along with other issues of national significance.[26] The Ministerial Council for Police and Emergency Management (MCPEM) considered and made decisions about national disaster policies and capabilities, but typically escalated policy decisions with national implications to COAG.[27]

3.27 The Australia-New Zealand Emergency Management Committee (ANZEMC) is the peak government committee responsible for emergency management.[28] It draws together senior officials from Australian, state and territory governments, together with New Zealand. ANZEMC formulates disaster policy for government consideration and decision by MCPEM and/or COAG. For example, at its meeting in April 2020, ANZEMC agreed to discuss the review of the DRFA and betterment provision, and to endorse implementation plans for the *National Partnership Agreement on Disaster Risk Reduction*, enabling work to commence on priority initiatives.[29]

Australian Government crisis response committees

3.28 Under the AGCMF, 'whole-of-government' crisis response to domestic crises is coordinated by two committees: the National Crisis Committee (NCC) and the Australian Government Crisis Committee (AGCC). The version of the AGCMF current during the 2019-2020 bushfires stated that these were to provide situational awareness, advice and support, communications strategy and strategic coordination.[30]

3.29 The AGCMF specified the NCC as the appropriate forum for facilitating cooperation and coordination between the Australian Government and the relevant state and territory governments in response to domestic crises.[31]

3.30 The NCC was to be convened when the Australian Government and affected jurisdiction(s) agree it is necessary, having regard to:

- the scale and nature of crisis and its actual or potential impact
- whether the crisis affects multiple jurisdictions
- whether multiple incidents occur simultaneously
- whether there is a request for Australian Government capabilities and/or assistance (such as inter-jurisdictional coordination and/or request for jurisdictional capabilities/assistance which need to be prioritised)
- whether the crisis has both domestic and international components
- whether existing national coordination and collaboration arrangement structures are suitable, and

- the degree of involvement and leadership required by the Prime Minister and other relevant first ministers (eg a community expectation of national leadership).[32]

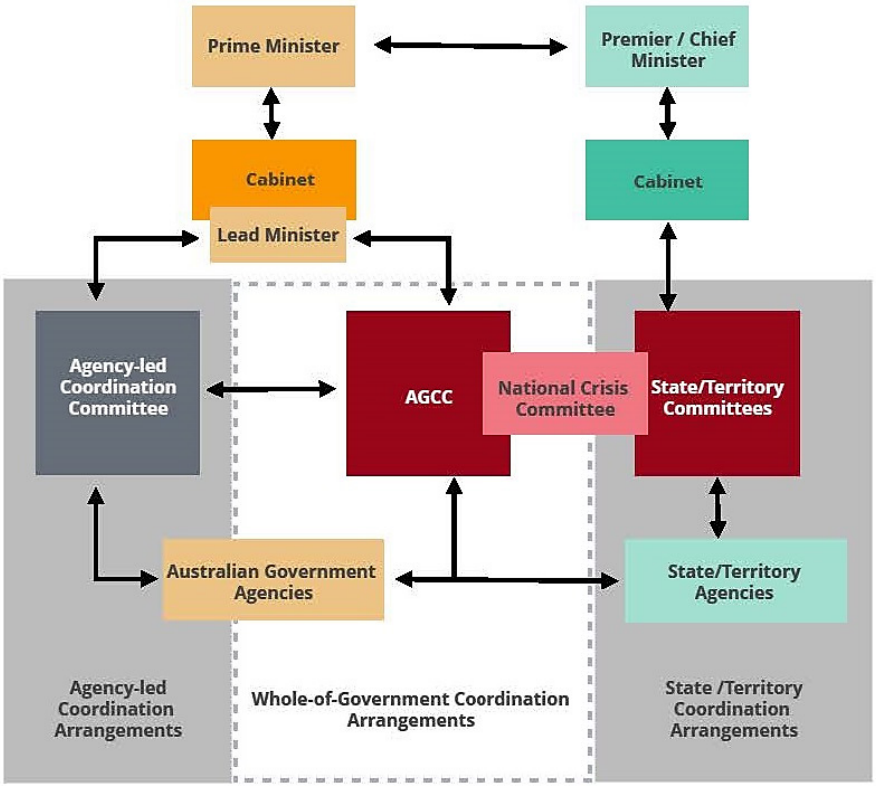


Figure 12: National Crisis Coordination Arrangements as set out in the AGCMF as in place during the 2019-2020 bushfires and prior to the COVID-19 pandemic[33]

3.31 The NCC is chaired by the Deputy Secretary, National Security, the Department of the Prime Minister and Cabinet (PM&C), or a delegate.[34] In the 2019-2020 bushfire season, the NCC was convened twice (on 11 November 2019 and 10 January 2020).[35]

3.32 The AGCC is a mechanism to bring together only Australian Government officials to coordinate the Australian Government response to domestic crises, where the scope or resourcing of Australian Government activity requires the highest level of whole-of-government coordination.[36] As such, it is not a national forum. It is convened and chaired by the Director-General, Emergency Management Australia (EMA) within the Department of Home Affairs. The Deputy Secretary, National Security, PM&C may decide to chair or co-chair the AGCC as appropriate. Over December 2019 and January 2020, in the midst of the bushfire season, the AGCC met 17 times.[37]

3.33 Operational forums, like the NCC, focus solely on operational issues with senior officials briefing ministers separately (see Figure 12). Operational forums can differ in membership and structure from policy forums like ANZEMC, which focus on policy matters and are not involved in operational decision making.

3.34 The National Co-ordination Mechanism (NCM) was established to support the National Cabinet as part of the Australian Government response to the COVID-19 pandemic. The NCM has coordinated engagement between Australian, state and territory governments, as well as industry, to support whole of government responses to domestic crises. The Australian Government described to us 30 different sectors with which it has engaged since the establishment of the NCM, including supermarkets, telecommunications, emergency management and education.[38] Committees associated with the NCM have included state cross-border commissioners to address issues with supply chain and resource availability.[39]

3.35 In October 2020, the AGCMF was replaced and updated. The new version (version 2.3) incorporates the NCM (see Figure 13 below), and provides the NCM as an example, noting that in 'some cases it may be appropriate for the Prime Minister, or the minister leading the response to a crisis, to establish special purpose/temporary response mechanisms in parallel with existing response mechanisms'.[40] It also notes that the NCM 'may be convened in place of an NCC in certain circumstances'. Those circumstances are not specified.

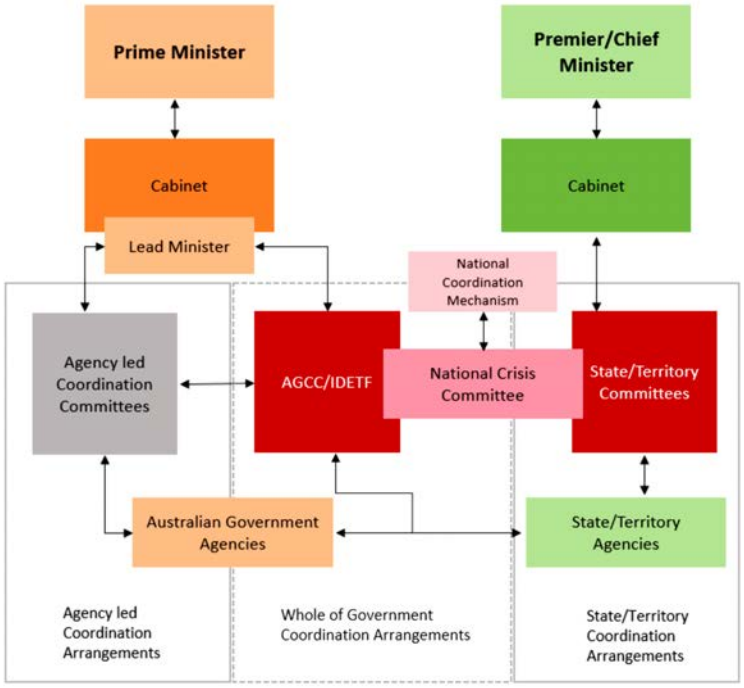


Figure 13: National Crisis Coordination Arrangements during the COVID-19 pandemic. Note that in response to the COVID-19 pandemic, the National Cabinet was convened to support coordination between first ministers[41]

Australia's disaster management organisation

3.36 EMA is Australia's national disaster management organisation.[42] It leads the Australian Government's efforts in disaster risk reduction, emergency preparedness, response and recovery. It is currently one of around 30 divisions within the Department of Home Affairs.

3.37 Among other matters, EMA is responsible for:

- managing the Crisis Coordination Centre (CCC), the Australian Government's 24/7 crisis management information and whole-of-government coordination facility
- activating COMDISPLAN where an event or disaster is imminent, or has occurred, triggering, among other activities, coordination of tasking requests for non-financial assistance from the Australian Government[43]
- administering the Australian Government's disaster recovery payments, including the DRFA
- conducting critical incident planning to better prepare the response to a critical incident with widespread consequences on Australia's critical infrastructure
- developing and implementing the NDRRF, and
- administering funding for the Australian Institute for Disaster Resilience (AIDR).

National recovery agencies

3.38 The Australian Government has established dedicated recovery agencies in response to specific disaster events: in particular, the National Drought and North Queensland Flood Response and Recovery Agency in 2019, and the National Bushfire Recovery Agency (NBRA) in 2020.

3.39 The NBRA was established within the PM&C in response to the 2019-2020 bushfires to lead and coordinate Australian Government support to affected communities. It facilitates delivery of recovery initiatives funded under the DFRA and the National Bushfire Recovery Fund. NBRA consults directly with communities to determine their priorities and to provide advice to the Australian Government on the administration of funding, implementation of programs, and the economic and social impacts of the 2019-2020 bushfires.

A national body for fire and emergency services

3.40 The Australasian Fire and Emergency Service Authorities Council (AFAC) is a not-for-profit company limited by guarantee, regulated by the Australian Charities and Not-for-profits Commission. AFAC describes itself as filling 'the national coordination requirement that is left by current constitutional arrangements that make fire and emergency management a jurisdictional responsibility with the additional advantage that New Zealand is an integral member'.[44]

3.41 AFAC was established by the fire and emergency services agencies and has existed for over 25 years as a national and trans-Tasman facilitator of common standards, doctrine and resource sharing. It functions as a peak body for its members — which are primarily state and territory fire and emergency service agencies. AFAC considers that this approach has contributed to 'a highly efficient and collaborative structure'.[45]

3.42 EMA, Airservices Australia and Parks Australia, which are Australian Government agencies, are members of AFAC, and several other Australian Government agencies

are affiliate members.[46] The AFAC Board members are heads or deputy heads of Australian and New Zealand fire and emergency services and land management agencies.[47] The Australian Government has no representation on AFAC's Board.

3.43 An early constitution identified AFAC's objects as including, among other things, to:

- provide a national forum for its members to consider matters of 'mutual concern' (including the management of fires and other emergencies)
- promulgate technical advice and inform, counsel and advise members in relation to effective fire and emergency management policies, and
- encourage coordination between members in matters of fire and emergency management research, education and training.[48]

3.44 AFAC's current objects have evolved to include:

> *To coordinate and manage the acquisition and deployment of fire and emergency resources and logistical support on behalf of States and Territories in order to benefit the community.*[49]

The Commissioner and Chief Officers Strategic Committee

3.45 The Commissioner and Chief Officers Strategic Committee (CCOSC) was established as a subcommittee of the AFAC Board in December 2013.[50] CCOSC membership 'represents each Australian Commonwealth, State and Territory jurisdiction; New Zealand; Land Management Agencies; SES agencies; Air Services and AFAC'. The representatives that attend CCOSC from state and territory government agencies are generally the heads of fire and emergency service agencies. EMA is a standing member of CCOSC and the Director-General of EMA is the permanent co-chair. AFAC emphasised to us that CCOSC is not an 'intergovernmental' body, and that 'CCOSC members do not represent their governments but represent the organisations under their command'.[51]

3.46 We often heard or saw reference to 'CCOSC decisions', in the sense of decisions made by, or at meetings of, CCOSC. For example, the Arrangement for Interstate Assistance (AIA) states that CCOSC will make a 'preliminary decision' on the allocation of resources in response to a request for assistance.[52] The AIA sets out the guiding principles and framework underpinning interstate and New Zealand fire and emergency service resource sharing arrangements. During the course of our hearings, we heard from a number of current and former members of CCOSC on how this works in practice. While some referred, in terms, to CCOSC decisions[53] the material before us supports the conclusion that 'the operative decisions are those of the individual members'[54] and any 'CCOSC decision' or vote on resource sharing is not binding on a jurisdiction. However, during the course of CCOSC meetings, members make agreements to share resources.[55] Mr Stuart Ellis AM, AFAC's Chief Executive Officer, emphasised that CCOSC members have their own legal responsibilities imposed by their jurisdictional emergency management arrangements.[56]

3.47 In addition to three scheduled meetings a year, CCOSC can be convened for emergency meetings, at which CCOSC members discuss resource sharing requests

and availability of resources. Emergency CCOSC meetings provide a forum for establishing national situational awareness and information sharing between jurisdictions. The role of CCOSC in Australian Government crisis management arrangements is footnoted in the AGCMF as 'limited to information sharing on operational matters during significant events'.[57]

The National Resource Sharing Centre

3.48 The AFAC National Resource Sharing Centre (NRSC), established in 2016,[58] facilitates interstate and international sharing of resources.[59] In 2017, NRSC was repositioned to directly support CCOSC.[60] The NRSC gives effect to interstate and international resource sharing decisions discussed within CCOSC. It has been variously described to us as an 'operational enabler' of national capability for fire and emergency services, that 'brokers' the filling of resource requests from state and territory agencies, but does not itself direct the deployment of resources.[61]

3.49 The NRSC also maintains the AIA.[62] The Guiding Principles of the AIA were endorsed by Australian, state and territory governments at the MCPEM meeting in November 2019.[63] The AIA is supported by an Operating Plan, which sets out detailed arrangements for the deployment of resources.[64] AFAC is named as the 'coordinating authority' for international fire management resources sharing arrangements between Australia and the United States and Canada, to which EMA is a signatory.[65]

3.50 The NRSC's role in facilitating interstate and international deployments includes administrative support. Depending on the requirements for a particular domestic deployment, that may include sending a NRSC representative to participate in the administration and management of the deployment.[66] The NRSC Operating Plan 2020-21 describes in detail the NRSC role in outbound and inbound international deployments, which includes tasks ranging from compiling the deployment plan, safety plan, fatigue management plan, and critical incident plan, to administrative tasks such as booking travel.[67] The plan also states, in relation to domestic deployments, that:

> *The NRSC coordinates the movement and tracking of resources as they deploy interstate and develops plans for subsequent rotations. The NRSC maintains national situational reporting on interstate deployments and through ongoing liaison, maintains an awareness of national capability and resource availability. The NRSC subsequently coordinates any required backfill of resources returning to home locations.*[68]

The National Aerial Firefighting Centre

3.51 The National Aerial Firefighting Centre (NAFC), established in 2003, coordinates the procurement of some aerial firefighting services on behalf of state and territory emergency services. A Resource Management Agreement[69] governs the relationship between AFAC and the state and territory governments with regard to NAFC. That agreement facilitates the sharing of aerial firefighting assets. Other aerial firefighting assets are also procured directly by state and territory governments.

Other AFAC business units and other national collaboration work

3.52 AFAC is the managing partner of the AIDR, which is responsible for developing, maintaining and sharing knowledge and learning to support national disaster resilience.[70] AIDR is funded by the Department of Home Affairs and is a consortium that includes the Australian Government, the Australian Red Cross and the Bushfire and Natural Hazards Cooperative Research Centre.

3.53 AFAC facilitates national collaboration between fire and emergency services through its 'Collaboration Model', which encompasses 34 working groups, technical groups and networks.[71] The groups may include representatives from members, affiliate members, and other organisations. Working groups (such as the Australian Inter-Service Incident Management System Steering Group and the Warnings Group) are formally linked to the AFAC Council and have agreed work plans. Technical Groups (such as the Bushfire Standards Technical Group and the Hazardous Materials Technical Group) seek to explore and resolve technical or practical aspects of industry practice. Networks include the Emergency Management Professionalisation Panel. We discuss the work of some of these groups elsewhere in this report.

3.54 'National doctrine', which is made up of positions and guidelines, are endorsed as the view of AFAC National Council.[72] National doctrine includes 'capstone' doctrine (such as the 'Strategic Directions for Fire and Emergency Services in Australia and New Zealand'), fundamental doctrine (such as 'Classifying Bushfire Fuels in Australia'), procedural doctrine (such as 'Managing Fatigue in Emergency Response') and technical doctrine (such as 'Conduct Complex Prescribed Burn').[73]

The effectiveness of existing national arrangements

Beneficial growth to fill a void

3.55 The functions performed by CCOSC, NRSC, NAFC, and more broadly, AFAC, have evolved and expanded over time. While this expansion has been beneficial to the national interest, the functions now extend significantly beyond their original intent.

3.56 In particular, CCOSC was created to provide 'jurisdictional consideration and representation on behalf of AFAC Council to the Federal Government'.[74] It appears to have been created after ANZEMC rejected a proposal, originating from EMA, to establish a representative group of operational emergency management leaders at a national level.[75] At that time, there was no senior officers group for fire and emergency services.[76]

3.57 The current terms of reference now reflect CCOSC's clear operational focus. Box 3.1 highlights the differences between the original and current terms of reference, reflecting the considerable evolution of CCOSC's functions since inception.

3.58 State and territory governments have increasingly used interstate resource sharing to meet the demands of responding to natural disasters:[77]

- According to AFAC, the first known example of large-scale resource sharing was in 1994 for the fires in NSW.

- Further significant movements of resources interstate took place in 1999 (Sydney hailstorm), 2001 (NSW fires), 2002-2003 (Victorian Alpine fires), 2006-2007 (Victorian Alpine fires) and 2009 (Victorian Black Saturday bushfires).
- The 2019-2020 bushfire season resulted in the movement of thousands of interstate and hundreds of international firefighters in support of firefighting operations.

3.59 National resource sharing arrangements have evolved from being largely informal. Many resource movements used to take place with little in the way of underpinning documentation, and were based on personal relationships and, at best, bilateral understandings. There was no national picture, or a shared 'common operating picture'.[78] The first version of the AIA was drafted in 2013, which documented arrangements for resources to be shared across Australia and New Zealand.[79]

3.60 The NRSC has been increasingly used to coordinate deployments nationally and internationally, as the scale and complexity of emergencies and disaster have grown across the globe. The NRSC coordinated outbound deployments to Canada in 2017, and the United States and Canada in 2018. It also coordinated resource sharing for Cyclone Debbie in 2017, the Queensland fires of 2018, and the Tasmanian fires of early 2019. However, AFAC has stated that 2019-2020 was the first year that the NRSC became heavily involved in coordinating domestic resource sharing.[80]

3.61 The NRSC played an important and expanded role in relation to 'strategic planning' during the 2019-2020 bushfires. In December 2019, the NRSC produced the '2019 Bushfire Strategic Planning Report'.[81] That report, based on input from each state and territory fire and emergency service,[82] provided an overview of the capacity of each jurisdiction and provided forward planning and situational awareness of what each state and territory fire and emergency service would make available. The NRSC then provided weekly situation reporting to CCOSC, which was intended to give a snapshot of the resource sharing across each state and territory.[83]

3.62 However, the strategic planning and situational awareness provided by the NRSC was limited to state and territory government resources, based only on NRSC deployments or high-level summary information provided by fire and emergency services. Resources can be, and were, shared between state and territory governments directly through bilateral agreements or cross-border arrangements made outside of the NRSC and CCOSC arrangements. Nevertheless, we heard from members of CCOSC that the NRSC assisted by providing an important national picture of the deployment of fire services resources and resourcing needs during the 2019-2020 bushfires.[84]

Box 3.1 The evolving functions of CCOSC

CCOSC's original terms of reference (October 2013) describe CCOSC's key functions as to:

- 'consider issues to be presented to ANZEMC and LCCS [Law, Crime and Community Safety] Council'[85]
- 'provide higher level consideration on issues related to the Federal Government and Federal Departments including specifically Attorney-General's Department[86] and Department of Defence', and
- 'progress national initiatives through jurisdictional support'.[87]

CCOSC has since revised its terms of reference to broaden its functions. The latest revision of the terms of reference (July 2019) lists the following as CCOSC's key functions:

- 'consider and influence operational issues to be presented to ANZEMC and MCPEM'
- 'provide consideration on operational issues related to the Commonwealth Government and Commonwealth Departments'
- 'develop, progress and oversee national fire and emergency services operational capability and capacity, including:
  - leadership
  - resources
  - governance of multi-jurisdictional events
  - communications, and
  - intelligence'
- 'coordinate national operational matters during significant events, through the CCOSC Emergency Operational Briefing process, and provide an operational reference group for multi-jurisdictional response requirements'
- 'provide direction to the NRSC in relation to its function of facilitating the interstate and international sharing of resources, by AFAC member agencies, apart from cross-border operations', and
- 'brief AFAC Council on national operational matters of significance'.[88]

3.63 The NRSC is supported by a small group of permanent employees, and a surge contingent from within AFAC and seconded from fire and emergency services during peak periods.[89] AFAC has stated that it is not currently staffed to undertake resource sharing on a national scale.[90] We heard from some state and territory governments and their agencies about the need for ongoing funding for the NRSC.[91] A similar concern was expressed in the NSW Inquiry into the 2019-2020 bushfires, which recommended that the NSW Government work with other Australian, state and territory governments to provide long-term funding certainty to AFAC, including the NRSC and NAFC.[92] In July 2020, CCOSC members endorsed 'maintaining the status quo of NRSC and to provide additional resources for a further 12-18 months to sustain the upcoming 2020-2021 season', although 'any further decisions on the future of the NRSC will be dependent on the outcomes of the Royal Commission'.[93]

3.64 NAFC, formerly a separate company, became a business unit of AFAC in 2018. AFAC describes NAFC as a 'relatively small, facilitating unit'.[94] It has grown from two people (a decade ago) to five full time equivalent staff today.[95] Presently, NAFC does not have the resources to provide operation-enabling functions for extended periods. We heard that functions such as sourcing and contracting additional resources, dealing with offers of assistance, and supporting resource sharing efforts placed considerable pressure on NAFC's internal capabilities and systems over the 2019-2020 fire season.[96]

3.65 The Australian Government committed to providing NAFC with approximately $15 million per year during the period 2018 to 2021, with total funding amounting to $44.79 million over three years.[97] For the 2019-2020 bushfire season the Australian Government provided NAFC with an additional $11 million in December 2019, and a further $20 million in January 2020, increasing its total contribution to $46 million for 2019-2020.[98]

3.66 Following the 2019-2020 bushfire season, CCOSC determined that the NRSC would also facilitate future sharing of aviation services.[99] NAFC would focus on its central procurement functions.[100]

3.67 Most state and territory government participants consider that CCOSC, NRSC and NAFC have worked well. Chief Officer, Tasmania Fire Service, Chris Arnol said:

> *AFAC played a key coordinating role through its National Resource Sharing Centre (NRSC) and the underpinning inter-jurisdictional agreements.*[101]

3.68 CCOSC co-chair, Director-General of EMA, Mr Robert Cameron OAM, told us:

> *The CCOSC is an extremely valuable vehicle for assisting and creating a shared national operating picture.*[102]

3.69 Other states and territories are similarly positive about the benefit of CCOSC as a forum for sharing situational awareness.

3.70 **Each of CCOSC, NRSC and NAFC has evolved and expanded to respond to emerging needs in emergency management, responding to gaps and the evolution of emergency response in the face of significant natural disasters. They have done so incrementally, with the objective of enhancing emergency management across Australia, noting AFAC's focus on a particular subset of disasters.**

Tensions between interests

3.71 AFAC's business units and initiatives, such as CCOSC, NRSC and NAFC, are designed to meet the needs and objectives of AFAC's members, which are primarily the state and territory fire and emergency services. As explained by AFAC:

> *These AFAC business units and initiatives are industry driven with a strong degree of ownership by fire and emergency agencies. Membership of AFAC acts as a force multiplier for fire and emergency service agencies, giving them access to and influence over the creation of national doctrine, gaining insight and learning of best practice across AFAC agencies and allowing them to draw on resources from across Australia, New Zealand and beyond to support emergency management.*[103]

3.72 However, the needs and objectives of AFAC's members will not necessarily align with those of neighbouring states or territories, let alone those of the nation as a whole. Each head of a state and territory fire and emergency service has responsibilities and accountabilities under their jurisdiction's emergency management framework. There is no requirement (nor would there be expected to be) for such leaders to be accountable to the public in other states or territories, or to the whole nation. For example, Commissioner Georgeina Whelan AM CSC, ACT Emergency Services Agency, said:

> *I represent the Emergency Services Agency of the ACT and I represent my jurisdiction and I'm going to fight to the death for the resources that my jurisdiction requires, and bid very hard to win those resources. And as a - as a good citizen and colleague, where I have resources that are available, I'm going to make CCOSC aware of what resources I am willing to make available to deploy interstate. But, ultimately, I'm not authorised to make decisions on whether one jurisdiction is more worthy of a resource than another…*
>
> *It may be that CCOSC is an ideal organisation to provide situational awareness, make professional recommendation and advice, but certainly not making decisions about the national interest versus the jurisdiction, I would imagine.*[104]

3.73 Similarly, Mr Stuart Ellis AM, the Chief Executive Officer of AFAC stated:

> *I would argue that introducing the concept of 'in the national interest' to fire and emergency resource movements is potentially misleading. The resources of state and territory (and New Zealand) fire and emergency services are paid for by the taxpayers of those jurisdictions, with the express purpose of meeting emergencies within that jurisdiction. They are largely made up of volunteers who will generally have a local focus. It is one thing to lend resources that are surplus to requirements to another jurisdiction in need. The idea however, that resources that are needed to combat an emergency in state 'A' could be coercively moved to state 'B' based on a conception of 'national interest' is at odds with the way those resources are composed and financed.*[105]

3.74 The questions of national interest and national prioritisation raise two considerations. First, a body considering whether actions are in the national interest, or how to prioritise finite resources and capabilities when simultaneous demand exists, should have an appropriately transparent and accountable authorising

environment. Second, that body should have available to it all relevant information to inform the question of the 'national interest'.

3.75 CCOSC's development over time has benefited emergency management significantly. However, we are concerned about the authorising environment in which CCOSC makes, or purports to make decisions, and the extent to which existing arrangements are appropriately adapted to making decisions that factor in the best interests of Australia as a whole.

3.76 We are not suggesting that the Australian Government (or another jurisdiction for that matter) should have the ability to command or requisition another state or territory government's resources.

3.77 However, although AFAC has undertaken national coordination functions, it is a company and not a part of government, nor accountable to government, nor the nation. Further, although CCOSC has the benefit of information shared by the state and territory fire and emergency services and EMA, it does not have awareness of, direct access to, or support of, the entire suite of capabilities the Australian Government may be able to provide.

3.78 In 2019, EMA developed a *Resource Prioritisation Guidance Note*[106] that provided high-level principles for prioritising resources between jurisdictions in complex circumstances.[107] It was intended to act as a guide for jurisdictions to inform decision making as to national prioritisation, and set out agreed prioritisation criteria and a priority order (starting with the protection of human life). The guidance note does not create authority, mandate action, or change or impact current jurisdictional, CCOSC or national disaster decision making. Rather, we heard that the guidance note clarified custom or practice around the guiding principles for sharing resources.[108] The guidance note was endorsed by officials nationally through ANZEMC and CCOSC in 2020.[109]

3.79 We are uncertain of the extent to which this guidance note is capable of influencing, let alone ensuring, the approach that state and territory fire and emergency services take to decision-making in the midst of a national disaster. Legal obligations, and operational need, will prevail over non-binding guidance.

3.80 This tension of interests between national outcomes and state or territory objectives will become more challenging to manage in the midst of compound disasters.[110] In catastrophic circumstances, when the finite national resources are insufficient, difficult and complex, decisions about resource sharing, including resources funded in whole or in part by the Australian Government, will require regard to whole-of-nation interests. In the extreme, it may involve making choices that prioritise the needs of one or more states or territories over another.

3.81 **National coordination arrangements for natural disasters should facilitate decision-making that takes into account the national interest.**

AFAC's contribution to policy development

3.82 AFAC's role and collaborative approach has improved the capabilities of the emergency services sector, as well as its professionalisation and technical policy

development. Some suggest that, without AFAC, and its forums and working groups, limited progress would have been made on a number of important national projects.

3.83 However, the pace of AFAC's policy development work is impeded by the priority fire and emergency services must give to the operational demands of the disaster seasons. As stated by Mr Ellis, the CEO of AFAC:

> *Any significant national policy development is impacted by the fact that fire services are not able to focus on research and strategic initiatives during the summer season (approximately October to March) because of operational priorities. AFAC ceases all collaboration meeting activity during this period. There is, therefore, a limited window in which to consider and progress national initiatives of this nature that require research, consultation, national consideration and debate.*[111]

3.84 This challenge in balancing continuous policy development against immediate response is reflected in the time needed to progress a number of policies, such as the Australian Warning System. This project has taken several years and is yet to be implemented, circling between research and a lack of consensus between CCOSC members. The challenges surrounding this project are canvassed in further detail in Chapter 13: Emergency information and warnings.

3.85 In light of the disaster outlook, we are concerned that national policy development will continue to be put 'on hold' as priorities shift to operations under these arrangements. Increasingly frequent and intense disasters, along with lengthening disaster seasons, are likely to place constant and increasing pressure on the workload of fire and emergency services to focus on preparing for, and delivering, immediate response and relief. As operational priorities extend with the lengthening of the severe weather season, the window of opportunity for policy development will further decrease.

3.86 There is a meaningful prospect that national policy development will be delayed or even stall, over the medium to long-term. Australia's disaster outlook requires continuous attention to reduce long-term disaster risk, and improved disaster resilience. Emergency management policy work must actively support longer term preparation, resilience and recovery – its urgency is no less immediate than operational response. Investment in sound policy will be critical to comprehensive emergency management across all phases into future years.

3.87 **National arrangements for disaster management should provide elevated and constant year-round focus on national policy development for disaster management, across all phases.**

3.88 AFAC is a not-for-profit company representative of the fire and emergency services 'industry', whose members are primarily operationally driven, with expertise for emergency management. This limits its ability to consider holistically broader risks, in which the sector does not have expertise. To try and address this limitation, AFAC can, and does, draw on external advice (such as research), to gain additional insights.

3.89 In developing strategic advice for governments, government departments work together so that ministers are aware of different interests from a range of portfolios before making a decision with national or state-wide implications. Development of

public policy related to disaster management delivers government commitments and programs, and to that end, is most appropriately led by those who are accountable to the public.

3.90 **Development of public policy for disaster management that has national implications should be led by governments and their agencies so that the policy development processes can benefit from consideration of all aspects of natural disasters, and ensure appropriate accountability.**

Authorised national response coordination arrangements

3.91 While the scope of AFAC and its initiatives has evolved over time and has been increasingly used for national coordination, Australian, state and territory governments have not reconciled this expansion with nationally-endorsed arrangements in which they participate.

3.92 This can be seen when comparing the activities of CCOSC with those of the NCC. Over the 2019-2020 bushfire season, planned and emergency meetings of CCOSC were used by state and territory fire and emergency services for national situational awareness, and to discuss requests for interstate and international resources. CCOSC, a sub-committee of the AFAC Board, met nine times, and we heard that there was 'frequent and ongoing engagements at operational level', that ministers were 'well engaged' and there was not 'a particular need for a rolling series of National Crisis Committees to share information'.[112] We heard that there is significant overlap in the material that is discussed at both forums and that these information flows could be streamlined.[113] While there is an overlap of membership, there is no structural link between the NCC and CCOSC.[114] Australia's existing national crisis response mechanism, the NCC, only met twice over the 2019-2020 severe weather season.

3.93 A key difference between CCOSC and NCC is their authorising environments and representation. NCC is recognised in the AGCMF as being the appropriate crisis committee to facilitate cooperation and coordination between the Australian Government and the relevant states and territory government(s) in response to domestic crises. The AGCMF, then, and now, recognises CCOSC but states that 'CCOSC's role in Australian Government crisis management arrangements is limited to information sharing on operational matters during significant events'.[115]

3.94 CCOSC appeared to function in lieu of the NCC during the 2019-2020 bushfires,[116] despite CCOSC not having the breadth of expertise the NCC has at its disposal to consider all aspects of risk and that CCOSC's role had extended well beyond that contemplated in the AGCMF.

3.95 CCOSC members have endorsed a proposal to reposition CCOSC as a subcommittee of ANZEMC, rather than as a subcommittee of the AFAC Board.[117] We do not consider that this resolves the relevant tensions. There would be less difficulty with this proposal if CCOSC activities were simply aligned with ANZEMC's policy remit. However, reporting to ANZEMC on response does little to address our concern that CCOSC appeared to have subsumed the role of the NCC.[118]

3.96 Some state and territory governments expressed concern to us about the use of NCC to ensure national situational awareness and national coordination. One state

suggested that NCC is dominated by Australian Government agencies due to its historical function, which it asserts was to share information to support Australian Government coordination.[119]

3.97 **NCC, as it is currently constructed, may not be appropriately conducive to the levels of national cooperation required to support coordination in the national interest in response to a national natural disaster. National coordination should be supported by arrangements that are nationally endorsed, and accountable. The NCC or a similar arrangement should be refreshed to that end.**

Accountability and transparency

3.98 The changes to Australia's national arrangements for coordinating disaster management that are contemplated in this chapter are substantive and structural. It has been therefore necessary to set out the current arrangements in detail.

3.99 It is also necessary to do so because much of the detail of the operation of those arrangements is not on the public record. Some information on the operations of AFAC, CCOSC and the NRSC is publicly available, such as in AFAC's annual reports and strategic achievement reports. However, that information is relatively limited. The detail of the arrangements which we have had the benefit of considering is not ordinarily open to public scrutiny in the same way as it would be had the arrangements been conducted under the auspices of government.

3.100 Queries about the suitability of AFAC's accountability and transparency are not new. For example, Mr Robert Cameron OAM expressed concerns to us, and to CCOSC, as to 'whether the authorising environment for inter-jurisdictional resource sharing via the NRSC is appropriately created under the auspices of AFAC a non-profit company'.[120] Mr Paul Baxter, President of AFAC and Commissioner, Fire and Rescue NSW, and previously Chief Executive and National Commander, New Zealand Fire Service, told us that 'there has been discussion in the past even that AFAC could be set up as a statutory body to allay some of the fears around accountability and transparency and we're not adverse to that either'.[121]

3.101 CCOSC is a sub-committee of the AFAC Board and the NRSC is a functional capability managed by AFAC. Mr Ellis, CEO of AFAC, expressed the view that AFAC has 'robust practical and legal accountability mechanisms'[122] and that AFAC's status as a not-for-profit company was the most appropriate governance option, as it allows AFAC to perform its roles efficiently and collaboratively.[123] We acknowledge that AFAC's governance mechanisms include obligations that apply by reason of AFAC's status as a registered charity, and some limited obligations under AIDR and NAFC contractual arrangements, including reporting against deliverables. AFAC has also reported on its achievements against the *Strategic Directions for Fire and Emergency Services in Australia and New Zealand 2017-2021* to ministers with responsibility for law, policing and emergency services.[124]

3.102 However, AFAC (and its business units including the NRSC and NAFC) is not subject to the same accountability and oversight as public sector bodies. For example, while AFAC's member agencies may be subject to Parliamentary scrutiny, freedom of information legislation and performance audit, AFAC is not.[125]

3.103 We heard a variety of views about the accountability for CCOSC decisions. Most members of CCOSC identified the accountability of members to individual jurisdictions,[126] and others indicating that accountability was not clear.[127] CCOSC does not formally report to any intergovernmental committees or councils.

3.104 In circumstances where decisions about the sharing of resources are discussed and made at CCOSC meetings (even if not made 'by' CCOSC as such), and where it is anticipated that difficult decisions about prioritisation of resources between jurisdictions will be made at CCOSC meetings, we agree with CCOSC's co-chair Mr Cameron, Director-General EMA that such decisions should be made 'under the clear auspices of governments'.[128]

3.105 AFAC informed us that the NRSC, as a functional capability managed by AFAC,[129] has no powers of direction regarding the deployment of resources.[130] While its staff report to the AFAC CEO, AFAC states that the performance of the NRSC is 'accountable to CCOSC'.[131] AFAC suggested that one option to provide assurance for NRSC and NAFC would be to strengthen governance arrangements that apply to the NRSC and NAFC through Australian Government funding agreements.[132] In our view, that option does not adequately provide for the operational nature and significance of the NRSC's evolving functions.

3.106 We heard concerns from AFAC and some state and territory government agencies about clearly capturing the functions of NRSC and NAFC within the auspices of government. AFAC suggests that the NRSC has been a significant success, and any move could compromise the principle of subsidiarity and a strong sense of industry ownership and responsibility.[133] Similarly, Fire and Rescue NSW has argued that NRSC and NAFC 'are the right bodies to continue this work as they have the confidence of the sector across the states and internationally'.[134] Fire and Rescue NSW emphasised that the 'the functions of NRSC and NAFC have been built by the sector with a high level of trust and commitment from the agencies'.[135]

3.107 The NSW Independent Inquiry into the 2019-2020 bushfires expressed similar concerns, suggesting:

> *The Inquiry is concerned that changes to this overarching structure would lead to greater bureaucratisation of AFAC functions, which in turn could have a negative impact on existing flexibility and responsiveness. The Inquiry notes that NAFC and NRSC functions are largely operationally focussed, and that moving away from the current model may be perceived as contrary to the widely accepted principle that combat agencies are best placed to determine operational requirements.*[136]

3.108 We disagree. These are critical functions, the performance of which has national implications for the future. Ensuring that these functions are undertaken by government would mean that NRSC and NAFC would be subject to appropriate transparency, accountability and responsiveness mechanisms.

3.109 **Discussions and decisions that facilitate consideration of national policies and the sharing of government resources in natural disasters should fall within the clear auspices of governments.**

3.110 **The functions performed by NRSC and NAFC should be subject to public sector accountability and oversight, to provide greater public confidence.**

Clear, robust and accountable national arrangements

Australia's future challenge

3.111 We recognise that disaster management in Australia has benefited from the collective efforts of Australian, state and territory government agencies working together, including those aspects conducted through AFAC.

3.112 The 2019-2020 bushfire season tested national coordination arrangements significantly. As described in the Australian Institute For Disaster Resilience's *Major Incidents Report for the 2019-2020 bushfire season*:

> *Across Australia in 2019–20, responses by front-line emergency operation and disaster recovery services, provided by state and territory agencies, was one of the most significant of modern history. Independent but concurrent natural hazard impacts and their compounding effects, followed quickly by the arrival of a pandemic and its sustained influence on Australia's community and economy, required new levels of cooperation nationally and drew on a very broad range of services and capabilities from Australian Government agencies, including the Australian Defence Force (ADF).*[137]

3.113 However, the 2019-2020 severe weather season provided only a glimpse of the types of events that Australia is likely to face in the future, and the level of national coordination that will be required. National arrangements need to be equipped to support Australia's future needs.

3.114 Better national coordination is required to enable significant reduction in disaster risks and impacts in the future. Australia is facing increasingly frequent and intense natural disasters, a significant number of which are likely to be compounding. Governments will need to prepare for more large-scale, multijurisdictional crises. Clear, robust and accountable arrangements for national coordination will greatly assist with addressing these future challenges.

3.115 Broadly, the key elements by which Australia's natural disaster arrangements need to be supported will involve an all-hazards approach to the following:

- strategic leadership, involving collective decision-making by Australian, state and territory government ministers
- strategic advice to ministers from Australian, state and territory government senior officials, and
- a clear, robust, and accountable national coordination mechanism that consolidates policy and operational inputs nationally, led by the Australian Government.

Figure 14 depicts, at a high level, our view of the way improved national arrangements could work.

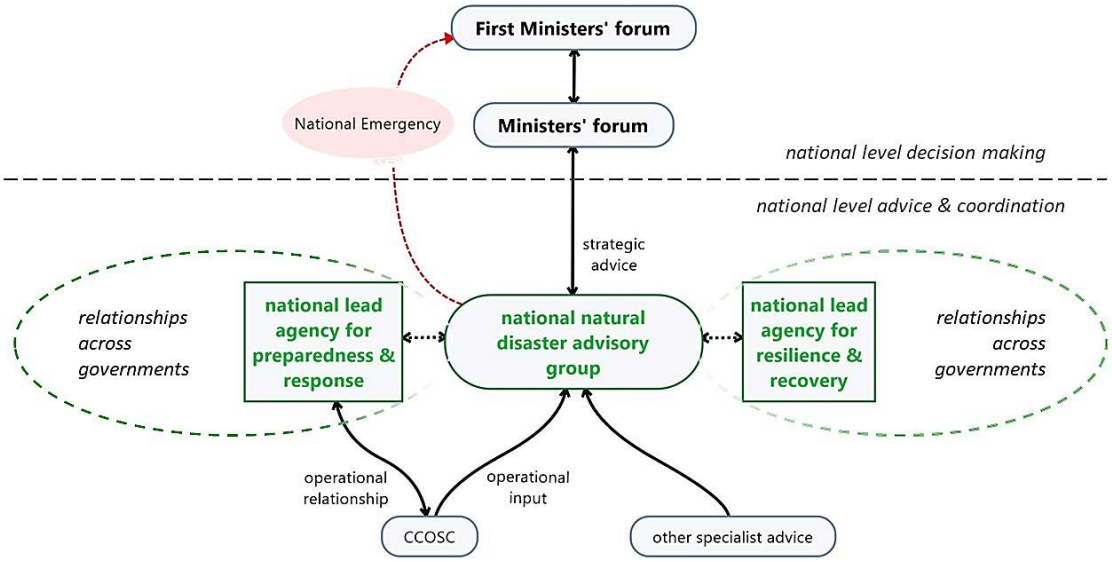


Figure 14: Simplified diagram of indicative high-level arrangements

Strategic leadership and advice

3.116 Natural disasters can have profound national impacts – at times, those impacts may exceed community expectations. For example, we heard several times that the scale of the 2019-2020 bushfires was 'unprecedented'.[138] While not necessarily a natural disaster, COVID-19 has resulted in global and domestic fatalities and disruptions on an unanticipated scale.

3.117 Strategic decisions require a broad view of long-term consequences, including unintended consequences, and must account for risks in a complex and sometimes ambiguous environment. These decisions require an appreciation of factors far beyond the operational focus that is required to combat or contain an immediate disaster. For example, the health impacts of future natural disasters may require a national response.[139] We examine the national arrangements for the health impacts of natural disasters in Chapter 15: Health.

3.118 We can envisage strategic decisions that would need to be made before, during and after a disaster that would have national implications. Without limiting the circumstances that might require strategic national decisions, these decisions could concern:

- strategic plans that describe the way that Australia will prepare for, respond to, and recover from a national level disaster, including economic and social aspects
- national priorities, including the use and allocation of finite resources
- whether to proceed with rapid mobilisation of Australian Government resources to support state and territory jurisdictions
- a shared communication strategy to promote social cohesion, and

- whether to activate financial assistance.

3.119 These types of strategic decisions need to be made by Australian, state and territory government ministers, who are accountable to Australian citizens. This is consistent with principles of accountability embedded within Australia's Constitutional arrangements. As noted by the 1976 *Royal Commission on Australian Government Administration*:

> *It is through ministers that the whole of the administration—departments, statutory bodies and agencies of one kind and another—is responsible to the Parliament and thus, ultimately, to the people.*[140]

3.120 Further, the Prime Minister and first ministers, in particular, are responsible for their governments and, therefore, leadership in a national crisis. This leadership is a reflection of the priority that governments place on the protection of the community and emergency response.[141] As explained by Mr Peter Jennings PSM, Executive Director of the Australian Strategic Policy Institute:

> *…we have something here which is deserving of, you know, the highest level of national priority. And at the end of the day in our system, that means the Prime Minister will naturally want to be shaping and leading how this structure should operate.*[142]

3.121 Ministers can, and for practical reasons must, delegate some decisions to senior officials. For example, ministers cannot, and should not, be making day-to-day operational decisions about the use of fire and emergency services, let alone tactical decisions on the fire ground itself. This would be inconsistent with both the principles of subsidiarity and operational independence, and significantly reduce the flexibility of combat agencies to respond effectively to disasters. As explained by AFAC:

> *…the idea that a body of politicians, however senior, should be making decisions about operational response would appear heterodox to the majority of professional emergency managers. Operational decisions may need to be made in a timeframe of minutes and against a breadth and depth of technical experience that political leaders do not have.*[143]

3.122 For ministers to gain an appreciation of broader risks, they also need to be informed by all relevant portfolios within government so that ministers are aware of, and can take into account, the full range of considerations impacting on the discharge of their portfolio responsibilities and ministerial accountabilities.

National Cabinet as a model

3.123 An intergovernmental process like the National Cabinet provides a potential model for a strategic forum for disasters with national implications. In the context of the COVID-19 pandemic, the ability of the National Cabinet to receive expert advice collectively and directly has proven to be particularly valuable.[144] The direct provision of advice by the Australian Health Protection Principal Committee (AHPPC) [145] and the COVID-19 National Co-ordinating Commission (subsequently named the National COVID-19 Commission Advisory Board)[146] to the National Cabinet has demonstrated how advisory groups can bring together relevant expertise to support ministerial decision making by governments on issues of national importance.

3.124 For example, while the AHPPC has an ongoing role in advising the Australian Health Ministers' Advisory Council,[147] during the COVID-19 pandemic, the AHPPC has also provided advice directly to first ministers at the same time. Professor Brendan Murphy, Secretary of the Australian Government Department of Health and formerly Chief Medical Officer and chair of the AHPPC during the early stages of the pandemic, described this arrangement as having 'removed five layers of bureaucracy,' and as having been an 'incredibly powerful and responsive mechanism' in dealing with a national crisis such as COVID-19.[148]

3.125 Having advisory groups report directly to the National Cabinet when required has ensured collective decision making and that the same advice is delivered to all jurisdictions at the same time. In responding to the COVID-19 pandemic first ministers have been able to apply this national advice in their own jurisdictional context, and provide a tailored response appropriate to their local needs.[149]

3.126 Mr Michael Pezzullo AO, Secretary of the Australian Government Department of Home Affairs, illustrated how such arrangements might work, using the National Cabinet as a model in the context of a future national natural disaster:

> *…the National Cabinet, would make a number of binding decisions because of the way the National Cabinet is working. Constitutionally they are pooling their sovereignty. And so, in effect, nine sovereign governments would say: okay, we've heard about the risk, we've heard about the preparedness side, we've heard about the concurrency side. We've taken advice from our experts, the chiefs of the fire and emergency services about pooled resources.*[150]

3.127 An advisory group responsible for strategic policy and operational advice on disaster management, would be a valuable addition to national arrangements for disaster management. Such a group could consolidate advice across Australian, state and territory government agencies, and other appropriate experts, about disaster management for ministers. This would provide ministers with a clearer understanding of the short, medium and long-term impacts of decisions, and their flow-on implications to other areas of policy, such as education, health, community development and essential services, to name but a few.

3.128 An advisory body should be a standing group that enables development of strategic policy across all phases of disaster management. It should not be limited to operating in times of crisis or disaster.

3.129 However, the Australian Government cautioned against exact replication of the National Cabinet model for national natural disasters:

> *This function should be tasked to a subordinate body of responsible Ministers in each jurisdiction either reporting to the National Cabinet or the National Federation Reform Council.*[151]

3.130 We are not suggesting an exact replication. While the AHPPC provides a useful model, emergency management raises a broader range of issues. The role of the AHPPC is focused on health protection matters and national priorities.[152] In contrast, a new advisory body would have a holistic approach to all disasters and disaster risk, and, in response to a disaster, would draw on a wide range of expertise relevant to

that specific type of disaster — whether floods, bushfires or hailstorms, for example, and with an eye to compounding events, such as cyber-attacks.

3.131 In light of this holistic approach, dictating a set structure for each type of hazard is inflexible and would not provide the means to consolidate policy and operational advice across governments. Similar to AHPPC, senior representatives from each state and territory governments, and the Australian Government, could draw on advice from a range of sources, particularly from bodies like CCOSC, as and when required.

3.132 State and territory governments told us that they were cautious or concerned about ministers making operational decisions for which officials from state and territory fire and emergency services have responsibility under legislation.[153] This is not our proposal, nor would it be effective. We agree with the position put by Mr Philip Gaetjens, Secretary, Department of the Prime Minister and Cabinet:

> *National Cabinet could focus on supplementing rather than supplanting jurisdictions' operational-level coordination mechanisms. I emphasise here the importance of subsidiarity - a policy construct under which roles are delegated to the lowest level of government possible, in order for the response on the ground to best meet the needs of the community.*[154]

3.133 In ordinary circumstances, intergovernmental processes could provide that a subordinate group of responsible ministers lead, monitor and track progress of the development of this strategic policy work. Where necessary, complex challenges that inhibit progress on strategic national policies could be escalated to the Prime Minister and first ministers for consideration.

3.134 We emphasise the importance of intergovernmental processes that provide national level senior leaders with the ability to direct strategic policy initiatives with purpose and urgency. Some national frameworks and strategies have taken years to gain national endorsement. For example, the NDRRF was finalised in 2018, but only endorsed by first ministers in 2020.[155] In other instances, we have been unable to determine a framework or strategy's implementation status. We discuss this issue further in the context of accountability and assurance in Chapter 24: Assurance and accountability.

3.135 To respond to a crisis, the Prime Minister and first ministers should have the ability to request advice directly from an advisory body. We consider that the Prime Minister's and first ministers' authority is critical for strategic decision-making concerning disasters that have national implications. These disasters require significant collaboration across senior leaders within, across and outside governments.

3.136 Ministers might not always be able to agree on particular issues. Where consensus is not possible, national deliberation and progress should still be pursued – an absence of consensus should not condemn progress for a majority for want of agreement.[156] These factors should be considered as part of reviewing intergovernmental processes. The functions of the new advisory body should align with the relevant ministerial forum so that there is clear authority for the advisory body to collate efforts across governments. Existing ministerial forums and intergovernmental committees such as the MCPEM, under which ANZEMC sits, are under review, and

would not be appropriate for the proposed intergovernmental process. The review will provide recommendations to National Cabinet before the end of 2020.

3.137 **The structure and processes of ANZEMC are not appropriate for the new advisory body.**

Recommendation 3.1 Forum for ministers

Australian, state and territory governments should restructure and reinvigorate ministerial forums with a view to enabling timely and informed strategic decision-making in respect of:

(1) long-term policy improvement in relation to natural disasters

(2) national preparations for, and adaptation to, natural disasters, and

(3) response to, and recovery from, natural disasters of national scale or consequence

including, where appropriate, through the National Cabinet or equivalent intergovernmental leaders' body.

Recommendation 3.2 Establishment of an authoritative disaster advisory body

Australian, state and territory governments should establish an authoritative advisory body to consolidate advice on strategic policy and relevant operational considerations for ministers in relation to natural disasters.

An enhanced national coordination mechanism

3.138 Improving national coordination in the face of natural disasters requires enhanced inputs across disaster resilience and all phases of disaster management. Improving Australia's approach is important to manage short, medium and long-term impacts that arise from disasters.

3.139 While state and territory governments should continue to have primary responsibility for responding to natural disasters, in light of the future risks that Australia is facing, state and territory governments will not be able to manage the short, medium and long-term impacts alone. Greater support and assistance is required from the Australian Government, especially for disasters that are of such scale or complexity that they have implications, and need to be led, at the national-level.

National resilience and risk reduction functions

3.140 Improving disaster resilience and risk reduction is required to lessen the long-term impacts of increasingly frequent and intense natural disasters. Resilience requires sustained focus supported by strategic policy insights.

3.141 In February 2011, COAG agreed to a *National Strategy for Disaster Resilience*, which states:

> *Building upon our existing emergency planning arrangements, we need to focus more on action-based resilience planning to strengthen local capacity and capability, with greater emphasis on community engagement and a better understanding of the diversity, needs, strengths and vulnerabilities within communities.*[157]

3.142 In 2018, the NDRRF was released, which built on the work of the National Strategy for Disaster Resilience:

> *[The NDRRF] is designed to leverage the great work and progress made across all sectors since the release of the NSDR in 2011 to better understand and reduce disaster risks, improve resilience and bolster the capability and capacity of communities to withstand natural hazards.*[158]

3.143 Over the last decade, a series of national partnership agreements has been agreed between the Australian, state and territory governments that involve significant funding commitments to improve disaster resilience and risk reduction. The most recent agreement from 2020 resulted in Australian, state and territory governments committing $261 million over five years to implement risk reduction initiatives.[159]

3.144 Evaluating Australia's success against frameworks like the NDRRF is important so that governments, businesses and individuals have confidence that Australia continues to reduce disaster risk. This is especially so in light of our alarming disaster outlook. This is discussed in further detail in Chapter 24: Assurance and accountability.

3.145 We are concerned about the extent to which broader work across governments relating to disaster risk is integrated. For example, the *National Climate Resilience and Adaptation Strategy*, which is led by the Australian Government Department of Agriculture, Water and the Environment, does not appear to be integrated with the NDRRF. We would expect a direct and articulated relationship, across government frameworks and strategies, in light of the link between natural hazards and climate risk.

3.146 Mr Gaetjens, Secretary, Department of the Prime Minister and Cabinet, told us, in relation to improving resilience, that:[160]

- *Building resilience by reducing disaster risk involves long timescales, short-and long-term trade-offs, and high levels of uncertainty.*
- *No single agency, portfolio or level of government controls all the levers to reduce risk.*
- *Different actors are exposed to different levels of risk, and have different capabilities to minimize or manage their risk exposure.*
- *The cost of de-risking retrospectively, or in response to a deteriorating risk outlook, is likely to be higher than the costs of actions to manage risk - particularly when it comes to land-use planning in the built environment.*[161]

3.147 Mr Mark Crossweller AFSM, a former Director-General of EMA, who was intimately involved in the development of the NDRRF, agreed. He emphasised the need to work cooperatively with the private sector throughout implementation of the NDRRF.[162] He also stated:

> *So I think, given the systemic and strategic nature of the problem, the key to this is a governance framing that allows that ongoing dialogue and, you know, sensible willing accountabilities and responsibilities.*[163]

3.148 The main focus of the AGCMF is 'near term crisis preparedness, immediate crisis response and early crisis recovery arrangements. Long term disaster risk reduction and resilience building activities are not covered in detail' in the AGCMF.[164] We see value in the Australian Government maintaining a standing function dedicated to championing 'resilience' at the national level, as suggested by Mr Gaetjens.[165] The responsible entity could educate and work collaboratively with partners to embed resilience considerations across the Australian community, including across the Australian, state and territory governments, private sector, non-government organisations and the community. This will support Australia to take a whole-of-nation approach to the reduction of disaster risk.

3.149 **The Australian Government should establish a standing disaster resilience function to provide continued focus on reducing long-term disaster risk and harmonising approaches across Australia to achieve risk reduction. A narrow focus on response and recovery would condemn Australia to a continuation of the existing cycle.**

National preparedness and response functions

3.150 We see an enhanced role for EMA in the future. EMA has been central to coordinating the Australian Government's activities during a crisis.[166] It is responsible for providing situational awareness to the Australian Government and facilitating Australian Government assistance to state and territory governments. We heard that, over the 2019-2020 bushfire season, Mr Cameron, Director-General of EMA, briefed the Prime Minister directly,[167] the CCC facilitated two meetings of the NCC, but many more of the AGCC, and the Director-General worked closely with state and territory fire and emergency services as co-chair of CCOSC meetings.[168]

3.151 We anticipate that future disasters will require a greater effort on behalf of the Australian, state and territory governments to achieve effective national coordination. While state and territory governments should retain control of their resources, the Australian Government should coordinate nationally for these types of large scale, multijurisdictional disasters, and can play an important leadership role.

3.152 National coordination activities that the Australian Government could undertake include:

- receiving information and advice from governments, non-government entities and the private sector
- providing national situational awareness for all governments, which should involve NCC, or a similar forum, and, where appropriate, CCOSC and other relevant advisors, such as the Bureau of Meteorology, and

- engaging with sectors that ordinarily do not connect but need to connect to respond effectively to a disaster.

These activities are important so that the Australian Government can ensure that a cohesive whole-of-nation perspective is provided to Australian, state and territory government ministers. For example, we heard that the Bureau of Meteorology briefed National Cabinet on natural disaster risks across the country.[169]

3.153 In response to large scale and multi-jurisdictional disasters, the Australian Government could adopt an approach to national coordination informed by the experience of the NCM.

3.154 EMA already undertakes some of these situational awareness and coordination activities. However, in order to meet the future needs for national situational awareness and coordination, we would suggest that EMA's role needs to be expanded and enhanced.

3.155 **The Australian Government should maintain a standing function to provide national situational awareness and coordination for all governments, based on inputs from relevant sectors.**

3.156 Efficiencies would be gained by the Australian Government undertaking the functions of the NRSC. Among other functions, NRSC facilitates interstate and international movements of fire and emergency service resources, including some aerial firefighting assets. States and territories would benefit from an Australian Government agency that has national situational awareness providing this coordination function, as well as enhancements to that function as discussed in Chapter 6: National emergency response capability. In addition, the Australian Government is well positioned to coordinate and integrate a greater range of resources beyond just fire and emergency service resources. For example, the Australian Government could use this mechanism to facilitate movement of other types of resources, such as health equipment. We discuss improvements to national health arrangements in natural disasters in Chapter 15: Health.

3.157 The Australian Government could also be responsible for the procurement functions of NAFC. We see benefits around ensuring clear lines of accountability regarding the significant funding that the Australian Government contributes to NAFC relative to AFAC member contributions. We discuss the need for an enhanced national aerial firefighting capability further in Chapter 8: National aerial firefighting capabilities and arrangements.

3.158 Mr Ellis, CEO of AFAC, raised concerns that the Australian Government conducting the functions of NRSC and NAFC would not best serve 'fire and emergency services' and 'national objectives':

> *… there is likely to be a reduced, or no sense of ownership, reduced shared responsibility and reduced collegiality that in turn is likely to reduce trust and confidence in sister agencies. The benefit of the AFAC structure is that it allows the parties to agree on how to move resources to the areas of greatest need. It allows the States and Territories to make decisions about their own resources and, if there are insufficient resources available, for the States and Territories to allocate resources to the agreed highest priority areas and when need be, adjust plans to*

operate with those resources available. This is crucial because fire and emergency services are a State and Territory responsibility, funded by States and Territories and not a Commonwealth responsibility. On that basis the decision about how to allocate resources should be made by the States and Territories themselves. AFAC's role (carried out by its functional bodies) is to facilitate and support those discussions.[170]

3.159 These concerns were echoed by some state and territory governments, which did not support a transition of functions exercised by the NRSC and NAFC to an appropriately funded and supported government entity.[171] They emphasised that NAFC and NRSC are currently working well.[172]

3.160 We disagree with the suggestion that conferring NRSC and NAFC's functions on the Australian Government would result in no sense of ownership, or diminish state and territory government control of their resources. To be clear, consistent with the views of state and territory governments, we do not dispute that state and territory governments should retain control and decision-making power over their resources. The Australian Government would only facilitate interstate and international deployments after the Australian, state and territory governments make decisions about their own resources.

3.161 Some state and territory governments also raised concerns that the Australian Government does not have the expertise necessary to conduct NRSC and NAFC functions. As stated by NSW:

The NRSC and NAFC are operated by fire service professionals who have the necessary fire management experience and operational knowledge to effectively and responsibly coordinate the provision of assets between jurisdictions. NSW has observed that NAFC and NRSC use effective processes structures and governance arrangements and operate well.[173]

3.162 We agree with state and territory governments that the Australian Government would need to develop further capabilities to perform this coordination function. Noting EMA and other Australian Government agencies already undertake complex coordination, we do not see this as a barrier to implementation. With appropriate support, the Australian Government could quickly develop capability. Additionally, state and territory governments could second experts on a temporary basis to the Australian Government, in the same way that they presently second personnel to the NRSC. This would also address a concern expressed by Queensland about the need to ensure that any transition does not disrupt activities.[174]

3.163 Importantly, even if the suggested role was undertaken by the Australian Government, close consultation with state and territory governments would continue to be necessary, to manage relationships and 'broker' resource sharing effectively. We consider that relationship management would be key to the success of implementing a broader coordination function.

3.164 **The Australian Government should assume, and make, standing arrangements for, the coordination and procurement functions of NAFC and NRSC.**

3.165 We stress that we continue to see an important role for AFAC in the future. AFAC has undertaken impressive work to date. It has identified improvements to emergency

management arrangements and followed through with those improvements for the benefit of Australia.

3.166 While some functions, in light of their national implications, are best served through public sector accountability, AFAC should continue to remain as a peak body for its members. There is a plethora of projects for which AFAC can continue to lead, particularly progressing and harmonising national doctrine. We heard many positive comments about AFAC from officials within governments, as well as from outside of government, in this regard, and commend its work in this area.

3.167 **AFAC should continue to contribute to doctrine development and best practice across the fire and emergency services sector.**

3.168 The role of the Australian Government would also involve continuous improvement and preparedness of national arrangements so that all governments are ready when a disaster strikes. National preparedness and response are intimately linked — at the heart of effective response is preparedness. Australia needs to prepare for national disasters so that it can coordinate effectively in response to those disasters. We agree with the assessment of Mr Pezzullo, Secretary of the Department of Home Affairs:

> *Your responses are going to be better honed with deeper preparation, training and exercising. I don't want to be glib about this but it's no different from sport or any other endeavour in life. The more preparation you do, the more planning and training you do, the better off you are on the day, although obviously you need to adjust on the day.*[175]

3.169 We anticipate that, as Australia faces more frequent, intense disasters that are large-scale and/or multi-jurisdictional, state and territory governments are likely to require greater assistance from the Australian Government in response to a disaster. Key to those responses are the NATCATDISPLAN and the COMDISPLAN, the national disaster plans that detail the mechanics for providing Australian Government non-financial assistance to state and territory governments. Both plans are the responsibility of EMA within the Department of Home Affairs. We consider NATCATDISPLAN further in Chapter 5: Declaration of national emergency.

3.170 We heard of uncertainty about the thresholds for requesting assistance under the COMDISPLAN. Some state governments considered that a request under COMDISPLAN required that it exhaust all other available resources. Others considered that a request could be made when exhaustion was possible, or likely. During the 2019-2020 bushfire season, this uncertainty had implications that potentially delayed requests or resulted in a request for the deployment of the Australian Defence Force not being made. We consider COMDISPLAN further in Chapter 8Chapter 7: Role of the Australian Defence Force.

3.171 We are concerned that, should these thresholds remain unclear, state and territory governments might not leverage, or might not use, available Australian Government resources in a timely way. While the 2019-2020 bushfires saw assistance from the Australian Defence Force, the Australian Government has a range of other resources available, such as health equipment, which could be necessary in future.

3.172 Mr Pezzulo, Secretary of the Department of Home Affairs, has stated that EMA did not adopt a strict interpretation of COMDISPLAN over the 2019-2020 bushfires, as it would have been impractical in the midst of a disaster:

> *... we had to throw the rule book out and start to anticipate requests including - and I think Counsel took some witnesses through the exact letter of the doctrine that you have to have exhausted all other possibilities. When something's burning or when you're the subject of a global pandemic or when you're the subject of another catastrophe, human or natural, the last thing you should rely on is a rigid rule book that has lost all contact with the enemy.*[176]

3.173 However, it is apparent that some states and territories were cautious of this approach. We also note and welcomed indications from the Australian Government that it will work with state and territory governments to update the COMDISPLAN to take into account the establishment of the National Cabinet and the NCM.[177]

Recommendation 3.3 Revise COMDISPLAN

The Australian Government should revise the COMDISPLAN thresholds to provide that a request for Australian Government assistance, including Defence assistance, is able to be made by a state or territory government when:

(1) it has exhausted, or is 'likely to exhaust', all government, community and commercial resources

(2) it cannot mobilise its own resources (or community and commercial resources) in time, or

(3) the Australian Government has a capability that the state or territory does not have.

National exercises

3.174 We agree that national coordination arrangements should be tried and tested before events, so that arrangements are robust and clearly understood by all involved. The challenges around the use of the NATCATDISPLAN and COMDISPLAN could have been identified by strategic scenario testing by the Australian and state and territory governments working together at a national level. Strategic scenario testing, as opposed to an operational focus, allows an evaluation of current policy settings, and whether they facilitate effective intergovernmental inputs and decision-making. Stress testing is an important part of the accountability and assurance process - lessons need to be identified and learnt to enable continuous improvement and best practice in Australia's approach to disaster management. We discuss this further in Chapter 24: Assurance and accountability.

3.175 In designing these scenarios, it is important that scenarios 'stress test' current settings – that is, place people and arrangements in circumstances that test the limits of the arrangements. While not directly relevant to natural disasters, this type of scenario planning has been carried out across other areas of government. For example, Professor Murphy, Secretary of the Australian Government Department of Health, referred to the Department of Health having done 'a range of desktop

modellings and some real life modellings' in relation to use of a declaration power under the *Biosecurity Act 2015* (Cth).[178]

3.176 **The Australian Government should maintain a function that designs and leads strategic scenario testing for natural disasters of national scale or consequence. Scenario testing should involve state and territory governments, as appropriate.**

National recovery functions

3.177 We see an enhanced role for the NBRA. The NBRA provides a compelling illustration of the value of national coordination, and of the positive effects of bringing together stakeholders across jurisdictions, sectors and levels of government, and providing strategic direction.

3.178 State, territory and local governments have told us that the NBRA enhances national coordination, empowers communities to pursue their recovery priorities, and facilitates information-sharing.[179] The activities of NBRA have also built shared situational awareness; enabled jurisdictions and sectors to work together; and influenced decisions to ensure that funding is targeted and effective. The NBRA has demonstrated how a national coordinating body can improve communication and sharing of expertise between jurisdictions.

3.179 While expressing praise for the NBRA's work, some local governments noted that the rapid stand-up of NBRA in January 2020 and the immediate aftermath of crisis caused confusion and uncertainty.[180] During the initial stages of its operation, NBRA experienced teething issues as it sought to develop an understanding of its environment, while coordinating the immediate need for assistance.[181] Local and state governments said that, on occasions, this hampered their ability to engage effectively.[182]

3.180 Establishment of national coordination of recovery on a standing basis would address many of these concerns and allow for institutional knowledge and relationships between all levels of government, civil society and the private sector to develop and mature. Such a body would not relieve local authorities of their essential role in supporting their communities; but it would support and assist them while ensuring that the Australian Government was able to maintain a nation-wide view of, and provide considered and targeted support for, recovery.

3.181 Establishing a standing national function would also provide the opportunity to plan for national recovery efforts in advance of a disaster. The value of a national, coordinated approach to recovery has been widely recognised, including by state and territory governments.

3.182 **National recovery functions should remain on a standing basis and should be expanded to apply to all-hazards, not just bushfires.**

Designing and delivering national coordination

3.183 There are a number of different ways that these functions could be designed and delivered. Our approach has been to focus on functions first.[183] We have considered existing structures and the implications that changes could have.

3.184 Preparedness and response are intimately linked, so it is important that one function informs the other. We understand that EMA currently performs some, but not all of the functions we have proposed as standing functions under response and preparedness.

3.185 We heard that resilience should sit with an expanded, standing recovery function. Both require policy insights and coordination, but more importantly recovery experiences inform resilience initiatives. Damage that needs recovery after one disaster should inform resilience measures (including 'betterment') ahead of the next.[184] We address the value of disaster impact assessments in informing all phases of emergency management in Chapter 4: Supporting better decisions.

3.186 We have also heard a suggestion that resilience and recovery could be undertaken separately from crisis management. Dr Robert Glasser, former United Nations Secretary-General's Special Representative for Disaster Risk Reduction, and now a member of the board of the Queensland Reconstruction Authority, suggested that if resilience and recovery are placed with emergency response, the latter will always trump the former.[185]

3.187 Some states advised that they do not support the establishment of a separate resilience and recovery agency.[186] Tasmania and the ACT queried why such an agency should have responsibility for resilience and recovery, but not other aspects of emergency management.[187] WA expressed concern that the agency would not have the flexibility to support community-led recovery.[188] Several states noted concerns that such an agency could lead to confusion and duplication or disrupt existing relationships.[189] Finally, Queensland told us that, while supportive of a standing body in principle, it did not support that body having a remit to deal directly with affected people[190], and Tasmania told us that any such body should not deal directly with local governments.[191]

3.188 We acknowledge the views of those state governments and suggest that close connections between all disaster management work is necessary – each will be informed by the other. Each is clearly connected and represents a different point, and sometimes simultaneous points, of a cycle. Attempting to put all functions of disaster management in a single agency could lead to seismic shifts in government responsibilities, due to the cross-cutting and multi-factorial nature of the work.[192] For example, while Geoscience Australia and the Bureau of Meteorology make significant contributions to informing disaster management, we would not suggest that they should be merged into a single entity within an enhanced EMA.

3.189 Irrespective of the extent to which functions are integrated, the enhanced EMA and NBRA should have clear authority and greater prominence so that these agencies can corral a national perspective across the plethora of frameworks and bodies. The relevant structural arrangements need not be the same for each, but rather should take into account their functions, intersections across government and accountabilities. Each could be continued as units within an Australian Government department, but with greater authority and recognition. Equally, a stand-alone agency might be considered, particularly for NBRA.[193] An agency would have the benefit of underpinning legislation that provides clear functions and objectives, and ensures public accountability. We heard that establishing a stand-alone agency

would reduce bureaucratic overheads, improve learnings over time, and provide a quicker response to disasters.[194]

3.190 Some of the reservations we heard from state and territory governments might be addressed by separating crisis management and strategic policy, but bringing them together within the same portfolio. Crisis management could be performed by a stand-alone agency, whereas strategic policy could be performed by the government department responsible for the agency. This would establish a strong connection between the two functions, but also ensure necessary separation to supported dedicated focus.

3.191 Importantly, these mechanisms need to be able to be applied across different risks and impacts, not just natural disasters. While our terms of reference are limited to natural disasters, we appreciate that governments will need to consider a range of complex hazards in the future. As Mr Jennings, Executive Director, Australian Strategic Policy Institute remarked:

> *…we're likely to continue to have to deal with a range of factors, some of them climate-related, but now also I think health-related, supply chain-related, cyber-related and so all of these things really do suggest that, ... there is I think time for a bit of new machinery of government to support an emerging and serious level of threats to Australia.*[195]

3.192 The considerations we have outlined for structure are not exhaustive – agility is required to mobilise national coordination in response to the impacts that we have not imagined.

3.193 The form of these arrangements will be a matter for the Australian Government. In our view the form should, however, include the following:

- clear lines of authority, including:
  - the ability for senior officials leading national coordination functions to escalate directly to the responsible minister, when appropriate, and
  - the ability to coordinate and articulate a holistic perspective on behalf of the Australian Government on natural disasters
- accountability and transparency, so that the public can understand the entities' functions and progress against longer-term national objectives, and
- appropriate resourcing, so that entities have sufficient capacity and capability to discharge their responsibilities.

Recommendation 3.4 Integrating disaster management of the Australian Government

Australian Government agencies should work together across all phases of disaster management.

Recommendation 3.5 Establishing a standing resilience and recovery entity

The Australian Government should establish a standing entity that will enhance national natural disaster resilience and recovery, focused on long-term disaster risk reduction.

Recommendation 3.6 Enhanced national preparedness and response entity

The Australian Government should enhance national preparedness for, and response to, natural disasters, building on the responsibilities of Emergency Management Australia, to include facilitating resource sharing decisions of governments and stress testing national disaster plans.

Chapter 4 Supporting better decisions

Summary 111

Informed decisions for natural disaster arrangements 112

Data and information to understand disaster risk 112

Nationally consistent and nationally comparable data 115

Pursuing consistent data: harmonisation versus standardisation 117

Moves toward better data and information are occurring 118

Improving climate, disaster risk and impact information 122

Climate science capabilities 122

Climate data for adaptation, risk assessments and scenario planning 124

Natural hazard risk information 126

Exposure information 128

Vulnerability information 129

Disaster impact assessments 130

Consistency of impact information 131

Platform for collecting and sharing information 133

Summary

4.1 Good decision making needs to be based on good information. Decision-making for national coordination of disaster management requires knowledge, data and information to be shared, consistent and up to date. Decision-making extends well beyond the immediate crisis or operational phases of a disaster.

4.2 Since at least 2002, there have been repeated calls for national consistency in disaster information and data. Australian, state and territory governments should progress their in-principle support for consistency, and agree a practical path forward to implement it.

4.3 The Australian Government has acknowledged that it can, as it should, play a national leadership role in coordinating national data, information and standard setting, in consultation with states and territories. Australian, state and territory governments should prioritise the implementation of data harmonisation, and national data standards, create common information platforms and share technologies. This will enable collaboration in the production, analysis, access, and exchange of information, data and knowledge about climate and disaster risks.

4.4 There are a number of opportunities to improve the risk and impact information used to inform strategic and operational decision-making.

4.5 An ongoing capability in national climate and weather modelling and improved national climate and weather intelligence will support Australian, state and territory governments to implement, assess and review their disaster management and climate adaptation strategies. Australian, state and territory governments should produce downscaled climate projections to inform the assessment of future natural disaster risk.

4.6 Australian, state and territory governments should explore the feasibility and practicalities of developing and maintaining nationally consistent assessments and projections of the frequency, intensity and spatial distribution of natural hazards in Australia. Exposure and vulnerability information, at a localised level, is also required to give a more complete understanding of disaster risk and impacts.

4.7 Australian, state and territory governments should also work together to develop consistent data standards to measure disaster impact and should continue to develop a greater capacity to collect and share standardised and comprehensive natural disaster impact data.

Informed decisions for natural disaster arrangements

4.8 In Chapter 3: National coordination arrangements we canvassed the importance of national arrangements for coordinating disaster management. We make recommendations for mechanisms to:

- enable timely and informed decisions that have national implications
- provide strategic advice, and
- enhance national coordination.

4.9 To operate effectively, these mechanisms, for strategic and operational decision making, require knowledge, data and information to be shared. Strategic and operational decision making, including at a national level, requires a consistent and contemporary understanding of disaster risks and impacts and relies on credible, accessible and up to date data and information. National information systems can support and facilitate these ends:

> *A rigorously safe, streamlined, transparent and accountable framework for sharing data between government agencies and the private, research and non-profit sectors can deliver significant benefits to the Australian community.*[1]

4.10 Information systems do not exist for their own purpose; they are created to provide information to support decision making. Any national information system should be evaluated on the basis of whether it provides the information needed by decision-makers in a timely and effective manner.

4.11 The requirement for knowledge, data and information extends well beyond the immediate crisis or operational phases of a disaster. Figure 15 provides some examples of common data and information needs across different phases of a disaster.

Data and information to understand disaster risk

4.12 In Australia, multiple agencies across all levels of government and the private and research sectors are involved in collating and producing disaster risk and impact related information. They use a range of information systems, tools and technologies to do so, and continued research and investment will be vital to maintaining and extending these capabilities. This is a matter we explore further in Chapter 23: National research and emerging technology.

4.13 In 2015, Australia adopted the *Sendai Framework for Disaster Risk Reduction 2015 – 2030* (the Sendai Framework). The *National Disaster Risk Reduction Framework* (NDRRF) seeks to implement the Sendai Framework in the Australian context. In 2017, the Australian Government's National Resilience Taskforce (the Taskforce), in presenting a case to enhance national disaster preparedness, spoke to the value of a national level understanding of disaster risk:

> *The availability of information at the national level is important to Australia's overall ability to prepare for the impacts of, and disruptions caused by, severe to catastrophic events.*[2]

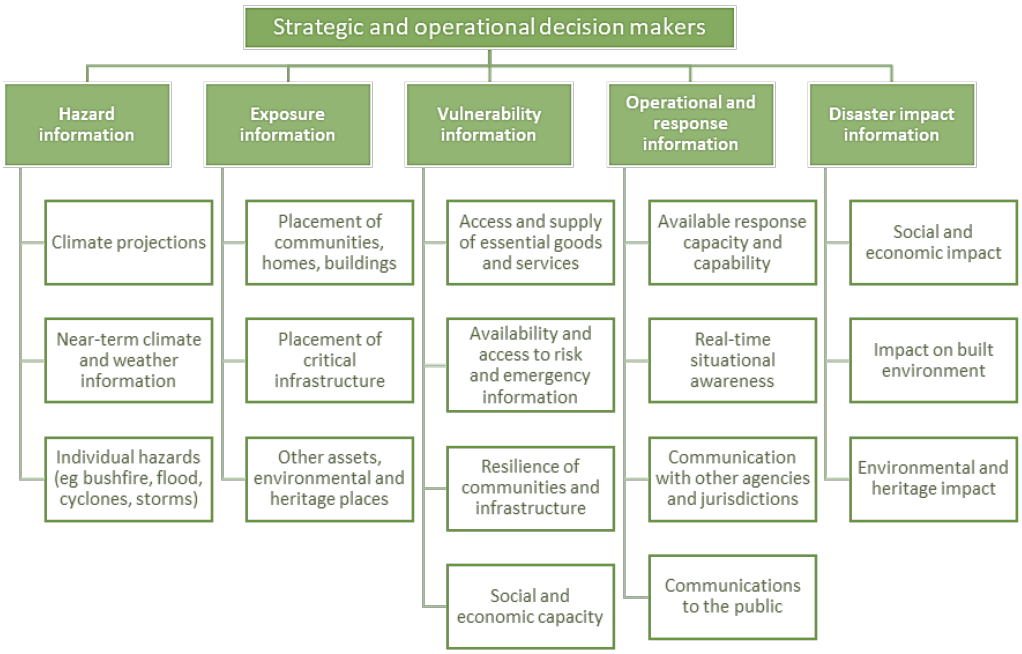


Figure 15: Information needs for strategic and operational decision makers

4.14 The Taskforce noted that official national information on hazard intensity, exposure trends and underlying vulnerability is not available.

4.15 In 2018, the Australian Government commissioned Deloitte Access Economics to undertake a 'data mapping exercise' to 'assess the current suitability of Australian data for current and future reporting' of '38 indicators across the seven targets set out in the Sendai Framework'.[3] Figure 16 shows the proportion of indicators Australia could report on at that time.[4]

4.16 The review made observations including that:

- from a quality standpoint, data consistency was 'essential to facilitating effective monitoring, reporting and informed decision-making' and using a national dataset 'where possible' ensures that data has 'agreed definitions, methodologies and standards to allow comparisons', and
- there were a number of gaps including that data may be available but access to the data was impeded and the data was not available for all states and territories.[5]

4.17 The NDRRF was endorsed by Australian, state and territory governments in March 2020. It emphasises the importance of understanding disaster risk. It notes that a wealth of disaster risk data, information and knowledge already exists across governments and the private sector, however much existing data relate to historical natural hazard patterns, and while useful, they cannot be relied on as a predictor of future risk. Further, it notes that, to make sensible long-term policy decisions and prevent new risks being created, Australia needs to understand possible future disaster risks and impacts.[6]

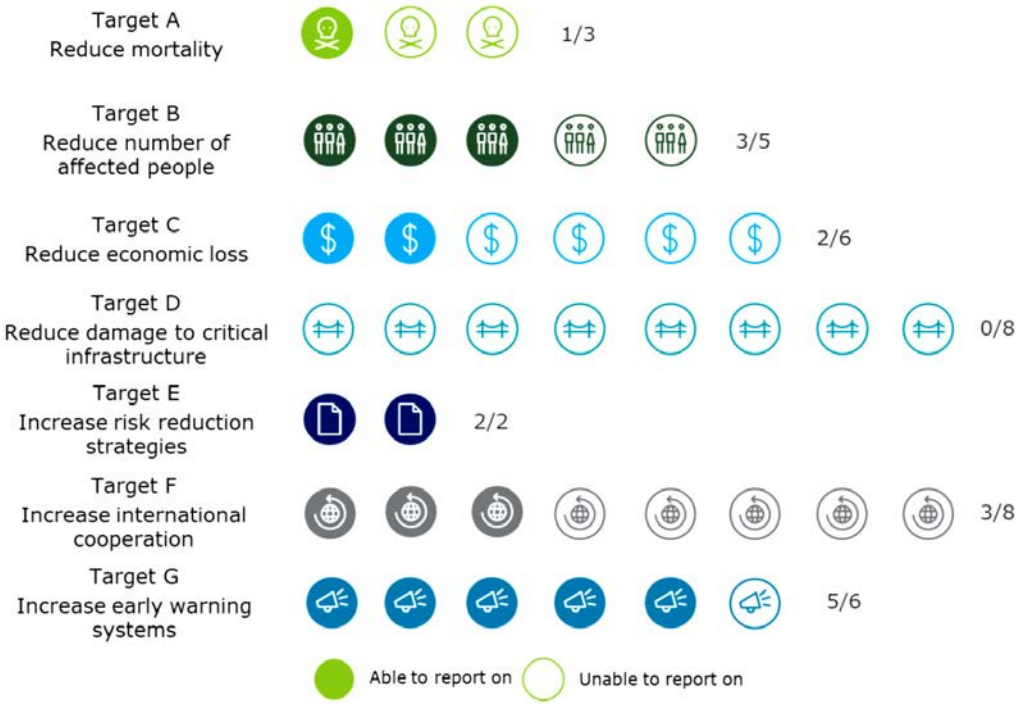


Figure 16: Proportion of 38 indicators across the seven targets set out in the *Sendai Framework* that Australia could report on in 2018.[7]

4.18 There are, of course, challenges and limitations in pursuing a national understanding of disaster risk. Disaster information is generated at a variety of scales, including national-scale products produced through satellite imagery and modelling, down to local and state-scale data generated using field-based techniques, remote sensing and modelling.

4.19 Bringing this data together, at a national scale, can result in a patchwork of inconsistent data of variable quality, at different scales and related to different periods. For example, risk assessment methodology used by the states and territories, while generally informed by the *National Emergency Risk Assessment Guidelines* framework,[8] varies. This variability limits the ability to bring together the outcomes of these risk assessments in a meaningful or comparable way. A further limitation is that disaster risk assessment is most effective when undertaken at a localised level, recognising context and specific details around hazards, vulnerability and exposure. When aggregated to a national level, the context and meaning is largely lost.[9]

4.20 Existing risk assessment and management approaches are useful for some sorts of natural hazards and categories of risk, but are inadequate when dealing with cumulative and cross scale issues, or situations where the likelihood is low but the consequences are catastrophic.[10]

4.21 We also heard of barriers in collating broad-scale disaster risk and impact data and information, including a reluctance to share data, restrictive licensing arrangements, cost of collection, cost of providing accessibility and transparency, lack of coordination and harmonisation or standardisation of data, and that a national approach will adopt the 'lowest common denominator' and have limited potential for practical application.[11]

Nationally consistent and nationally comparable data

4.22 Nationally consistent data and nationally comparable data can facilitate the sharing of information and the development and implementation of national information systems.

4.23 For example, from early in our inquiry, we struggled to obtain consistent burnt area data on a national scale. After the 2019-2020 bushfires, data were collected by the states and territories using a variety of means. The national burnt area data we received ranged from 24.3 million hectares (the sum of the burnt area data provided by each affected state and territory)[12] to 33.8 million hectares from the Australian Government (from the National Indicative Aggregated Fire Extent Data Set).[13]

4.24 The pursuit of nationally consistent data has been raised by a number of reviews and inquiries. Since at least 2002 there have been ongoing calls for national consistency in disaster information and data. For example:

- 2002 Natural Disasters in Australia: reforming mitigation, relief and recovery arrangements (COAG)

  Establish a nationally consistent system of data collection, research and analysis to ensure a sound knowledge base on natural disasters and disaster mitigation.[14]

- 2004 National Inquiry on Bushfire Mitigation and Management (COAG)

  Develop national consistency in data sets relevant to bushfire mitigation and management under the Australian Spatial Data Infrastructure framework, and within this context, identify and resource national bushfire data set coordinators.[15]

- 2012 Enhancing Disaster Resilience in the Built Environment Roadmap (National Emergency Management Committee)

  The mapping of risks and priority hazards must be undertaken using nationally accepted conventions and standards to ensure consistency and effective sharing of 'like' data across jurisdictional boundaries.'[16]

- 2015 Inquiry into National Disaster Funding Arrangements (Productivity Commission)

  Governments should task the Australia–New Zealand Emergency Management Committee with leading the development of guidelines for the collection and dissemination of natural hazard mapping, modelling and metadata. Guidelines should be developed for all hazards that need to be modelled and mapped at the local/regional level and where consistency across regions is desirable.[17]

Box 4.1 Opportunities for improving disaster-related data and information[18]

We heard from Australian, state and territory government departments and agencies on a multitude of opportunities to improve disaster-relevant data and information. By way of example – and by no means exhaustive – respondents to our initial notices identified the following opportunities for improvement:

Improved access to information and data sharing (raised by NSW, SA, WA, QLD, VIC, Emergency Management Australia (EMA), Bureau of Meteorology (BoM) and the Department of Agriculture, Water and the Environment (DAWE)).

Improved capability of existing institutions / tools to provide data and/or research (raised by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), WA, NSW, WA, ACT, VIC)

Improved data capabilities, including:

- *Weather* (incl. seasonal forecasts) (raised by the BoM, CSIRO, EMA, QLD)
- *Earth observations* (LiDAR[19], Satellite, air quality etc) (raised by BoM, CSIRO, WA, NSW, NT, SA, EMA, ACT, QLD, VIC)
- *Simulations and/or scenarios* (raised by BoM, CSIRO, DAWE, NSW, SA, VIC)
- *Climate information* (raised by BoM, CSIRO, DAWE, QLD, SA, VIC)
- *Risk information* (raised by NT, ACT, BoM, SA, CSIRO, VIC, DAWE, QLD, EMA, ACT)
- *Impact assessments* (raised by CSIRO, SA)

Improved national data consistency, including:

- *Standards* (raised by BoM, CSIRO, NSW, ACT, SA)
- *Harmonisation* (raised by CSIRO, DAWE, SA)
- *Undefined consistency* (raised by NSW, WA, EMA, NT, QLD)

Improved community messaging and warnings (raised by BoM, WA, QLD, VIC, NSW)

Improved availability of data to emergency services (raised by CSIRO, NSW, WA)

4.25 Geoscience Australia, CSIRO, local governments, peak bodies, and the insurance industry have also all advocated making natural disaster information data nationally consistent.[20]

4.26 State and territory governments have shown a strong interest in understanding and developing or adopting best practice, including by sharing and learning from each other.[21]

4.27 The Australian Government supports improved data governance and greater harmonisation of standards and technologies to enable collaboration in the production, analysis, access, and exchange of information, data and knowledge about climate and disaster risks.[22] Various Australian, state and territory agencies support improvements in consistent risk data in one domain or another, with some referring specifically to national standards, some noting support for harmonisation and others focusing on the outcome of consistency, rather than how they get there.[23]

4.28 State and territory governments expressed the following reservations regarding national information systems:

- there should be an identified need for any national information system
- any national information should not duplicate or undermine the information systems currently used by each state and territory
- local and downscaled information should be available to local decision makers
- collaboration to develop or implement any national information system should extend to state and territory agencies with relevant expertise and knowledge, and
- national information systems, and the work required to create and maintain these systems, will be expensive.[24]

4.29 **Australian, state and territory governments should progress their in-principle support for consistency, and agree a practical path forward to implementation.**

Pursuing consistent data: harmonisation versus standardisation

4.30 There are multiple ways of pursuing consistent data. Two common ways are through data harmonisation and data standardisation.

4.31 A harmonisation approach brings together various types, levels and sources of data such that they can be made compatible and comparable. A standardisation approach relies on agreed minimum standards as to how data are recorded, collated and stored.

4.32 Harmonisation differs from standardisation in that it does not impose a single standard, methodology or norm, but rather seeks to find ways of integrating information gathered through disparate methodologies. A harmonisation approach allows information systems to be brought together to ensure comparability of the data delivered by those systems and provide a broader picture. It also allows for the integration of the best parts of each system, without replacing the systems already being used by each state and territory.

4.33 We heard that state and territory agencies have 'different levels of maturity, different levels of expertise and in many cases…use different systems and tools'. Some of these systems and tools are 'absolutely cutting edge' and 'incredibly valuable work' is being done and 'very high resolution data being delivered'. However, 'that often means that a neighbouring jurisdiction is not using the same data or the same platform, and that's where we run into challenges for how collaboration takes place'. Having 'harmonisation', rather than 'standardisation', allows 'comparability of those systems and the potential to integrate the best parts of them, without replacing the very fine work that's being done within those jurisdictions'.[25]

4.34 Dr Dan Metcalfe, CSIRO, highlighted to us how national consistency of data and information could be pursued gradually, without requiring significant reform in the short-term. Dr Metcalfe put to us that if Australia were to set a 'lowest common denominator' standard to bring data together, Australia could then integrate the data nationally, interrogate it and provide a product back at the national scale. He noted that setting minimum standards to start with would allow jurisdictions which collect data to a higher resolution to keep doing so and, over time, jurisdictions could gradually work towards a 'best practice' national standard.[26]

Moves toward better data and information are occurring

4.35 The Australian Government has acknowledged that it can, as it should, play a national leadership role in coordinating national data, information and standard setting, in consultation with states and territories, to ensure that authoritative, useful information is available to decision makers and to support innovation.[27]

4.36 As at October 2020, a number of projects are underway to deliver improved data and information at the national level, including through pursing national consistency where appropriate. These projects are occurring in the Australian Government, including national organisations such as the BoM, Geoscience Australia and the CSIRO in collaboration with and between state and territory governments, in research institutions, and within the private sector.[28]

National Disaster Risk Information Services Capability

4.37 The *National Disaster Risk Information Services Capability* (NDRISC) is an initiative of the Australian Government to support decision makers across public and private sectors. A pilot project was undertaken in 2019 to explore the feasibility and benefits of NDRISC, using freight and supply chain case studies. A report of the pilot project is due to be released in late-October 2020. We have had the benefit of reviewing the report in advance of its release. The report of the pilot project:

- confirms the need for a national capability to provide decision makers across the entire economy with the information and advice they need about climate and disaster risk
- notes that a national capability should unite information, analytics, risk assessment processes and networks of collaborating scientists, technical specialists, decision makers in government, industry and citizens and address complexity, uncertainty and systemic risk

Box 4.2 Climate Measurement Standards Initiative

The Climate Measurement Standards Initiative (CMSI) is an industry-led enterprise to develop standards to help enable business to consistently and comparably report and disclose climate-related financial risks.[29] It is a collaboration between insurers, banks, scientists, reporting standards professionals, service providers and others including CSIRO and the BoM.[30]

It is an Australian initiative seeking to align with the international recommendations by the Task Force on Climate Related Financial Disclosures to develop voluntary, consistent climate-related financial risk disclosures for use by companies in providing information to stakeholders. [31]

The first phase of the CMSI was the development of financial disclosure guidelines and specifications for scenario analyses. Guidelines and specifications are open-source and voluntary. Over the long-term, the CMSI aims to develop open-source standard and guidelines which will:

- enable consistency and comparability in the disclosure of climate-related risks
- improve confidence in the accuracy of these disclosures by an expert-led design process
- reduce costs associated with companies going their own way in developing disclosure approaches (eg it may enable a cost-effective path for small companies to disclose climate-related risk)
- improve transparency of disclosure by making data sets and tools publicly available, and
- enable businesses to make informed decisions to manage climate-related risk, and thereby improve the collective capability of Australia to address climate-related risk.[32]

The CMSI argue that for the full value of this initiative to be unlocked, 'improvements to weather and climate data, information and services are needed' [33] including in nationally consistent high-resolution climate projections that are comparable across regions. [34]

The CMSI illustrates that the private sector is taking action on the issue of climate-related risk by developing expert-led processes to assist in managing the cost of this risk. By its collaborative nature with institutions such as CSIRO and BoM, and advocacy for improved climate data, it also shows the value of the public and private sectors working together toward a common goal.

- recognises that a national capability is critical to understand and collectively manage risks from a variable and changing climate and is central in realising a sustained policy posture to build climate and disaster risk reduction considerations into decisions and actions taken by the Australian Government
- notes that the concept of a national capability aligns with international best practice – national platforms are recognised by the United Nations Office for Disaster Risk Reduction as playing a key role in providing and mobilising knowledge, skills and resources required for mainstreaming disaster risk reduction into development policies, planning and programs, and
- notes that Indigenous knowledge systems embody deep knowledge of natural systems and land management practices that can be used for disaster risk reduction, and that a key challenge for a national capability is to improve the connections between these practices.[35]

4.38 The Victorian Government has told us that implementation of the NDRISC, and aligned adaptation initiatives, should occur through engagement and consultation with individual jurisdictions during the design phase, to ensure that potential negative impacts on jurisdiction-level risk analyses and predictive services are avoided.[36] The SA Government is supportive of common standards, definitions and interoperability.[37] The NT Government told us that the particular and inherent limitations faced by smaller jurisdictions with respect to personnel and resources should be taken into account. The Tasmanian Government had a similar concern and is 'further considering' the NDRISC.[38]

Data and information access

4.39 The Australian Government has told us that information on climate and disaster risk should be made accessible and usable for all. They note that there is an opportunity to consolidate, harmonise or connect data sets across the Commonwealth and with other sectors, to make climate and disaster risk information more useful and available.[39]

4.40 Examples of Australian Government initiatives to improve coordination of data and information include enabling new information products, such as releasing disaster and emergency management data to data.gov.au and *NationalMap*.[40] As of July 2020, data.gov.au has over 89,000 datasets, including 244 datasets relating to disasters and 248 datasets relating to emergency management.[41]

4.41 The Australian Digital and Data Council (ADDC), made up of a ministerial representative from each jurisdiction, was formed in 2018 to progress a strategic data and digital agenda. In response to the 2019-2020 bushfires the ADDC established two projects:

- Project 1 – Experiencing a disaster life event. This project is being developed by the Digital Transformation Agency, in collaboration with representatives from the Victorian, Queensland, NSW, WA and SA governments. It is working to understand people's end-to-end experience of natural disasters (with a focus on bushfires), uncover common 'pain points' and identify opportunities for whole-of government service improvements.

- Project 2 – National all-hazards service. This project is investigating integration and tactical sharing of all jurisdictions' hazards information, including relating to fires, floods and cyclones. The project is led by the NSW Government in collaboration with the Queensland, Victorian and Australian Governments.[42]

4.42 In September 2020, the Australian Government released an exposure draft of a Data Availability and Transparency Bill 2020 and consultation paper. The bill seeks to create a scheme for the Australian Government to share public sector data by providing access to relevant people as needed.[43] The consultation paper notes that the 2019-2020 bushfire season demonstrated that the need for a safe, modern, and streamlined approach to data sharing is more pressing than ever.[44] The consultation paper also acknowledges that data are crucial to effectively manage, respond to and learn from crises. Data access allows various government services to pre-populate information, saving citizens time and effort; policies and programs are fit for purpose and unintended consequences are reduced; and researchers are able to help shape government policies and better understand their impact.[45]

4.43 Although there are clear benefits in nationally coordinated data and information, we also acknowledge that the best level for making decisions can be at a local level – national harmonisation of data and technology should not be at the expense of relevance to local communities, nor compromise local community responses.

Recommendation 4.1 National disaster risk information

Australian, state and territory governments should prioritise the implementation of harmonised data governance and national data standards.

Recommendation 4.2 Common information platforms and shared technologies

Australian, state and territory governments should create common information platforms and share technologies to enable collaboration in the production, analysis, access, and exchange of information, data and knowledge about climate and disaster risks.

Recommendation 4.3 Implementation of the National Disaster Risk Information Services Capability

Australian, state and territory governments should support the implementation of the National Disaster Risk Information Services Capability and aligned climate adaptation initiatives.

Recommendation 4.4 Features of the National Disaster Risk Information Services Capability

The National Disaster Risk Information Services Capability should include tools and systems to support operational and strategic decision making, including integrated climate and disaster risk scenarios tailored to various needs of relevant industry sectors and end users.

Improving climate, disaster risk and impact information

4.44 There are a number of opportunities to improve the risk and impact information used to inform strategic and operational decision making and interests. These include improving:

- climate and weather capabilities
- climate information for risk assessments and scenarios
- risk information from hazard, exposure and vulnerability, and
- disaster impact information.

Climate science capabilities

4.45 Australia's weather and climate research capability is considered world-class and is highly respected internationally but, as articulated in the recent *Report on Climate and Disaster Resilience* to the Prime Minister, requires ongoing effort to remain as best practice.[46]

4.46 While the observed climate over the last decade is consistent with changes described in early projections,[47] each iteration draws on Australian and international advances in climate modelling to bring in the latest science and enable a cycle of continuous improvements.[48]

4.47 **It would be useful to tailor the next set of climate projections to sectors with the greatest need to adapt and respond to changes in natural disaster risk.**

4.48 Integrating up-to-date climate and weather intelligence into scenario planning will reduce the risk that future extreme seasons are outside the realms of expectations. To date, regional climate modelling in Australia has been done on an intermediate scale, on an ad hoc basis, and would benefit from a more coordinated national approach:[49]

> *At the climate change scale, acceleration of CSIRO's current aim to move towards coordinated, nationally consistent, high resolution climate modelling of future climate scenarios, using best practice multimodal ensemble techniques, would result in an improvement on the current ad hoc set of modelling studies.*[50]

4.49 We also heard that climate services for Australia, particularly those pertaining to longer term risk and future projections, are provided by a mix of agencies and research groups, leading to 'consistency, reproducibility and sustainability issues that may hinder future planning and resilience activities.'[51] We were told that:

> *…at the moment there is no best set of data or techniques to be able to draw upon…. We've got lots of different approaches.*[52]

4.50 In addition, a 2018 review of the National Environmental Science Program's Earth Systems and Climate Change Hub (ESCC Hub) found that:

> *…overwhelmingly [survey participants] agreed that the current level of climate change science capability in Australia is not appropriate for the task of monitoring,*

analysing and responding to climate change' and 'the reality of climate change is generating increasing needs for evidence-based and science-based assessments of climate change risk.[53]

4.51 To understand and manage hazard risk, Australia needs to maintain a strong ongoing science capability.[54] The Australian Academy of Science reviewed Australia's climate science capability in 2017 and recommended 'implementation of an enduring arrangement for the coordination, facilitation and assessment of climate science and research in Australia'.[55]

4.52 In July 2019, the National Climate Science Advisory Committee published a report, *Climate Science for Australia's Future*.[56] The report noted that Australia's prosperity and security depends on our ability to anticipate, manage and prevent the economic, social and environmental impacts of climate change and variability.[57] The report identified six essential elements needed for decision makers to have the information they need to understand climate change and manage its risks and impacts:

- observations, data, analysis and infrastructure
- climate process studies
- climate modelling and projections
- climate risk, adaptation and services
- international engagement and dependencies, and
- research coordination and funding.[58]

4.53 The report identified several actions with a view to ensuring Australia is prepared for the impacts of climate change and variability in the decades ahead, informed by robust climate science and projections that are integrated into decision making across all sectors of society and the economy. The intended outcomes of these actions include:

- an enhanced national weather and climate model platform
- next-generation climate projections for Australia
- a national climate service capability that provides decision makers with climate risk information tailored to their organisations and sectors, and
- improved coordination and prioritisation of Australia's climate science and research effort.[59]

4.54 Following on from this report, a study conducted by researchers at the University of Technology Sydney in partnership with the ESCC Hub and the CSIRO *Navigating Climate Change Mission* mapped the current climate services capabilities in Australia.[60] The study, based on surveys from providers and users of climate services, found that climate information and associated services in Australia are sourced primarily from national climate service providers (CSIRO and the BoM), universities, the Climate Change in Australia website, Geoscience Australia and some international climate service providers, such as the Intergovernmental Panel on Climate Change (IPCC). The study also found scientific validity, trust and accessibility were key reasons for selecting sources of climate information.

4.55 **Researchers developing climate projections should seek opportunities to work closely with end-user groups and developers of climate services and decision support tools, to ensure their modelling outputs are targeted to support decision-makers and planners.**

Climate data for adaptation, risk assessments and scenario planning

4.56 CSIRO has been undertaking long-term, regional climate projections since around 1992.[61] The most recent set of nationally consistent climate projections for regional Australia was delivered by CSIRO and BoM in 2015 through the Climate Change in Australia project.[62]

4.57 We heard from CSIRO that regional climate models can be used to better understand and simulate potential disaster extremes at a regional and local scale.[63] These climate projections are tailored to enable impact assessment and adaptation planning, especially in the natural resources management sector.[64] This is sometimes referred to as 'down-scaling'.

4.58 Climate projections 'rely on first and foremost global climate modelling, because the climate system is a global system'. Global climate modelling 'relies on multiple models from around the world, run through specialist modelling centres and the best practice is to assess and use the entire set, rather than pick one winner'. Global climate modelling produces at a 'very coarse resolution' of 'approximately 100kms grid cells', providing 'a continental view of climate and climate change'.[65]

4.59 We heard that 'down-scaling' of climate projections refers to any method that takes the existing very coarse resolution to add resolutions spatially and temporally, and make it locally relevant down to a local scale, for example five kilometres or less.[66]

4.60 We heard that regional modelling has the 'potential to give a lot of insights … at the local scale such as mountain ranges, coastlines and so on, and also simulate and then show the effect of climate change on extreme events, which happen through processes that operate at very fine scales'.[67]

4.61 A number of state and territory governments have produced down-scaled regional climate projections for risk assessments and adaptation planning to meet the needs of their own state or territory. For example:

- The NSW, SA and ACT governments have partnered with the Climate Change Research Centre at the University of NSW to produce regional climate projections for south-eastern Australia. This collaboration is known as the NSW and ACT Regional Climate Modelling (NARCliM) Project.[68]
- The Victorian, Queensland and Tasmanian governments have each partnered with the CSIRO to produce downscaled climate projection datasets.[69]
- The Tasmanian Government has also partnered with the School of Geography and Spatial Sciences at the University of Tasmania to develop down-scaled scenario modelling of future climate projections and extreme events.[70]

4.62 There is a patchwork of climate datasets across Australia.[71] **Australia does not have an authoritative agreed set of climate change scenarios for the nation nor standardised guidance on how to interpret and use these scenarios consistently**.[72]

4.63 There is growing national and international interest in understanding and disclosing the impacts of climate change, including hazard and disaster impacts. The finance sector is perhaps the strongest example – where the impact of a changing climate on assets and investments, coupled with changing consumer interests as the world transitions to a lower-carbon economy, mean that the viability of businesses may be at risk.[73]

4.64 There is a substantial body of published Australian and international literature demonstrating that decision makers need support, in the form of decision tools, scenarios and other climate services, to use data on future climate and risk effectively.[74] The Climate Measurement Standards Initiative (CMSI) is an industry-led enterprise that demonstrates collaborative efforts to manage and disclose future risks. See Box 4.2 Climate Measurement Standards Initiative.

4.65 End users may need education and support to use data on climate trends effectively, including scenarios for stress testing disaster response and resilience. Tools should be co-developed and tailored to meet the needs of particular end-users[75] such as land-use planners or emergency managers. State and territory governments should also build capacity and tools to better integrate climate and weather intelligence into disaster planning mitigation and response, and provide support for local governments to use this intelligence.[76]

Adapting to a changing climate

4.66 In December 2015, the Australian Government released a *National Climate Resilience and Adaptation Strategy*. The Strategy articulates how Australia is managing the risks of a variable and changing climate. It identifies a set of principles to guide effective adaptation practice and resilience building, and outlines the Government's vision for a climate-resilient future.

4.67 Each state and territory also has state-wide climate adaptation strategies. Some jurisdictions also take a 'region-based' approach to climate change adaptation. All adaptation strategies rely on an understanding of how the climate will affect jurisdictions or regions in order to inform what adaptation efforts are required.

4.68 **An ongoing capability in national climate and weather modelling and improved national climate and weather intelligence relating to natural hazards and disaster risk will support Australian, state and territory governments to implement, assess and review their disaster management postures.**

4.69 **There is an opportunity for the Australian Government to review and update the *National Climate Resilience and Adaptation Strategy*, taking into account the initiatives that have been proposed since it was adopted in 2015.**

Recommendation 4.5 National climate projections

Australian, state and territory governments should produce downscaled climate projections:

(1) to inform the assessment of future natural disaster risk by relevant decision makers, including state and territory government agencies with planning and emergency management responsibilities

(2) underpinned by an agreed common core set of climate trajectories and timelines, and

(3) subject to regular review.

Natural hazard risk information

4.70 Hazard data in respect of different natural hazards are at different stages of maturity in consistency and coverage. For example, bushfire hazard mapping is produced by state fire authorities and typically has full state-wide coverage. Discrepancies in modelling methods between states are most apparent when comparing hazard mapping at the state borders. These discrepancies in methods make it difficult to measure risk at a national scale or to undertake comparative risk between regions.[77]

4.71 We recognise that state and territory governments have developed, to varying degrees and for various purposes, regional and local natural hazard risk assessments, projections and maps, and some of these resources are publicly available - for example, the Tasmanian Government's 'Risk Ready' website. We also recognise that significant capabilities already exist in the commercial sector. Any national capability should leverage these existing capabilities, rather than duplicating them.

4.72 NSW, Victoria, SA, ACT and the NT have all expressed a desire for higher resolution data on hazards and factors that influence hazards such as fuel loads, including using technology such as Light-Detection and Ranging and satellite imagery.[78] The CSIRO notes that 'improving weather forecasting and climate projection capability is important to improve the ability to predict or estimate the likelihood of extreme bushfire conditions',[79] and 'improvement in temporal and spatial resolution of forecasting is of great utility but is extremely challenging'.[80]

4.73 **Australian, state and territory governments should explore the feasibility and practicalities of developing and maintaining nationally consistent:**

- **assessments of the frequency, intensity and spatial distribution of natural hazards in Australia, and**
- **projections of the frequency, intensity and spatial distribution of natural hazards in Australia.**

Box 4.3 'Preparing for a Changing Climate' – research by the Climate Change Authority

In March 2020, the Australian Government's independent Climate Change Authority published a report *Prospering in a low-emissions world: an updated climate policy toolkit for Australia*. Chapter 7 of the report, 'Preparing for a Changing Climate', focuses on climate adaptation needs. It notes:

- Research on impacts and adaptation strategies, and the effective communication of information and advice produced, is vital for improving resilience to and preparedness for climate change.
- Research is recognised as a priority under the National Climate Resilience and Adaptation Strategy, although the Government's investments have been sporadic.
- Some parts of the Australian economy need a greater focus on adaptation, as they are more exposed to the physical risks of climate change (for example, long-lived infrastructure, coastal environments and agriculture) or because they need to respond to the impacts of climate change (for example, health systems and disaster response).
- The scale and complexity of climate modelling and projections means that forming useful information is an activity beyond the capability of individuals and all but the largest of businesses. Locally relevant information on climate change impacts is required to allow people and organisations to adequately prepare for and optimally adapt to climate change impacts.
- The need for relevant, granular climate information has been raised repeatedly. As firms are increasingly looking to manage their climate risks and local communities experience the impacts of climate change, the requirements for high-quality information will increase.
- To effectively guide mitigation and adaptation efforts, Australia will need to retain an expert capacity to model climate change impacts at local levels and develop capability in customising information for the needs of communities and organisations.

The report recommendations include:

- a collaborative review and update of the 2015 *National Climate Resilience and Adaptation Strategy* to ensure a coordinated and integrated approach, with clear roles and accountabilities, to enhance Australia's climate resilience
- improved integration and consideration of climate change risks in decision making about government programs, assets and services, and
- implementation of the strategic actions in the National Climate Science Advisory Committee's *Climate Science for Australia's Future* report.

Exposure information

4.74 Exposure is used to describe what might potentially be at risk from a hazard or event – such as people, buildings or infrastructure, businesses, public facilities, agricultural commodities, or environmental assets.[81]

4.75 The nature of exposure information required for risk assessment is dependent on decision context. However, there are critical, commonly used products on exposure information that are required to support climate and disaster risk assessment across multiple decision contexts. Among the most important of these are products characterising the built environment. These include buildings, infrastructure and services supported by infrastructure.[82]

4.76 Understanding the relationship between infrastructure and the services supported by it is a complex undertaking, and would require significant investment to model these complex systems. However, it is a critical task as it underpins the ability to assess and address both component and system vulnerability through risk reduction measures.[83]

4.77 Australia has already benefited from some development of information systems to capture exposure information on a national scale.

4.78 The National Exposure Information System (NEXIS), a national information system developed by Geoscience Australia made up of databases and data processing software, which captures and manages information that describes the location and the characteristics of communities, infrastructure and businesses anywhere in Australia. NEXIS was developed to address gaps in Australia's ability to manage natural disasters, in response to a COAG reform commitment in 2002.[84] SA noted the utility of this system, but also that the availability and accuracy of its data can be improved.[85]

4.79 The Australian Exposure Information Platform (AEIP) is a web-based delivery platform that makes exposure information from NEXIS available to the public. AEIP was released in 2019. It was developed by Geoscience Australia in collaboration with the Bushfire and Natural Hazards Cooperative Research Centre (BNHCRC). A decision maker can use AEIP to generate an exposure report for any area in Australia. AEIP does not currently provide exposure information in the form of a geospatial mapping layer.

4.80 Australian, state and territory governments should identify all existing data collected and maintained by them in respect of the elements that may be at risk of a natural hazard event now and in the future, including:

- individuals
- dwellings or households and communities
- buildings and structures
- public facilities and infrastructure assets
- agricultural commodities
- environmental assets

- cultural assets, and
- business activity.

4.81 **Australian, state and territory governments should take steps to harmonise, at a national level, exposure information.**

4.82 **NEXIS and AEIP should be maintained and improved.**

Vulnerability information

4.83 The NDRRF speaks to the long term and complex nature of disasters, including natural disasters:

> *The impacts of disasters can be long term, complex, and intangible. Collectively, we are only now beginning to fully understand indirect, flow on and cumulative effects of disasters. We do know that disasters can trigger long-term challenges across a range of areas, including reduced education and workforce participation, increased crime, and physical and mental health and wellbeing.*[86]

4.84 The Department of Home Affairs released *Australia's Vulnerability Profile* in 2018.[87] It was a precursor to the NDRRF. Australia's Vulnerability Profile identified whole-of-community influences on vulnerability regarding disasters, including:

- placement of communities, infrastructure and assets, and
- access and supply of essential information, goods and services.

4.85 CSIRO, in its technical report supporting the development of *Australia's Vulnerability Profile*, noted that the complex nature of climate and disaster risk is not assisted by a 'response and recovery' focus on risk management:[88]

> *Much of the existing effort in disaster risk reduction, or disaster resilience, is focused on improved characterisation or quantification of risk – particularly the elements of likelihood, and impact (or consequence) through a standard risk assessment lens.*

4.86 We heard that a more mature understanding of the root causes and effects of disaster risk and, in particular, systemic vulnerability is needed, so that our efforts to mitigate the risk and build resilience can meet the challenges of the future.

4.87 Vulnerability can be physical and relate to the susceptibility to damage of the built environment. This not only includes the vulnerability of physical infrastructure but also the vulnerability of infrastructure systems where damage to components disrupt service delivery. Vulnerability also includes the vulnerability of people and the likelihood of injury or death in a natural hazard event.[89] Vulnerability of the built environment is discussed in Chapter 19: Land-use planning and building regulation.

4.88 For the most part, our existing lifestyles and daily activities are heavily dependent on interconnected systems for the delivery of essential services when we need them (eg energy, water, food, health and education services, transport, and communications).These complex and interconnected systems support our society and influence our resilience or vulnerability to disaster.[90]

4.89 Mr Sharanjit Paddam, Actuaries Institute, noted that 'in order to manage climate and disaster risk, we need to better understand vulnerability'.[91] Geoscience Australia told us that 'system vulnerability and risk needs to be studied to identify vulnerabilities and the most effective measures to mitigate them'.[92]

4.90 In a *Review of Emergency Management for High-Risk Victorian Communities* dated October 2019, the Inspector-General for Emergency Management in Victoria found that:

- the development of an index of vulnerability provides a strong basis for targeting resources to groups who are vulnerable, and
- this approach will highlight the strengths and deficiencies of current emergency management arrangements so that capacity building initiatives can be developed, targeted and continuously improved over time.[93]

4.91 Relevant data sources for vulnerability information include socioeconomic statistics from the Australian Bureau of Statistics, data held by the private sector and small-scale localised datasets produced through targeted surveys. However, much of the required understanding of vulnerability is also based on values, attitudes and perspectives of citizens, businesses and government stakeholders.[94]

4.92 As noted in Chapter 2: Natural disaster risk, the Bushfire and Natural Hazards Cooperative Research Centre and the University of New England launched the *Australian National Disaster Resilience Index*. The Index provides a tool to understand, at a national level, how resilience varies in different regions of Australia, providing a means to track change over time and to allocate resources accordingly.[95] The Australian Disaster Resilience Index assesses resilience based on two sets of capacities—coping capacity and adaptive capacity, through a combination of social, economic, natural environment, built environment, governance and geographical factors.[96]

4.93 **Australian, state and territory governments should take steps to develop tools, methods and guidance to identify and assess the vulnerability of individuals and communities to natural hazard events.**

Disaster impact assessments

4.94 Impact data can be used to judge the success of recovery services and programs, to evaluate the effectiveness of mitigation measures like building regulations and fuel management, and to better plan for the next event. We heard that there is a 'keen appetite across a broad range of audiences for this type of information to inform decision making'.[97]

4.95 The collection and assessment of data on disaster impacts usually occurs in two phases:

- Phase 1 – 'rapid damage assessments' or 'initial impact assessments', occur soon after the natural disaster event, most commonly performed by the emergency agency that led the response to the natural disaster. These assessments look at impacts such as the number of houses destroyed, and

with a view to reducing further risk to individuals and communities by identifying dangerous areas.

- Phase 2 – 'secondary impact assessments' are conducted after the risk from the event has subsided, and can be conducted by local governments, contractors or state and territory agencies.[98]



Figure 17: Contemplating the impact of bushfire[99]

Consistency of impact information

State and territory processes

4.96 We heard that there are limitations to the utility of information that is currently derived from impact assessments due to insufficient levels of accuracy and lack of consistency of the data collected,[100] data not being suitable or of a high enough quality to inform decision-making[101] and failure to collect all relevant information. SA suggested that a contributing factor to the quality of data may be the lack of experience and knowledge of staff called in at short notice during a large-scale emergency.[102]

4.97 States and territories collect different disaster impact information, and that collection occurs in different ways. We found it difficult to obtain a consistent understanding of the impacts of the 2019-2020 bushfires across the states and territories.[103] For example, in Tasmania, the collection of economic impact data draws on businesses reporting impacts to the Business Tasmania Hotline or to recovery centres.[104] In WA, economic impact data is sourced through the Small Business Development Corporation, which receives anecdotal information directly from impacted local service providers and local governments.[105]

4.98 We also observed that states and territories do not have a consistent approach to collecting and using impact data from industry and non-government organisations.[106] This is in part because organisations outside government have their own methods for assessing the impact of a disaster on their business or their customers.[107] Some

organisations hold data that is not publicly available and others will share data at a cost.

4.99 These delays and limitations can have compounding effects. For example, the Insurance Council of Australia indicated that the insurance industry's ability to provide financial assistance to residents impacted by disaster is frequently delayed by the lack of access to government impact assessment data. This requires insurers to wait until access to the property is available.[108]

National consistency

4.100 During our inquiry, we heard that to create a consistent set of impact information on the 2019-2020 bushfires, the National Bushfire Recovery Agency (NBRA) manually analysed data from states and territories.[109] While some jurisdictions provided certain kinds of impact data under reporting arrangements or through established committees, other kinds of data were only provided on request.[110]

4.101 A *National Impact Assessment Framework* (NIAF) and the *National Impact Assessment Model* (NIAM) have been developed by a sub-committee of ANZEMC.[111] The NIAF seeks to provide high-level guidance to states and territories to achieve consistency of impact assessments.[112] The NIAM is a component of the NIAF, being the model used to guide the collection of quantitative and qualitative data on the severity of an event.[113] It does this by providing 50 high-level indicators across four recovery domains (social, built, economic and environment).[114]

4.102 We heard that, in their current form, the NIAF and the NIAM may not facilitate the creation of comprehensive and consistent impact data across the states and territories. A number of state and territory governments raised concerns with the current form of the NIAM, particularly about the validity of the scoring system[115] and the potential to produce inaccurate[116] or misleading results.[117] Some state and territory governments expressed support for reviewing the NIAF and NIAM,[118] stating that there is scope to improve them[119], and suggested that some impact indicators from the NIAM could be used in the development of a new national platform.[120]

4.103 The NBRA has created the Bushfire Recovery Data Working Group to identify and develop a series of nationally consistent reporting metrics, produce an agreed set of data sharing principles, and facilitate all jurisdictions in communicating and referencing the same foundation datasets.[121] By September 2020, this working group had developed a set of consistent key impact metrics that can be used in the future to provide more complete impact data.[122] NSW, Victoria and the NT drew our attention to the work of the ANZEMC's Community Outcomes and Recovery Sub-committee data sharing project[123] which seeks to develop a methodology for collecting and assessing data on recovery needs and to develop a mechanism to share recovery needs assessments.[124] It is unclear to what extent both pieces of work overlap and care should be taken to avoid duplication of effort.

4.104 **To provide a sound basis for short and long term decision-making, impact data needs to be comprehensive, accurate, consistent and timely. Nationally consistent reporting metrics, and an agreed set of data sharing principles between states and territories, which apply across different hazards, should be pursued.**

Platform for collecting and sharing information

4.105 States and territories have different platforms and systems for recording disaster impact data.[125] Some of these systems may need updating. For example, SA noted that a challenge it experienced was the limited capability of its data collection system, requiring it to expand its data collection process to accommodate its disaster waste management program.[126]

4.106 We also heard of similar issues in other states and territories. There were instances where agencies had different data collection methods,[127] and were not able to efficiently share information. For example, Victoria acknowledged that difficulties with interoperability and integration between impact assessment platforms with broader emergency management systems had an effect on the timely provision of impact assessment data within the state.[128] We note that Victoria has since undertaken work to improve information sharing.[129] Separately, the SA Department of the Premier and Cabinet has said that, within the state, '…consolidating the data is naturally complex as much of it comes from systems that are not sufficiently integrated'.[130] The Department has also identified that using enhanced information systems that allow information exchange between systems would improve its information gathering process and be beneficial for recovery activities.[131]

4.107 We heard of a range of work to improve information platforms in some states. For example, Resilience NSW has developed an online reporting platform to allow agencies to update information in real-time, creating a single source of information for recovery agencies within the state.[132] Similarly, Emergency Management Victoria has been looking to streamline data-sharing in Victoria, focused both on the data collected for impact assessment and the mechanisms for sharing data.[133]

4.108 Some state and territory governments have expressed support for a consolidated platform which could collect uniform datasets and allow sharing, under strict guidance,[134] and greater nationally consistent guidance for, and coordination of, the impact assessment processes.[135] Some states have also suggested that sharing of personal information with key government and charity organisations through a consolidated platform could be beneficial in providing better services to affected community members.[136] Information sharing in recovery is discussed in Chapter 22: Delivery of recovery services and financial assistance.

4.109 A national data sharing platform for impact data would support better sharing of information between government agencies which, in turn, would assist in the development of impact awareness at a national level and consistent and harmonised data.

4.110 **State, territory and national processes should ensure the sharing of consistent, accurate, comprehensive and timely data. Platforms should be interoperable, both intra-jurisdictionally and inter-jurisdictionally.**

4.111 As part of this, consideration should be given to greater incorporation of data collected from non-government organisations and improving the capacity of entities responsible for conducting impact assessments.

4.112 **Australian, state and territory governments should consider the extent to which de-identified personal information provided by affected persons can or should be included or connected with impact data to facilitate timely recovery support.**

4.113 The Australian, state and territory governments generally support improving existing arrangements for collecting and sharing disaster impact data. There are likely to be costs associated with developing a national system, or seeking to integrate existing systems, and data standardisation across jurisdictions will inevitably face challenges.

4.114 These improvements are necessary because the absence of consistent impact data and a national perspective is a significant gap, and warrants commitment to achieving consistency to ensure that better data collection and sharing processes are in place for future disasters to improve the recovery processes.

Recommendation 4.6 Consistent impact data standards

Australian, state and territory governments should work together to develop consistent data standards to measure disaster impact.

Recommendation 4.7 Collection and sharing of impact data

Australian, state and territory governments should continue to develop a greater capacity to collect and share standardised and comprehensive natural disaster impact data.

Chapter 5 Declaration of national emergency

Summary 136

A challenging future 137

An enhanced Australian Government role 138

Existing arrangements 138

What would the declaration do? 140

Sources of constitutional power 143

Referral of power from states 143

Legislative power 144

Executive power 145

Proposed declaration model 146

Relevant considerations for the making of a declaration 146

Interaction with state and territory frameworks 149

State and territory declaration frameworks 149

Declarations in the 2019-2020 bushfire season 150

Potential interaction 151

Summary

5.1 Australia's disaster outlook is alarming. States and territories alone may not be able to respond effectively to, or provide immediate relief or recovery from, extreme to catastrophic disasters.

5.2 State and territory governments are primarily responsible for responding to and recovering from natural disasters. The role of the Australian Government is largely to support states' and territories' responsibilities. However, the Australian Government has unique capabilities, and is able to take a broader view of the national consequences of extreme to catastrophic disasters.

5.3 To better assist states and territories in responding to and recovering from such disasters, the Australian Government should create a legislative mechanism for the making of a declaration of a state of national emergency.

5.4 A declaration would signal to communities the severity of a disaster early, act as a marshalling call for the early provision of Australian Government assistance when requested, facilitate coordination with state and territory emergency management frameworks, and, in very limited circumstances, allow the Australian Government to act without a request from a state or territory.

A challenging future

5.5 Natural disasters that engage the responsibilities of the Australian Government will be more frequent and more intense in the future. Consecutive and compounding natural disasters will increasingly stress existing emergency management frameworks. These disasters will not always be confined to a single state or territory; they will extend across boundaries and, in more severe cases, will have a truly national impact.

5.6 The 2019-2020 bushfire season is an early indication of a concerning future, concurrently impacting several states and territories. The bushfires were not the only disaster to impact Australia during that period. The season also saw heatwaves, hailstorms and flooding; all on the back of the crippling drought. In many areas, the combination of these events compounded their effect. These successive hazard events strained existing systems and capacity.

5.7 It is foreseeable that a future disaster, or compounding disasters, could have a catastrophic impact on a national scale. This is particularly so given the increasing exposure of some areas to disaster risk. For example, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) noted that the Gold Coast in Queensland has significantly more infrastructure and interconnected critical services, and many more inhabitants, than it did when the Great Gold Coast Cyclone struck in 1954. A similar cyclone on the Gold Coast today would be likely to be many times more damaging. It could also impact the communities now located across the border in NSW.

5.8 The risks posed to Australia are, of course, broader than those posed by natural disasters. They extend to the risks posed by events such as pandemics, cyber-attacks, terrorism and war. While these risks and threats are not the focus of our report, they should be considered when determining whether Australia is prepared for the risks posed by such events, including by future compounding disasters. This includes because the same agencies that are required to respond to a natural disaster may also be needed to respond to other events.

5.9 State and territory governments are responsible for responding to, and recovering from natural disasters. The Australian Government's role is one of support – it provides assistance to states and territories, and its capabilities complement state and territory responses. The Australian Government has told us that it does not wish to replicate or assume state and territory government responsibilities[1] and, in our view, nor should it.

5.10 Some state and territory governments have taken the position in this Royal Commission, in effect, of maintaining the status quo. However, we are concerned that maintaining the status quo could increase the risk of state and territory resources being overwhelmed to the extent that the relevant state or territory cannot effectively respond to, or recover from, a natural disaster.

5.11 Our terms of reference require us to consider whether the Australian Government should have the power to declare a state of national emergency (a declaration), how such a declaration would interact with state and territory emergency management

frameworks, and whether it should facilitate the Australian Government having clearer authority to take action in the national interest.

5.12 It is clear that communities expect national leadership and coordination in times of crisis. In particular, communities expect the Australian Government to provide assistance when it can, regardless of the division of responsibilities for managing natural disasters across the different levels of government under Australia's federal system. The Australian Government is uniquely placed to be able to understand, and respond to, future disasters in the national interest. It is able 'to see the national picture, the national risks and the impacts on all Australians.'[2] There is a need, however, to better use and coordinate Australian Government resources to act in the national interest in response to natural disasters. A declaration of a state of national emergency would provide a clear, transparent articulation of the role of the Australian Government and foundation for action.

An enhanced Australian Government role

5.13 As noted, the Australian Government primarily plays a supporting role in relation to natural disasters. We are of the view, however, that there is scope for a greater level of Australian Government support, which could be brought to bear earlier to assist state and territory governments to discharge their responsibilities. The Australian Government needs to take further action, and do so sooner, to protect lives and property in the future.

5.14 This is partly because the Australian Government 'is often better placed to take a broader national view of the strategic consequences of unfolding events'.[3] This national perspective uniquely positions the Australian Government to signal that the impact, or likely impact, of a disaster will be extreme or catastrophic.

5.15 The Australian Government also has a unique set of supporting capabilities that can, and do, assist states and territories to save lives and property and also to recover from the impacts of natural disasters. These capabilities include the provision of logistical support, transportation of personnel and equipment, assistance in large-scale evacuations, and provision of financial assistance. These capabilities were drawn on in the 2019-2020 bushfire season, and in response to other disasters such as Cyclone Debbie in 2017.

5.16 Australian Government capabilities continue to evolve and develop, and are likely to have additional benefits in responding to, and recovering from, natural disasters in the future.

Existing arrangements

5.17 Plans are already in place for the management of natural disasters. The most recent version of the Australian Government Crisis Management Framework (October 2020) (AGCMF) outlines the Australian Government's approach to the management of disasters and emergencies.[4] This includes providing ministers and senior officials with guidance on their respective roles.

Supporting Role	Joint Management	Primary Responsibility
Providing support to the states and/or territories where Australian Government coordinated assistance has been requested or where Commonwealth interests are affected or threatened.	Working together with the states and/or territories to manage a crisis that has potential to affect, or has affected, more than one jurisdiction, the broader community or an Australian Government area of responsibility, and prioritise limited resources when there is competing demand.	Managing any crisis that is not the responsibility of a state or territory.
Financial assistance		
Providing financial assistance to state and territory governments and individuals affected by a major crisis.		

Figure 18: Adapted from the Australian Government Crisis Management Framework (October 2020) outlining Australian Government responsibilities.

National Catastrophic Natural Disaster Plan

5.18 The AGCMF is supported by a number of national plans and arrangements. In 2010, the Australian Government and states and territories agreed to a plan that applies in circumstances where a *catastrophic* disaster impacts Australia – the National Catastrophic Natural Disaster Plan (NATCATDISPLAN).[5] The Council of Australian Governments (COAG) endorsed the plan on 12 July 2010. Its stated function is as a 'contingency plan' for the provision of coordinated support by the Australian, state and territory governments to a state or territory where its government and/or its capacity to manage the response to and recovery from a catastrophic natural disaster has been 'significantly incapacitated'. Notably, the NATCATDISPLAN has never been triggered, not even during the 2019-2020 bushfire season, despite the national scale of the disaster.

5.19 In agreeing to the NATCATDISPLAN, Australian, state and territory governments have effectively agreed that in certain, albeit extreme, circumstances the Australian Government can provide assistance to a state or territory where a request for that assistance has not been made (ie when the 'affected Executive Government is temporarily incapacitated').[6] One principle underlying the plan is that assistance provided by governments will normally be at the request and in support of 'the legitimate Commonwealth Government or State authority'. The plan could, however, also be activated at the direction of the Prime Minister where no representative of the government of an affected state can be readily contacted due to the impact of a catastrophic natural disaster and where it appears to be clear that significant assistance to the jurisdiction is required.[7]

5.20 It is unclear when the NATCATDISPLAN would be activated, in particular where a state and territory government is incapacitated. Further, it does not outline how Australian Government resources would be coordinated to provide assistance to states and territories, and does not facilitate clear messaging to communities. While it contemplates, and may therefore be said to allow, the taking of unilateral Australian Government action, it would be preferable to redraft the current plan to

provide certainty. We note the intention of the Department of the Prime Minister and Cabinet to comprehensively review the plan in 2021 as part of a wider review of the AGCMF and its plans.[8]

Australian Government Disaster Response Plan

5.21 We also note that the Australian Government Disaster Response Plan (COMDISPLAN)[9], while necessary, is not sufficient to facilitate greater direct involvement by the Australian Government. This is because the COMDISPLAN is the plan for the provision of Australian Government non-financial assistance to Australian states and territories in an emergency or disaster when requested by a state or territory. The COMDISPLAN assumes that a state or territory is managing the disaster and also has the capacity to request assistance.

A state of emergency

5.22 The Australian Government does have mechanisms, set out in legislation, for declaring an emergency in some circumstances. For example, the Australian Government can declare an emergency in relation to biosecurity matters.[10] The Governor-General can declare a human biosecurity emergency if the Health Minister is satisfied that a listed human disease is posing a severe and immediate threat, or is causing harm to human health, on a nationally significant scale. The declaration must also be necessary to prevent or control the entry into, or the emergence, establishment or spread of, the listed human disease in, Australia. Such a declaration was made during the COVID-19 pandemic.[11]

5.23 There is, however, no formal mechanism for the Australian Government to convey the seriousness of a natural disaster to Australian communities and internationally. Australian natural disaster arrangements would benefit from a specific, legislative mechanism for a declaration that provides both a signal of a state of emergency, and articulates the role and objectives of Australian Government support.

What would the declaration do?

5.24 In circumstances where a natural disaster is having a major impact, a declaration could provide an important formal signal to communities and individuals about the severity of the disaster. A declaration would also provide an important signal to the Australian community more broadly. This signalling effect would be consistent with the purpose of similar state declarations. For example, NSW told us that that a 'natural disaster declaration' is used by the NSW Government 'to publicly acknowledge the severity of a natural disaster'.[12] Victoria also supported the important signalling effect of a declaration of a disaster, advising that 'the declaration signalled to Victorian communities the gravity of the situation'.[13]

5.25 In addition to signalling, a declaration would provide clarity and transparency of objectives, thresholds and considerations for the use of Australian Government resources. The Australian Government already contributes significantly to the response to, and recovery from, natural disasters through financial and non-financial measures. For example, the Australian Government provides financial assistance to communities through the Australian Government Disaster Recovery Payment and Disaster Recovery Allowance. Australian Government agencies also facilitate the

provision of international support, and make continued dispensing determinations to enable ongoing access to prescription medicine for those affected by a natural disaster.

5.26 Other Australian Government departments, bodies and agencies also routinely provide essential services that are needed in the preparation for, response to, and recovery from disasters. Examples include the Bureau of Meteorology, Geoscience Australia, the CSIRO and Services Australia.

5.27 A declaration could, as the Australian Government suggested, be 'an implied warning order requiring all Commonwealth agencies to adjust their posture to be ready to respond'.[14] It would indicate the need for a state of readiness or action, and could function to mobilise those agencies in support of states and territories. The introduction of this new mechanism would support action by the Australian Government before, during and immediately after, and in the recovery phase of, a natural disaster.

5.28 A declaration should normally, where state and territory consent has not been provided, only relate to Australian Government resources – it should not seek to determine how the resources of states and territories are used or allocated.

5.29 It should also provide a clear mechanism to support the Australian Government to act unilaterally in a limited set of circumstances – such as where a state or territory government cannot take actions to save lives or property, including, for example, where an executive government of a state or territory is incapacitated.

Before

5.30 A declaration would put Australian Government agencies on the front foot before a disaster occurs, or before an existing disaster becomes more severe. It should be 'the catalyst for a more coherent, pre-emptive and expeditious mobilisation of Commonwealth resources, including movement to heightened preparedness postures and pre-positioning of critical Commonwealth resources in anticipation of state and territory requests for assistance'.[15]

5.31 A declaration would signal to Australian Government agencies that existing powers and processes should be ready to be used at short notice. For example, while the ADF can already pre-position to areas where a state or territory might eventually request their assistance, a declaration may trigger or expedite that pre-positioning. A declaration could also enable the rapid redeployment of the resources of the Australian Public Service, for example, to better aid the provision of international assistance or financial support during a natural disaster.

5.32 Many welcomed the assistance received from the ADF during the 2019-2020 bushfires and suggested that earlier assistance from the ADF would be desirable. The request for earlier assistance reflects two important considerations. First, the Australian Government should not wait for a natural disaster to overwhelm or exhaust local resources before it is able to provide assistance and secondly, it generally takes time to mobilise resources and move them to affected areas.

5.33 Consideration should also be given to whether specific powers could be introduced that allow directions to be given to Australian Government agencies, such as science

and geoscience agencies, to prioritise providing assistance related to the disaster to states and territories. Similar powers exist in some state declaration frameworks. For example, a declaration of an emergency in Victoria allows the relevant minister to provide direction to any government agency concerning activities to be undertaken, or refrained from being undertaken, in a state of emergency.[16]

During and immediately after

5.34 State and territory governments have primary responsibility for responding to natural disasters, and a declaration should not displace that responsibility. States and territories must be able to coordinate and direct their own emergency combat and recovery agencies, and other resources.

5.35 The effect of a declaration during a natural disaster, and immediately after, should facilitate Australian Government agencies proactively supporting states and territories in responding to the disaster. This should include expeditious mobilisation of Australian Government resources, and continued pre-positioning of those resources where they may be required.

5.36 In extremely limited circumstances, a declaration should also enable the Australian Government to take action in the national interest and in support of a state or territory where a request for assistance has not been made. The scale of future disasters may be such that the resources available to a state or territory, including those provided by other states and territories, are or are likely to be fully committed or exhausted. For a variety of reasons, a request for Australian Government assistance may not have been made, such as where the impact of a natural disaster is rapidly developing in an unforeseen manner. In these limited circumstances, where lives and property are in danger, the Australian Government should not stand idle – it should act.

5.37 We heard that, during the 2019-2020 bushfires, the ADF evacuated over 1,100 people from the coastal town of Mallacoota in Victoria by sea and air. The evacuation is a good example of how an Australian Government resource may be utilised in the national interest to provide relief during a natural disaster. The ADF also delivered much needed food and water supplies to places and persons that were affected by the bushfires or were cut off during the bushfires.

5.38 It is important that our intention is clear in suggesting an Australian Government declaration of a state of national emergency – we do not suggest the Australian Government supplant the responsibility of states and territories for management of emergencies within their jurisdictions and for determining their own internal coordination mechanisms. Instead, we suggest the Australian Government support them to meet that responsibility by facilitating Australian Government action where a state or territory government is unable to discharge its responsibilities without assistance.

5.39 The making of a declaration would also give greater weight to the escalation of discussions of national resourcing priorities to the National Cabinet or similar forum. There may come a time when the competition for resources to respond to a natural disaster is such that a national decision concerning the prioritisation or allocation of

resources, especially the finite resources of the Australian Government, is required. The National Cabinet or similar forum could play a role in this regard.

Longer term recovery

5.40 Consideration could also be given to whether a declaration triggers, or might otherwise initiate, the provision of additional financial support from the Australian Government to assist communities to recover from a natural disaster. The Australian Government provided significant financial support following the 2019-2020 bushfires. For example, the Australian Government committed $2 billion to recovery through the National Bushfire Recovery Fund, to 'coordinate a national response to rebuild communities and livelihoods after the devastating fire-front has passed'. This Fund is administered by the National Bushfire Recovery Agency (NBRA). The Australian Government has also paid $252.3 million under the Australian Government Disaster Recovery Payment and the Disaster Recovery Allowance.

5.41 Under the Constitution, the Australian Government can make grants of financial assistance to the states with certain terms and conditions. These grants may be made to assist states to recover from natural disasters. In most cases, the spending of public money by the Commonwealth Parliament requires a source of legislative authority. A declaration underpinned by legislation could provide unambiguous authority for these grants of assistance, thereby supporting the delivery of relief.

Sources of constitutional power

5.42 A declaration that allows the Australian Government to take the actions outlined above raises some constitutional issues. That is primarily because there is no express mention of national emergencies or natural disasters in the Constitution. However, our view is that the Australian Government has a sound constitutional basis for introducing a declaration mechanism through legislation.

Referral of power from states

5.43 State Parliaments can refer 'matters' to the Commonwealth Parliament, as provided for by the Constitution.[17] Referrals can occur where the Commonwealth either does not have the power to make legislation or to ensure that it does have power, or to fill any potential gaps in Commonwealth legislative power. This approach has been taken to support measures relating to, for example, terrorism, corporations, and redress for institutional child sexual abuse.

5.44 The Australian Government has suggested to us that the states should refer power to it to allow it to clearly enact legislation supporting the making of a declaration as part of a 'two key' model for collective action that involves the consent of the Australian government and the affected state or territory. This two-key process relies on the states referring power to the Commonwealth.[18]

5.45 We agree that a referral of power by the states could provide a strong and unequivocal basis to enable the Australian Government to implement a declaration. It would signify a collective, national approach to the introduction of the declaration.

5.46 The exercise of power could be made contingent on the making of a declaration. In particular, it could be that the referred power is only activated when a state consents to the making of a declaration, or where a state is unable to provide consent (or is unable to provide consent in sufficient time) and the Australian Government needs to take unilateral action. Consideration could also be given to whether a referral would allow for the Australian Government to direct the use of state resources.

5.47 However, we do not consider that a referral is required for legislation to enable the making of a declaration. Additionally, an approach that depends upon negotiating with the states to refer matters could be protracted, thus delaying the introduction of legislation that enables the making of a declaration. As the Australian Government noted, negotiation 'with potential participating states and territories and the necessity for sequenced state and Commonwealth legislation to give effect to a referral means that referrals can often take some time to put in place'.[19] We would be reluctant, especially in the face of increasing disaster risk, to see extended delay in circumstances where a referral is desirable, but far from essential.

Legislative power

5.48 The Australian Government's suite of legislative powers provides constitutional authority for a declaration. These powers, known as 'heads of power', are set out in section 51 of the Constitution. Provided that an act, fact, matter or thing described in a law is relevantly connected to a section 51 head of power, the law will ordinarily be valid. The 'incidental power', contained in section 51, allows the Commonwealth to introduce laws that give practical effect to each of the other powers set out in that section.

5.49 The heads of power listed are extensive and should cover the circumstances where the Australian Government needs to act with respect to a national emergency without a request from a state or territory. A full list of these powers is reproduced at Appendix 15: Declaration. In particular, the Australian Government could introduce legislation that would allow it to take action in circumstances where a natural disaster (whether bushfire, cyclone, flood or another natural disaster) impacts upon, for example, the following subject matter:

- trade and commerce with other countries, and among the States
- postal, telegraphic, telephonic, and other like services
- the naval and military defence of the Commonwealth and of the several States, and the control of the forces to execute and maintain the laws of the Commonwealth
- astronomical and meteorological observations
- quarantine
- banking, other than State banking; also State banking extending beyond the limits of the State concerned, the incorporation of banks, and the issue of paper money
- insurance, other than State insurance; also State insurance extending beyond the limits of the State concerned

- bankruptcy and insolvency
- foreign corporations, and trading or financial corporations formed within the limits of the Commonwealth
- external affairs, and
- the control of railways with respect to transport for the naval and military purposes of the Commonwealth.

5.50 The Commonwealth also has exclusive power under section 52 of the Constitution to make laws for the peace, order, and good government of the Commonwealth with respect to:

- the seat of government of the Commonwealth, and all places acquired by the Commonwealth for public purposes
- matters relating to any department of the public service, and
- other matters declared to be within the exclusive power of the Parliament.

5.51 A combination of these powers would support the making of a declaration underpinned by legislation. This legislative approach has been used previously, and has been upheld by the High Court of Australia.[20]

5.52 Some states have commented that relying on a 'patchwork' of powers to support a legislative scheme may result in unintended gaps. We are of the view, however, that given the extensive scope of the combined powers, and the wide ranging potential impact of natural disasters, it would be difficult to encounter a situation that is not relevantly connected to the subject matter of a head of power.[21]

5.53 We have already noted that legislation for a grant of financial assistance to the states can provide for certain matters and conditions.

Executive power

5.54 The executive power of the Commonwealth, found in section 61 of the Constitution, extends to the execution and maintenance of the Constitution, and of the laws of the Commonwealth. The 'execution and maintenance of the Constitution' encapsulates the notion of maintaining the federal system. If a natural disaster were to threaten or disrupt the operation of the federal system, the executive power would enable the Commonwealth to act to uphold and protect it.

5.55 Section 61, in conjunction with the incidental power,[22] has been relied upon for the purpose of enacting legislation. The Australian Government's response to the global financial crisis is an example of legislation relying on this source of power. This power is said to encompass the inherent authority derived from the character and status of the Commonwealth as a national government.

5.56 Some states and territories consider that the extent to which this power could be relied upon by the Australian Government is uncertain, may not extend to coercive action, and could contravene the *Melbourne Corporation* principle.[23] We note, however, that facilitating the evacuation of individuals to save their lives where a

state cannot act is unlikely to contravene the *Melbourne Corporation* principle, and it is unlikely that any state could reasonably argue that it does.

Proposed declaration model

5.57 The introduction of a declaration should be supported by legislation. Legislating for a declaration model would provide clarity of the circumstances in which a declaration may be made and the actions that the Australian Government could take in support of states and territories. It would also better define the role of the Australian Government in relation to that of the states and territories.

Relevant considerations for the making of a declaration

5.58 The following matters will need to be considered in determining the declaration model to be adopted. We provide our views on each of these considerations, including canvassing limits in some circumstances.

Decision-making

5.59 The Australian Government's 'two key' proposal would, in a majority of circumstances involve the Australian Government and the affected states and territories agreeing that a declaration be made. In circumstances where affected state and territory governments do not agree to the making of a declaration, the Australian Government proposes that it still be able to make a declaration.[24]

5.60 We think that the proposal could also allow the Australian Government to make a declaration where affected state or territory governments have not agreed at the time, but where agreement is provided at a later date. For example, a state government might be temporarily incapacitated to the extent that it cannot provide agreement at the time of the making of a declaration, but it may provide agreement once it has returned to proper functioning, or where an emergency action was taken by the Australian Government to save lives or protect Australian Government assets.

5.61 Ordinarily, the role of the Australian Government is to provide support to states and territories in responding to and recovering from natural disasters. Due to this, it will generally be appropriate for the Australian Government to consult with state and/or territory governments about how it can best perform these roles. The decision to make a declaration could be assisted by consultation with first ministers through the National Cabinet or a similar forum.

5.62 However, there may be instances where consultation is not possible (for example, where a state or territory is incapacitated) or practical (for example, where lives are in immediate danger). Accordingly, the making of declaration should not depend on agreement from the affected state or territory government, or a referral of power from states.

5.63 Regardless of whether state or territory government agreement is obtained, the making of a declaration will require a decision-maker at the Australian Government level. Existing legislation provides a useful guide as to the appropriate person to make a declaration. For example:

- the Prime Minister can declare that a terrorist act that occurs outside Australia is a declared overseas terrorist act for the purposes of the Australian Victims of Terrorism Overseas Payment scheme
- the Minister for Water Resources, Drought, Rural Finance, Natural Disasters and Emergency Management is responsible for determining that an event is a 'major disaster' for the purpose of the Australian Government Disaster Recovery Payment, and
- the Governor-General may declare that a human biosecurity emergency exists if the Health Minister is satisfied of defined criteria, allowing the Health Minister to specify requirements necessary to prevent or control the entry or spread of a human disease into Australia, including restricting or preventing the movement of persons, and requirements for specified places to be evacuated.

5.64 Given the limited circumstances in which a declaration would be made, and the objective of giving national recognition and prominence to a disaster, we suggest that the Prime Minister should be responsible for making a declaration.

Thresholds

5.65 Careful consideration would need to be given to the threshold for making a declaration. We suggest that a declaration model could contain two thresholds.

5.66 The first threshold, in the case of a national disaster, would apply to the making of a declaration generally. The second threshold would apply with a view to the Australian Government taking unilateral action. We suggest that two thresholds are necessary, as a declaration should be able to be made where unilateral action is not required, and the taking of action by the Australian Government without a request from a state or territory should be subject to a higher threshold.

5.67 We consider that the first threshold for making a declaration could include circumstances where:

- a natural disaster (or compounding disasters) is having, or is likely have, a national impact because of its scale or consequence
- the natural disaster (or compounding disasters) has the potential to overwhelm or exhaust the affected state or territory's capacity to respond and recover, or
- given the nature or complexity of the natural disaster (or compounding disasters) Australian Government assistance should be provided in the national interest.

5.68 The second threshold for a declaration, supporting the Australian Government taking unilateral action, will need to be sufficiently high so as to confine the circumstances in which such action could be taken. The intervention of Australian Government resources, such as the ADF, in response to a disaster and without a request from a state, is truly exceptional. It is, from a principled perspective, at odds with the division of responsibilities between the Australian Government and the states and

territories, and our long established use of the ADF in Australia. The threshold for taking unilateral action should recognise that:

- there is significant risk to lives or property
- the affected state or territory cannot take action
- a request for assistance will not be forthcoming before lives or property are lost, and
- it is necessary to take action in the national interest.

Duration

5.69 Consideration should also be given to how long a declaration would be in place after it has been made.

5.70 We note that all emergency declarations made under state and territory legislation prescribe a period of operation. Australian Government legislation also contains limits on duration of analogous declarations. For example, under the *Biosecurity Act 2015* (Cth), a declaration of a biosecurity emergency or human biosecurity emergency made by the Governor-General must not be longer than the relevant minister considers appropriate and, in any case, must not be longer than three months. However, the Governor-General may extend the emergency period for up to three months at a time in prescribed circumstances.

5.71 It is our view that a declaration should only be in place for the minimum period for which it is required. A declaration that is in place for an unnecessarily long duration risks reducing the important signalling effect of the declaration. It also risks extending, unnecessarily, the duration of any associated intervention.

Powers and processes

5.72 The powers available under a declaration could reflect those outlined above before, during and immediately after, and in the recovery from, natural disasters. In particular, the powers and processes enabled by a declaration could include:

- the ability for the Australian Government to make a public declaration to communicate the seriousness of a natural disaster
- processes to mobilise and activate Australian Government agencies quickly to support states and territories to respond to and recover from a natural disaster, and
- the power to take action without a state or territory request for assistance in clearly defined and limited circumstances.

Recommendation 5.1 Make provision for a declaration of a state of emergency

The Australian Government should make provision, in legislation, for a declaration of a state of national emergency. The declaration should include the following components:

(1) the ability for the Australian Government to make a public declaration to communicate the seriousness of a natural disaster

(2) processes to mobilise and activate Australian Government agencies quickly to support states and territories to respond to and recover from a natural disaster, and

(3) the power to take action without a state or territory request for assistance in clearly defined and limited circumstances.

Interaction with state and territory frameworks

State and territory declaration frameworks

5.73 All state and territory governments can declare a state of emergency or disaster in certain circumstances. The terminology of the declaration – that is, whether it is called an emergency or a disaster – varies depending on the arrangements in each state or territory. For present purposes, we use 'emergency' to capture both terms. Under state and territory legislation, an 'emergency' is typically defined as an actual or imminent event that requires a coordinated response and represents a threat to life, persons, animals, property or the functioning of an essential service. It will usually also have resourcing implications for the state and possibly other jurisdictions. An 'emergency' or 'disaster' tends to include events such as: natural disasters, including fires, floods and earthquakes, epidemics or disease outbreaks; and terrorism or warlike actions.

5.74 The power to make a declaration in each state and territory varies, with some providing that the Premier or responsible minister can make a declaration, while others allow the state emergency coordinator, or other officials, to make a declaration for a defined area.

5.75 State and territory declarations typically trigger the activation of certain powers to be used by the government or responsible agencies for the duration of the declaration.[25] In Victoria, for example, the declaration provided 'the Minister with powers for directing and coordinating the activities of all government agencies and the allocation of State resources necessary for responding to the disaster'.[26] A summary of the key powers activated by a declaration for each state and territory is outlined in Appendix 15: Declaration.

Declarations in the 2019-2020 bushfire season

5.76 During the 2019-2020 bushfire season, a number of states of emergency or disaster were declared.[27] Some were made in anticipation of the disaster, while others were reactive:

- In NSW, the Premier, the Hon Gladys Berejiklian MP, declared three states of emergency during the 2019-2020 bushfire season. The first was declared on 11 November 2019 for a period of seven days.[28] The second was declared on 19 December 2019 until 26 December 2019,[29] and the third was in force from 2 January 2020 until 10 January 2020.[30] The declarations were made upon the Premier being satisfied that an emergency, 'namely bushfires in various parts of the State, constitutes a significant and widespread danger to life or property'.
- In Victoria, the Premier, the Hon Daniel Andrews MP, declared a state of disaster on 2 January 2020 for six local government areas and three alpine resorts,[31] and varied it on 3 January 2020 to include an additional alpine resort.[32] The 2019-2020 bushfire season was the first time such a declaration had been made in Victoria.[33] The declaration remained in force until 9 January 2020. The decision to make and then later vary the declaration was stated to be made on advice from the Minister for Police and Emergency Services and the Emergency Management Commissioner, including the potential for 'significant and widespread danger' to life or property, among other matters.[34] At that date, the Premier extended the declaration for a further two days, until 11 January 2020.
- In the ACT, the Chief Minister, Andrew Barr MP, declared a state of alert from 2 January – 9 February 2020. A territory-wide state of emergency was declared from 31 January 2020 to 2 February 2020, the Chief Minister 'being satisfied that an emergency is likely to happen'.[35]
- In WA, the Fire and Emergency Services Deputy Commissioner Craig Waters declared an emergency situation for the City of Karratha and Shire of Ashburton lasting three days on 9 February 2020, in regard to Tropical Cyclone Damien.[36] No declaration was made in relation to the 2019-2020 bushfires.[37]
- No declarations were made for (or for parts of) the NT, Queensland, SA [38] or Tasmania. We note that in Queensland a state of fire emergency was declared on 9 November 2019 by the Minister for Fire and Emergency Services, the Hon. Craig Crawford MP, under the *Fire and Emergency Services Act 1990* (Qld) 'to mitigate public safety risks'.[39] However, there was no declaration of a disaster situation under the *Disaster Management Act 2003* (Qld).

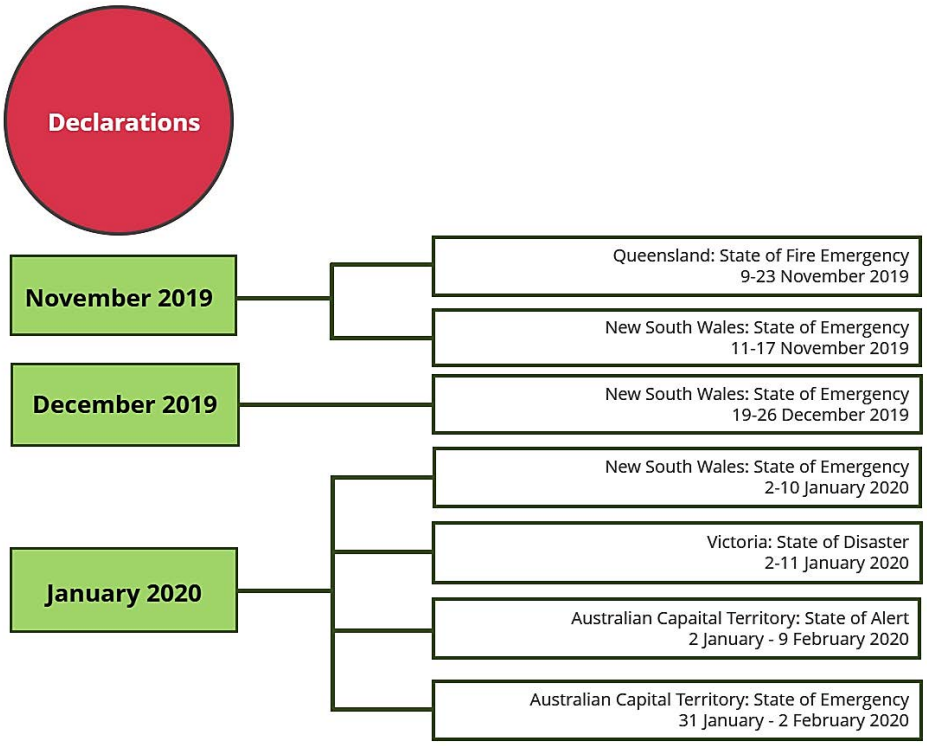


Figure 19: Timeline of state and territory emergency declarations made during the 2019-2020 bushfire season

Potential interaction

5.77 The extent to which a national declaration would interact with state and territory emergency management frameworks would depend on the way in which a national declaration is made and its legal effects.

5.78 Where the Australian Government makes a declaration without relying on a referral of power, we envisage that a declaration would sit alongside state and territory frameworks. This is because a declaration would involve the Australian Government taking steps to organise its own resources in responding to the disaster, rather than interfering with state and territory processes. It would not be dependent on the existence of a state or territory declaration. Instead, it would operate to 'complement existing state and territory emergency declarations and support better national coordination'.[40]

5.79 In the event that national and state and territory frameworks were to interact – for example, if a declaration was made based on a referral of power from the states – the integration of a national declaration within state and territory frameworks could be used to activate state and territory powers and authorities. This would assist in providing certainty in the operation of a national declaration, and would ensure that the frameworks were harmonised for use during an emergency. Integration of a national declaration within state and territory frameworks would, in particular, assist in the event of incapacity of a state to respond to the disaster, including by triggering state powers and the deployment of state or territory resources in the interest of that state or territory.

Chapter 6 National emergency response capability

Summary 153

Planning for future demands on capability 154

Existing fire and emergency services capability 156

Capability development for the future 157

Resource sharing 158

Arrangements for resource sharing 159

A national register of personnel and equipment 161

National interoperability 164

Responding to natural disasters at the border 165

Interoperability of private firefighters and primary producers 166

Communication interoperability 167

Public Safety Mobile Broadband 170

National training standards 172

National-level exercises 177

Supporting the volunteer workforce 179

Summary

6.1 The increasing complexity of disaster risks presents new challenges that have the potential to overwhelm the capabilities of our fire and emergency services. Fire and emergency services will need to undertake long-term strategic capability development, and consider what needs to be developed or enhanced to meet future requirements. However, this should not be done in isolation.

6.2 Complex, concurrent and compounding natural disaster events, like those experienced over the 2019-2020 summer season, showcase the growing need to consider capabilities nationally. A more consistent and connected approach to capability planning across jurisdictions is needed to enable resource sharing and to ensure that Australia has sufficient capabilities to prepare, respond to and recover from natural disasters, now and in the future. We consider that states and territories should regularly assess the capacity and capability requirements for fire and emergency services in light of both current and future natural disaster risk.

6.3 Natural disasters do not respect borders and the increasing frequency of natural disasters will, in turn, increasingly require cooperation and collaboration between agencies and jurisdictions. National resource sharing arrangements were tested during the 2019-2020 bushfires. National resource sharing arrangements need to be strengthened to support resource sharing in times of crisis. We consider the development of a national register of resources would support situational awareness, and resource sharing, and inform national capability development.

6.4 For national resource sharing to occur efficiently and effectively, the people, equipment and systems used across the country need to be interoperable. Fire and emergency services have worked to improve interoperability over time. However, further challenges remain, especially in relation to interoperable communications and consistent and portable training for emergency responders. We consider that states and territories should update and implement plans to achieve interoperable communication for emergency services. We also recommend expediting efforts to create Public Safety Mobile Broadband to improve communications capabilities for emergency responders.

6.5 Sustaining an effective volunteer workforce is vital to ensuring future capabilities of fire and emergency services to respond to natural disasters. Volunteers make up the majority of the fire and emergency services workforce in Australia. Volunteers need to be supported and enabled to participate in a way that respects the values of volunteerism, and considers the competing demands on their time. Increasing employment protections for fire and emergency services volunteers represents a way to support volunteer participation into the future.

Planning for future demands on capability

6.6 The fire and emergency services of the states and territories play important and varied roles before, during and after natural disasters. Fire and emergency services form a key part of Australia's natural disaster response capability[1]—that is, our ability to take action in anticipation of, during, and immediately after a natural disaster to ensure that its effects are minimised, and that people affected are given immediate relief and support.[2]

6.7 The increasing complexity of disaster risks presents new challenges that could overwhelm the capabilities of our emergency services.[3] Australia's weather and climate agencies have told us that changes to the climate are projected to increase the frequency and intensity of natural disasters, potentially resulting in complex, concurrent and compounding events (see Chapter 2: Natural disaster risk).[4]

6.8 The 2019-2020 bushfires provided a glimpse of the way that these scenarios, which were previously 'unprecedented', could come to pass.[5]

6.9 The duration and severity of the 2019-2020 bushfire season tested the capabilities and capacity of emergency services across Australia. Large scale concurrent fires in multiple jurisdictions meant that Australia drew on resources from each state and territory, the Australian Government and international support to respond. Local fire and emergency services resources were stretched in NSW, Victoria and SA.[6]

6.10 We heard suggestions that there was a shortage of particular personnel with the qualifications, skills and experience needed to respond to the fires.[7] The Australasian Fire and Emergency Service Authorities Council (AFAC) identified that the National Resource Sharing Centre (NRSC) was unable fulfil some resource requests due to a 'lack of appropriate trained and qualified personnel available'.[8] The skills gaps identified in concurrent inquiries by fire agencies include fire behaviour analysts, aerial firefighting specialists, divisional commanders and level 3 incident controllers.[9] Concurrent state inquiries in Queensland, NSW and SA identified the need for improved workforce planning such as additional training for leadership development and incident management roles.[10]

6.11 Resource sharing of personnel occurred on a scale not seen before. Over 9,000 interstate and international personnel were deployed through bilateral and national arrangements to provide additional support where it was needed most.[11] Resource sharing highlighted the importance of interoperability as people, equipment and systems were required to work together.

Table 2: Number of personnel deployed through NRSC and MOUs during the 2019-2020 bushfire season[12]

Receiving jurisdiction	Sending jurisdiction										
	NSW	**QLD**	**VIC**	**SA**	**WA**	**NT**	**NZ**	**US**	**CAN**	**TAS**	**ACT**
NSW		860	2,487	1,522	479	83	237	82	98	576	2,159
QLD	111		52	120	67	88	71				
VIC		5					12	273	134		
SA								5	7		
ACT		339		1							
Total personnel deployed	**9,868**										

* ACT and Tasmania did not specify to which jurisdictions they deployed personnel.

6.12 In addition, the 2019-2020 summer season placed significant demands on the emergency responder workforce. As the *Victorian Inquiry into the 2019-20 Victorian Fire Season* found, the strain on the capacity and capabilities of fire and emergency services had 'implications for the management of fatigue and the occupational health and safety of personnel'.[13] We also heard about the need to improve how our emergency responders, both career and volunteer, are trained and supported.

6.13 The increasing frequency, intensity and complexity of natural disasters demands assessment of the nation's capability to work together to respond. The capabilities of fire and emergency services should not be developed in isolation. Capabilities should be developed in a complementary way that allows resources to be shared as needed and provides an understanding of our national collective capabilities.

> There's a need for a step change in how we deal [with the enemy] - the enemy being climate change and how that's affecting natural disasters and fires - and we need a step change in how we coordinate the insufficient resources we have to deal with this threat.[14]

6.14 We focus here on the capabilities of fire and emergency services, encompassing fire services agencies (urban, rural and parks), and state emergency services (SES). Many of the lessons learned can be applied across the emergency services sector, and more broadly, other bodies which play a role in responding to natural disasters, such as local governments.



Figure 20: Firefighters conducting a roadside back burn[15]

Existing fire and emergency services capability

6.15 Each state and territory is responsible for its own capability to respond to natural disasters. Capability is not just people and resources but also the systems and arrangements that support them. The core elements of emergency response capability are:[16]

- people
- equipment and assets
- incident management systems, and
- governance arrangements.

6.16 Fire and emergency services workforces are comprised of career and volunteer personnel. In the context of bushfires, emergency responders also include public land managers (eg national parks and state forest agencies) as well as some private personnel such as forestry industry brigades, and community farm fire units. Emergency responders do not work in isolation. Each brings their own skills and knowledge, and must work together in a response.

6.17 Resources include the equipment and assets used by emergency responders to respond to natural disasters. For example, firefighting vehicles, aerial assets, heavy machinery, chainsaws, communications equipment, and personal protective equipment. Equipment and assets must be safe and suitable for the task.

6.18 An incident management system provides a set of processes and procedures that can be applied when responding to natural disasters. The Australasian Interservice Incident Management System (AIIMS) is the nationally agreed incident management

system for fire and emergency services. All Australian fire and state emergency services adopted AIIMS in 2004.[17] We heard from emergency responders and agencies about the benefits of AIIMS in coordinating response activities and facilitating interoperability.[18]

6.19 Governance, in this context, refers to the set of controls, authorities, systems and processes by which emergency services derive their powers and are held to account for their decision-making in relation to natural disaster response.[19] This includes legislation, emergency management plans, resource sharing arrangements and policies. States and territories have each developed their own governance arrangements.

Capability development for the future

6.20 Capability development can be considered in two ways; short-term operational capability development and strategic long-term capability development. Short-term operational capability considers what is needed to be prepared for the next natural disaster. Long-term strategic capability development considers what needs to be developed or enhanced to meet future requirements 10 or 20 years from now, including future workforce modelling, advances in technology, and climate risks.[20]

6.21 Fire and emergency services assess and develop their own capacity and capabilities, using contextualised requirements and risk assessments.[21] We heard concern that existing fire and emergency service capability plans tend to be based on short-term operational needs,[22] ahead of the next season,[23] with a limited focus on long-term capability planning.[24]

6.22 NSW is currently undertaking a project to understand and estimate state-level capacity requirements for severe to catastrophic disasters.[25] Some states and territories use data modelling and forecasting or are working on planning tools to forecast resource needs.[26] In Victoria, the Country Fire Authority (CFA) and Department of Environment, Land, Water and Planning (DELWP) have been working with CSIRO to develop a planning tool to forecast firefighting resources requirements for 2020 and 2050 for all fire regions in Australia based on the Forest Fire Index and two climate change scenarios.[27]

6.23 Fire and emergency services have at times been slow to update, and integrate new equipment and technologies.[28] We heard this is due to the financial costs and long lead time required for agency wide updates.[29] We recognise that investing in certain capabilities can be expensive, therefore capability planning based on long-term needs is important.

6.24 There is growing recognition that capacity and capability must be developed in light of changing demographics, land-use and climate risks.[30] For example, the 2019-2020 NSW Bushfire Inquiry recognised the need to consider the impact of changing fire seasons on resource sharing when determining its future capability needs.[31]

6.25 Jurisdictional approaches to capacity and capability development have served fire and emergency services well in the past. However, climate and demographic changes are likely to increase the demand on fire and emergency services. The ability of individual jurisdictions to meet this demand at peak times is likely to become

increasingly difficult, prompting a need for increased resource sharing.[32] There is a need to consider capabilities nationally, and for a more consistent and connected approach to capability planning across jurisdictions.

6.26 There have been efforts to create 'a single consolidated picture of the capabilities that enable Australia' to respond to disasters.[33] Emergency Management Australia (EMA) and AFAC, in collaboration with fire and emergency service, developed the National Statement of Capability for Fire and Emergency Services.[34]

6.27 The National Statement of Capability for Fire and Emergency Services acts as an inventory of resource types available in each jurisdiction to indicate the jurisdiction's ability to contribute resources to national deployments.[35] It was also intended to begin to assess the limitations of available capabilities in the face of increasing frequency and intensity of disasters.[36] While it is important to be cognisant of resources available, capability should be driven by an understanding of current and future needs. The National Statement of Capability for Fire and Emergency Services was current at December 2016. A third revision of the statement commenced in 2019 but was placed on hold as a result of the summer bushfires and COVID-19 pandemic.[37]

6.28 The Australian Government should have an important role in facilitating national cooperative efforts in building capabilities and strategic long term planning.

6.29 A national strategy for the comprehensive management of disaster risk would help make available expert advice to fire and emergency services to develop the long-term capability needed to respond to the growing disaster risk, particularly in relation to resource sharing and interoperability. This could be a role for standing disaster resilience functions within the Australian Government (see Chapter 3: National coordination arrangements).

Recommendation 6.1 Assessment of the capacity and capability of fire and emergency services in light of current and future natural disaster risk

State and territory governments should have a structured process to regularly assess the capacity and capability requirements of fire and emergency services, in light of both current and future natural disaster risk.

Resource sharing

6.30 Australia's fire and emergency services rely on resource sharing, both domestic and international, to cope with surges in requirements during large scale and severe natural disasters. To date, the sharing of resources has benefited from relatively predictable natural disasters seasons for hazards, including tropical cyclones and bushfires. For example, Australia has historically experienced fire seasons that start and finish earlier in the north of the

> If the Orroral Valley fire had have continued…we would have got to the point of having to request international firefighters because we know - we know nationally we had almost exhausted access to available Australian firefighters.[38]

country than in the south, and cyclone and bushfire seasons that are distinct in the west,[39] allowing resource sharing between states.[40]

6.31 Lengthening and overlapping natural disaster seasons are testing these arrangements, limiting the ability of emergency services to help each other while maintaining local capacity.[41] Similarly, overlapping seasons have been recently observed between the northern and southern hemisphere. This limits Australia's ability to rely on international resource sharing to meet domestic requirements.[42] The ability to have a clear understanding of nationally available resources during a response will become more important.

Arrangements for resource sharing

6.32 Two primary mechanisms are presently used for resource sharing between fire and emergency services agencies in Australia. The first is through bilateral agreements and cross-border arrangements between state and territory fire and emergency service agencies. The second is through the Commissioners and Chief Officers Strategic Committee (CCOSC), the NRSC and the Arrangements for Interstate Assistance (AIA). These bodies and arrangements have evolved in relation to bushfires, and their operational role has been largely in, but is not limited to, bushfire events.[43]

6.33 CCOSC supports national coordination of operational matters during significant events.[44] CCOSC is a forum for information sharing between jurisdictions, providing situational awareness and facilitating resource sharing.[45] CCOSC, through its members, provides direction to the NRSC in relation to its function in facilitating the interstate and international resource sharing, 'apart from cross-border operations'.[46]

6.34 The NRSC, managed by AFAC, supports national capability in a response by:

- maintaining and implementing the AIA.[47] The AIA is the primary arrangement for large-scale resource sharing between fire and emergency services during significant natural disaster events[48]
- coordinating the deployment of international resources, in conjunction with the Australian Government,[49] and
- contributing to operational situational awareness through briefings.

6.35 The role of CCOSC and the NRSC is further discussed in Chapter 3: National coordination arrangements.

Resource sharing during the 2019-2020 bushfire season

6.36 The NRSC played an important and valuable role during the 2019-2020 bushfire season. Queensland, NSW, Victoria and SA requested assistance under the AIA, resulting in the NRSC coordinating the deployment of over 7,305 interstate and international personnel.[50]

6.37 The NRSC acted as an 'operational enabler'.[51] In addition to facilitating resource sharing, the NRSC provided a national picture of the deployment of resources and resourcing needs based on information provided to it by states and territories.[52] The

NRSC provided weekly situation reporting to heads of fire and emergency services and EMA. NRSC situation reports provided a snapshot of resource sharing at that point in time and indicated the commitment levels in each state and territory.[53]

6.38 The NRSC resource sharing arrangements are well-established and are generally considered successful and effective by fire and emergency services, and EMA.[54] However, the NRSC was tested during the 2019-2020 bushfire season. We heard that, at times, resource requests were unable to be filled,[55] and some fire agencies considered that resource sharing processes were not sufficiently responsive or agile.[56] AFAC accepts that there are improvements that can be made to the NRSC and, with CCOSC, has been actively considering those improvements.[57]

6.39 A number of states suggested that the NRSC's provision of national situational awareness could be improved.[58] The information available to the NRSC was reliant on the information provided by each state and territory as to their assessment of their available resources.[59] The NRSC did not have the capability to report a forecast of resources against the committed capacity of the jurisdictions.[60] Commissioner Whelan, ACT Emergency Services Agency, told us that, while the NRSC captured information based on what the states and territories advised was available, with the increasing likelihood of concurrent national disaster activity, it is 'imperative that we actually have a national outlook to best understand what resources are or are not available'.[61]

6.40 **There are opportunities to strengthen national resource sharing arrangements to ensure that Australia can best cope with disasters into the future. Resource sharing arrangements should provide a clear national picture of available resources. They should facilitate timely resource sharing in times of crisis, enabling sufficient and appropriate resources to be directed when and where they are needed most.**

6.41 There is also a need for resource sharing to be within an authorising environment that is informed by broader risks and national resources (including Commonwealth resources), to ensure national situational awareness is provided to fire and emergency services in a response. Accountability and transparency for national coordination of resource sharing is discussed in Chapter 3: National coordination arrangements.



Figure 21: Firefighting trucks during the 2019-2020 bushfire season[62]

A national register of personnel and equipment

6.42 A national register for resources, both personnel and equipment, would assist decision making during natural disasters. It would improve resource sharing by ensuring available resources are easily identified, and can be efficiently and strategically deployed in a response.[63] It could also be used to create a national picture of capability and national situational awareness.

6.43 The CSIRO's *Climate and Disaster Resilience Report* advises that effective resource management starts with registration of resources:

> *Resource management starts with registration of vehicles, aircraft, equipment and personnel available (including details on skills and qualifications of deployed personnel), which can then be used for planning, tasking, tracking, and coordination of emergency response at national, state and incident levels.*[64]

6.44 For a national register to be effective, there must be some consistency of descriptions used to register personnel, equipment and aircraft between jurisdictions. We heard that different descriptors for resources across states and territories exist and cause confusion when requesting resources.[65] Standardised descriptions for resources would provide greater clarity for all jurisdictions, improving resource sharing.[66]

Existing registers in state and territories

6.45 Registers of career and volunteer emergency responders exist within each jurisdiction.[67] In some cases there are multiple registers for each fire and emergency

service agency.[68] Registers typically capture personal information, training and qualifications.[69] These registers can be used when organising deployments to confirm if a person is suitable and qualified.[70] Some jurisdictions maintain separate deployment registers to identify personnel interested in being deployed intrastate, interstate, or internationally.[71] We heard that challenges remain in capturing volunteer availability.[72]

6.46 Jurisdictions use different systems to track their equipment and personnel.[73] Fire and emergency services recognise the need to improve how they monitor and manage resources. We heard from former Commissioner Shane Fitzsimmons NSW Rural Fire Service (RFS), now Deputy Secretary, Department of Premier and Cabinet and head of Resilience NSW that:

> *…one of the big lessons we had out of this season, was our resource tracking systems are rudimentary and they need to be more sophisticated and more mature into the future.*[74]

Better management of emergency responders

6.47 Fatigue management was a concern over the 2019-2020 bushfire season. Some firefighters reported experiencing fatigue, at times feeling both physically and mentally exhausted.[75] We heard from firefighters who worked long shifts extending to 16 hours at a time, sometimes longer.[76] We also heard from other firefighters who were available but were not utilised or deployed, despite their willingness.[77]

6.48 We heard about the need to ensure that processes for deployments are suitable to both paid and volunteer personnel. For example, volunteers need enough notice ahead of a deployment to arrange leave with their employer.[78] We heard from volunteers that processes that did not adequately consider volunteer needs resulted in the inability to mobilise the 'full depth of volunteer capacity'.[79]

6.49 **The 2019-2020 season highlighted the need for improved systems for managing and rostering the thousands of emergency responders working at any given time in a response. As seasons get longer and more complex, tracking and monitoring of deployed personnel through a register would provide a better understanding of overall capacity and improve fatigue management. Jurisdictional registers should be developed in a way that can be aggregated to provide a national picture of resources to facilitate resource sharing and enable national operational capacity.**

NRSC Deployment Registry and ARENA

6.50 AFAC has proposed the development of a National Deployment Registry through the NRSC. [80] The proposal includes a registry of personnel and a single national IT system to manage interstate personnel deployments. The IT system would support the NRSC to fill resource requests, share information, track resources and create situation reports. AFAC previously launched a Deployment Registry to support outbound international deployment.[81]

6.51 The proposal for a National Deployment Registry for the NRSC was endorsed by CCOSC in July 2020 subject to further development in consultation with AFAC members.[82] However, no funding was committed and the proposal is still in an early stage.[83]

6.52 We heard that it is AFAC's aim for the National Deployment Registry to provide near to real-time data of available fire and emergency services resources for the purposes of resource sharing through the NRSC.[84] AFAC acknowledged that this will require considerable development of the software tool, and will not be possible in the first iteration of the Registry.[85]

6.53 The National Deployment Registry proposal, if it is accepted and developed, would provide benefits. However, it will not have a complete picture of national resources, as the NRSC does not capture all domestic resource sharing. The NRSC does not facilitate bilateral resource sharing outside of the AIA, and is accordingly unable to provide situational awareness for all deployment activity.[86]

6.54 The National Aerial Firefighting Centre (NAFC), a business unit of AFAC, maintains ARENA - a management support system for aerial firefighting resources.[87] ARENA provides a registry of aircraft, operators and crew, visibility of available 'Call When Needed' aircraft, real-time tracking of aircraft locations and dispatch functionality.[88] All states and territories use the registry functions of ARENA, including for some aircraft that are not procured through NAFC (Chapter 8: National aerial firefighting capabilities and arrangements). However, not all aircraft are recorded in ARENA and not all states and territories currently use the aircraft dispatch functions.[89] AFAC told us that the utilisation of a common national system, such as ARENA, for dispatch and monitoring would enhance the effective sharing of resources, providing national, real-time visibility of resource availability and commitment.[90]

A national register

6.55 A national register would build on AFAC's National Deployment Registry proposal and the existing functionality provided by ARENA and collate a national understanding of available personnel, equipment and aerial assets. This would support national situational awareness during a response and could inform national capability development. Further, a national register would facilitate interstate resource sharing. A national register should eventually be able to facilitate the tracking of all resource deployments, to assist visibility of deployments and situational awareness for operational decision making.

6.56 The development of a national register with such capabilities is not a short term project. State and territory fire and emergency services should consider the development of a national register as a part of their long-term capability planning. Any national register should consider how existing registers and tracking tools can best be used, to maximise interoperability and leverage existing investment.[91] Existing state and territory registers already capture much of the necessary information to create a national register, although interoperability is limited.[92] In the short term, states and territory should work to harmonise registers, for example through consistent descriptions of resources and interoperable IT platforms, with the long term goal of creating state and territory systems that can be aggregated into a comprehensive national registry of personnel and equipment.

6.57 **A national register should facilitate and support the interstate sharing of state and territory fire and emergency services resources, including personnel, equipment and aerial assets, and the sharing and deployment of international fire and emergency services resources in Australia. The national register should support**

tracking of personnel, equipment and aerial assets deployments interstate and internationally.

Recommendation 6.2 A national register of fire and emergency services personnel and equipment

Australian, state and territory governments should establish a national register of fire and emergency services personnel, equipment and aerial assets.

National interoperability

6.58 The term interoperability is commonly used by fire and emergency services to refer to the ability for agencies (the individuals and/or agencies as a whole) and equipment to interact and integrate with each other.

6.59 For resource sharing to occur efficiently and effectively, the people, equipment and systems used across the nation need to be interoperable. Interoperability of equipment, systems and personnel is necessary for efficient coordination of response across borders and effective deployments interstate.

6.60 Achieving national interoperability would mean that each jurisdiction understands and trusts the capability of other jurisdictions, and can communicate and integrate with others' systems, equipment and personnel in a response, without the need for significant workarounds or just-in-time training.

6.61 Fire and emergency services have worked to improve interoperability over time, including through the use of AIIMS by all state and territory fire and emergency services agencies.[93]

6.62 Nevertheless, ongoing challenges remain. We heard about key challenges and opportunities for increased interoperability, particularly with respect to:

- communication equipment
- time taken to replace firefighting equipment, and
- training and qualifications for emergency response personnel.



Figure 22: Incident Management Team Hawksbury Gospers Mountain Fire December 2019[94]

Responding to natural disasters at the border

6.63 Natural disasters do not respect borders. Where a natural disaster is at, or crosses, a state or territory border, the operational response to that natural disaster requires coordination of response between control agencies. This requires coordinated planning, effective communication, sharing of situational awareness information and coordination of control.

6.64 We heard from Queensland, NSW, the ACT and Victoria, in particular, as to arrangements that facilitate cross-border response. Those arrangements vary, and include memoranda of understanding between border brigades and between agencies.[95]

6.65 We heard that there were difficulties in some instances with information sharing when managing border-border fires, during the 2019-2020 bushfire season.[96] We heard that limited or delayed information sharing impacted the ability to coordinate timely response activities.[97] Information sharing was complicated by agencies using different data and communication systems.[98]

6.66 Differences at the border can also include terminology, procedures, protocol and legislation, impacting the way each jurisdiction is able to respond. These differences can pose significant challenges to coordination of response efforts at the border.[99] Bordering jurisdictions mitigate or minimise the impact of these communication and information sharing challenges by agreeing border plans, conducting joint training and exercising.[100]

6.67 We heard that fire and emergency services use Liaison Officers in cross border incidents. Traditionally, Liaison Officers, a role defined in AIIMS, coordinate resource sharing and facilitate information sharing between agencies. The Liaison Officer role has been expanded to assist cross border incidents. In one example during the 2019-2020 bushfires, Liaison Officers were embedded in bordering jurisdictions' incident management teams (IMT) to 'facilitate consistent and complementary strategies and tactics.'[101]

6.68 The Victorian Inquiry into the 2019-2020 bushfires season found:

> *Liaison Officers were in place in border region IMTs and were deemed to have worked well, although stakeholders also discussed the lack of trigger conditions and prompts needed to get them into place in a planned way.*[102]

6.69 We heard there may be value in other jurisdictions utilising the cross-border liaison officer model to support coordination and communication in future cross border incidents.[103] This could be supported by the development of an agreed standard for cross border Liaison Officers, including when they should be used (eg level 2 or 3 incidents), as well as responsibilities and skills set required to fulfil the role.[104]

6.70 **It is important for cross-border arrangements and protocols to be regularly reviewed, implemented and updated, and to consider best practice.**

6.71 We note Recommendation 13 of the NSW Inquiry into the 2019-2020 bushfires:

> *That, to ensure updated resource-sharing arrangements are in place, the NSW and Victorian Governments progress and finalise a multi-agency Memorandum of Understanding before the 2020-21 fire season commences.*[105]

Interoperability of private firefighters and primary producers

6.72 Private firefighters and primary producers offer additional capacity and capability that can be operationalised by fire and emergency services to meet peak demands. Private firefighters and primary producers can provide valuable expertise and local knowledge. Private forestry industry brigades and farm fire units made a significant contribution during the 2019-2020 bushfires.[106] However, we heard that coordination between these groups and fire and emergency services was often not ideal and was hindered by limited communication.[107]

6.73 Fire and emergency services should ensure they utilise private emergency responders effectively and safely to respond to natural disasters. For example, in SA, Victoria and Queensland, private plantation firefighters may form 'industry brigades', which are identified as Country Fire Service (CFS), CFA or rural fire brigades respectively, and operate under that structure with the associated liability protections.[108] NSW does not have 'industry brigades', but Forestry Corporation NSW contracts private firefighters to supplement resources during the fire season. We heard that the approach in NSW leaves private firefighters without the necessary liability protections to effectively and safely assist in a response.[109]

6.74 **Fire and emergency services should ensure that private firefighters they directly engage or contract in a response have the same protections as paid and volunteer emergency responders.**

6.75 States and territories also have variable means of cooperation with primary producers and landowners. Queensland, for example has less formalised 'primary producer brigades'[110] and NSW has commenced a 'Farm Fire Unit Integration project'.[111] The ACT, by contrast, generally does not engage private firefighters and has ceased the provision of 'slip on' units to landowners for fire suppression.[112]

6.76 Primary producers and land owners could be supported by receiving training (where appropriate), and ensuring clear communication through interoperable equipment. Both the NSW and SA 2019-2020 bushfire inquiries identified better integration of Farm Fire units as important in managing and responding to future bushfires.[113]

Communication interoperability

6.77 In responding to disasters, timely and reliable communication is important. Communication is essential to provide situational awareness, to inform decision making and ensure the safety of emergency responders.

Communication equipment on the ground

6.78 Interoperable communications equipment is vital for cooperation between fire and emergency services. A lack of interoperability of communications equipment can make information sharing in the field challenging or impossible.[114] This is especially the case where people from different jurisdictions are working together to respond to a natural disaster.[115] Effective communication among emergency responders on the ground relies on the equipment (eg radio type), the radio channels and the radio network (eg government radio network) they use being compatible.

6.79 There is no single standard for radio equipment or unified radio network for emergency services nationally.[117] Historically, each agency has operated on its own radio network.[118] This has resulted in a lack of technical interoperability between agencies and between jurisdictions. For example, two different agencies attending the same response may not be able to communicate via their radios. Different radios are not just used by fire and emergency services but also by Australian Government organisations that may be involved in a response, such as the Australian Defence Force.[119]

> So we are unable to communicate with a number of agencies. They all run … separate radios. The recent fire season saw one of our vehicles with five different radio systems in it: a DELWP one, an RFS, a CFA, a Forest Corp, and a UHF hand piece, all in one vehicle.[116]

6.80 Achieving interoperable radio communications has been an ongoing challenge for fire and emergency services, with numerous inquiries and post-event reviews into natural disasters making recommendations for greater communications interoperability.[120]

6.81 Legacy communication networks appear to be able to be adjusted to improve interoperability, albeit with challenges.[121] For example, efforts have been made to improve interoperability between Queensland RFS and NSW RFS at the border, integrating and linking the two communication networks.[122]

6.82 At least one jurisdiction introduced an entirely new communication system to improve interoperability. The ACT RFS introduced the same communications systems as NSW RFS to enable interoperability.[124] ACT RFS radio can now access NSW RFS operational radio channels.[125]

> Different suppliers of radio, different systems, different frequencies and different protocols all add to the inability to communicate effectively on the fire ground.[123]

6.83 Despite some progress, we heard from emergency responders about the challenges they experienced with radio communications over the 2019-2020 bushfire season. We heard that, within jurisdictions, multiple radio networks are still used by agencies, making effective communication difficult.[126] Further we heard that challenges communicating at the border remain, with one firefighter explaining that 'bar from getting out and waving at them, there's not much you can really do'.[127]

6.84 We heard that workarounds are used when personnel are deployed interstate to overcome the lack of common radio equipment and systems. It is typical for interstate personnel to be deployed in a 'strike team' of multiple personnel with their own communication equipment, allowing them to communicate among themselves.[128] The leader of the strike team is then responsible for coordinating and communicating with the incident controller for tasking, fire ground intelligence and safety alerts. Some emergency responders told us that this workaround was successful during the 2019-2020 bushfire season, allowing deployed personnel to integrate into response activities.[129] However, we also heard of deployed personnel being left without the ability to communicate with others on the fire ground, impacting the timeliness of communication and the safety of crew.[130] One volunteer told us:

> *The CFA crews could not interact with any of the New South Wales counterparts during their deployments with their own appliances. This, on its own, was extremely dangerous. Previously communication vans were deployed with task forces. This did not occur this past season. If CFA crews were using RFS appliances, there was still extreme difficulty communicating during deployments.*[131]

Communication with aircraft

6.85 Communications between aircraft and ground crews are important to ensure a coordinated tactical response and to ensure the safety of crews in the air and on the ground. Aircraft can provide ground crews with important situational awareness of their surroundings and advise of escape routes where necessary. NAFC contracts require that aircraft be equipped to communicate with the relevant fire agencies operating on the ground during operations.[132]

6.86 Because each state or territory operates a different tactical radio communications system for ground operations, there are implications for communication with aircraft.[133]

6.87 Tactical radio communications systems are separate from, and incompatible with, the aeronautical radio systems that are normally used in aircraft. This means that firefighting aircraft need to be equipped with at least two radio systems: one to

communicate with ground crews and the other to communicate with air traffic control and other aircraft. This makes communications difficult and has safety implications for pilots.

6.88 There are technical and practical limitations to equipping aircraft with multiple tactical radio systems. In most instances, at least two tactical radio units are required per jurisdiction. Different radio antennas are also required for different jurisdictions, and most aircraft have limited space for mounting antennas. The acquisition and support of tactical radios is also costly.

6.89 We heard that incompatible communication impacts the coordination and use of aerial firefighting assets. Additional problems arise in border areas where two separate ground communications systems might be required in addition to aeronautical radio. For example, during 2019, when there were bushfires in northern NSW and southern Queensland, Queensland authorities requested assistance from a nearby, NSW-based helicopter in gathering situational awareness on a fire on the Queensland side of the border. As the helicopter had no means of direct communication with the Queensland personnel on the ground it was necessary to land the aircraft and arrange a meeting in-person to convey the necessary information to the ground personnel.[134]

6.90 When an aircraft moves to another jurisdiction, work is required to change radios such as by reprogramming, changing the radio unit or installing new radios. This impacts aerial resource sharing, requiring additional time and costs to allow aircraft to work interstate.

Addressing communications interoperability

6.91 Australian, state and territory governments have long recognised the need to improve the national interoperability of communications equipment and networks used by emergency services.[135]

6.92 Numerous previous inquiries into natural disaster events have recommended the need for interoperable communications.[136] For example, in 2004, The National Inquiry on Bushfire Mitigation and Management supported the development of a national strategic plan to enable interoperability of emergency service radio communication across Australia, work that at the time, was already underway by a National Coordination Committee for Government Radio Communications. The National Framework to Improve Government Radio Communications Interoperability 2010-2020 was agreed by Council of Australian Governments (COAG) in 2009.[137] The framework states:

> *The National Framework suggests an indicative ten-year timeframe to allow jurisdictions sufficient time to align technical requirements with their procurement cycles and thus significantly mitigate any cost of change. Most jurisdictions are already either implementing or planning their next technology refresh and all jurisdictions will most likely do so in the Frameworks timeframe.*[138]

6.93 A decade on, despite the recognition of the importance of interoperable communications by governments and fire and emergency services, progress has been

very limited. One might have hoped by now that the framework would be fully implemented.

6.94 To our inquiry, the Australian Government and all states and territories offered support or support in principle for governments working towards ensuring that emergency communications are interoperable across jurisdictions. However, SA, Victoria and Queensland noted the significant costs required to achieve interoperability.[139] Further WA noted that:

> *[i]ntegration of communication systems between jurisdictions (which is high cost) may be appropriate for those jurisdictions where there is a high degree of cross-border activity. This is not the case for WA. The lower-cost approach WA successfully uses involves having locally-based equipment (configured to local radio networks) available to personnel deploying into WA from other jurisdictions for emergencies or major planned events.*[140]

6.95 The NT told us that the interoperability of equipment and cross border firefighting 'have minimal bearing on the NT, which rarely experiences natural disasters that require a cross border emergency response'.[141] It stated that the more 'pressing priority in the NT was intrastate interoperability.'

6.96 Further, SA also noted 'that communications planning between agencies developing (or that have developed) interoperability is crucial to successful outcomes'.[142]

6.97 We encourage governments to prioritise arrangements to deliver more interoperable communications equipment and improve interoperability of communications. We acknowledge that achieving interoperability will take significant investment and that it cannot occur overnight. However, this does not mean that years should pass with little progress. Rather, it demands that steps be taken now to agree and plan how communications interoperability will be achieved.

6.98 **Achieving interoperable communication between all fire and emergency services should be addressed in long-term capability planning, and will require ongoing collaboration, coordination and action between states and territories.**

Recommendation 6.3 Interoperable communications for fire and emergency services across jurisdictions

State and territory governments should update and implement the National Framework to Improve Government Radio Communications Interoperability, or otherwise agree a new strategy, to achieve interoperable communications across jurisdictions.

Public Safety Mobile Broadband

6.99 A Public Safety Mobile Broadband (PSMB) capability is a dedicated mobile broadband service for emergency services to use. PSMB capability would enable first responders to make better use of internet-based technologies and applications to access video, images, location tracking and other data.[143] A PSMB capability would provide support to emergency responders broadly, not just in natural disasters.

6.100 The existing land and mobile ultra-high frequency (UHF) radio communication used by fire and emergency services are largely reliable in critical response situations (albeit not interoperable with other services), but cannot support heavy data traffic and web-based applications.[144] Fire and emergency services are increasingly relying on more complex and diverse information technologies that cannot be shared via existing UHF radio systems; for example, Automatic Vehicle Location services, databases and maps.[145]

6.101 We heard frustration from emergency responders and governments about the time taken to deliver PSMB.[146]

6.102 Over the past decade, progress towards a PSMB capability has been slow, even taking into account the project complexity, with multiple extended delays since the initiative was established. The Australian, state and territory governments first agreed the need for a PSMB capability as one means to improve Australian natural disaster arrangements in 2009.[147] The implementation deadlines of the PSMB capability continue to shift. The timeframe set out in the 2018 Roadmap shows implementation commencing in 2020-2021.[148] We were told that this timeline is no longer on track and it is unclear when the capability will be delivered.[149]

6.103 The Australian, state and territory governments disagree about which of them is best placed to lead and fund the PSMB capability. Some states and territories suggest the Australian Government should 'provide leadership'[150] and invest further to deliver the PSMB.[151] It was suggested that an absence of dedicated funding across states and territories is the key barrier to progressing delivery of the PSMB capability.[152] Others, including some state and territory governments, suggest the Australian government's delay in allocating the necessary spectrum needed to deliver the PSMB has acted as a roadblock to implementation.[153] An offer of spectrum was made by the Australian Government at a reduced market price to states and territory government on 28 November 2018, and negotiations are ongoing.[154] While the NSW Inquiry into the 2019-2020 Bushfires recommended that the Australian Government allocate spectrum for PSMB at no cost to states and territories, it does not appear to us that their Inquiry had the benefit of the extent of evidence we have received.[155]

6.104 PSMB will not resolve all communication issues faced by emergency responders. It will not resolve incompatibility of existing state communication systems and it will not work in mobile black spots as it relies on commercial mobile networks.[156] Nevertheless, PSMB provides a significant advancement that would enhance network and data access in the field.[157] It will also be important for PSMB implementation to be supported by appropriate end-use devices, policy, procedures and training.[158]

6.105 A national PSMB capability would confer significant benefits to emergency responders in the states and territories, and should be prioritised. The cost of the PSMB should be shared by governments reflecting the collective responsibility and shared benefits of a national capability for emergency responders.

6.106 As the PSMB develops, there should be a national coordinating body to oversee PSMB development and maintenance. This body would ensure ongoing efficiency of the PSMB capability and act as a coordination point to support cooperation between governments. This body should sit within the Australian Government, but have state and territory representation.

6.107 All governments, along with telecommunications carriers, supported or supported in principle the prioritisation of negotiations for a comprehensive and cost-effective delivery of the PSMB.

Recommendation 6.4 Delivery of a Public Safety Mobile Broadband capability

Australian, state and territory governments should expedite the delivery of a Public Safety Mobile Broadband capability.

National training standards

6.108 Fire and emergency services personnel should be able to work seamlessly together, irrespective of the jurisdiction or agency from which they come. A level of national consistency in training and competency standards is important to facilitate effective sharing of resources between jurisdictions and services, and to provide portability of skills for emergency responders.[159]

6.109 There has been substantial progress in Australia towards national consistency of training and national recognition of qualifications. This includes the Public Safety Training Package (PSTP)[160] and AFAC's Emergency Management Professionalisation Scheme. Nevertheless, we heard that there is further work that can be done to assist interstate deployments and portability of skills.



Figure 23: Firefighters working together, 2019-2020 bushfires[161]

Public Safety Training Package

6.110 The Public Safety Training Package (PSTP) establishes national training standards and qualifications for fire and emergency services, and the emergency management sector.[162] The PSTP is maintained under the direction of the Public Safety Industry Reference Committee, which is made up of representatives from the emergency services industry, such as AFAC.[163] Qualifications under the PSTP are nationally recognised as a part of the national vocational education and training (VET) system, with the delivery of these qualifications being regulated by the National VET Regulator, the Australian Skills Quality Authority, or the VET regulators in Victoria and WA.[164]

6.111 All state and territory fire and emergency services use the PSTP as the basis for delivering their fire and emergency services training.[165] However, the PSTP does not provide consistent training across all jurisdictions as each agency incorporates the PSTP into their training in different ways.[166] While many agencies seek to align their training with the qualification under the PSTP, they may not accredit their courses to deliver qualifications.[167] It appears that agencies take this approach to 'balance the requirements of the role versus the extra volume of learning needed to make a course accredited'.[168]

6.112 We heard concerns from fire and emergency service agencies as to the heavy administrative burden and high costs associated with being a registered training organisation.[169] Only training providers that are registered with the national vocational education and training regulator are able to deliver nationally recognised training towards qualifications. We encourage the Australian Government to work with the states and territories to consider whether this is creating barriers to national training and to address such concerns.

> Despite representative bodies drive for change… jurisdictional differences in training competencies, validation, exercising and accreditation against jurisdictional legislation impedes the seamless transition of personnel across roles across the nation.[170]

6.113 We also heard that fire and emergency services have different competency requirements for particular roles.[171] For example requirements to complete 'plantation firefighter' training differs between the South Australian CFS and Victorian CFA,[172] creating an apparent need for double accreditation to operate on both sides of the border.[173] Further, there is no consistent competency requirements to meet incident management team roles (eg planning officer).[174] We heard that variations are often due to agency-specific training requirements (eg specific equipment or safety standards), some of which exceed the standard set by the PSTP.[175]

6.114 We heard from volunteer firefighters that there is limited understanding of how training provided by each agency compares, impacting the portability of training and skills across borders. For example, private forestry firefighters told us that they complete basic firefighting training for each jurisdiction they work in because it is easier to re-train than get training from one jurisdiction recognised in another.[176]

6.115 **Fire and emergency services have shown support for the PSTP but do not utilise the package in a consistent way resulting in varying levels of training, skills and difficulty transferring skills across borders.**

The Emergency Management Professionalisation Scheme

6.116 AFAC's Emergency Management Professionalisation Scheme (EMPS) credentials (through registration and certification) fire and emergency services practitioners based on national benchmarks for a number of fire management and incident management roles.[177] While the education component of the EMPS is based on the PSTP, a PSTP qualification does not transfer automatically to registration or certification. Registration requires two years practical experience and endorsement by the home agency. Certification under EMPS provides a higher-level credential, with certified personnel being interviewed by a panel of industry peers, providing assurance of their expertise and experience. The EMPS is intended to address concerns that personnel with an 'on paper' qualification lack training, experience or currency to deploy interstate or internationally.[178]

6.117 The EMPS is generally supported by fire and emergency services agencies although some note that the roles certified under EMPS are not comprehensive.[179] Further, AFAC notes that uptake of credentialing has been relatively slow. AFAC attributes this to a number of factors including variable approaches to training pathways, fire and emergency services not delivering nationally recognised training and poor record keeping by fire and emergency services around training.[180]

Terminology, protocols and procedures

6.118 We did not hear that differences in training significantly impeded the ability to deploy personnel interstate during the 2019-2020 bushfires season.[181] Nevertheless, we heard that there were some difficulties resulting from inconsistencies between jurisdictions.

6.119 We heard that the definition of incident levels varies across jurisdictions, which can have unintended consequences when aligning competencies to incident levels (eg Level 3 Incident Controller).[182] We also heard that some firefighters experienced difficulties with inconsistent terminology and protocols when deployed interstate, significantly impacting their ability to conduct their jobs safely and effectively. For example, a 'K' on a tree in NSW means a koala is present; but in Victoria it signifies a 'killer tree' that is extremely dangerous and should not be approached.[183]

6.120 **There is merit in further harmonising approaches to terminology, protocols and procedures for fire and emergency services in order to facilitate seamless interstate deployments. Nationally consistent training would be supported by common terminology, protocols, procedures, and common standards of competency for particular roles.**

Improvements to the national approach to training and competency standards

6.121 Some variation in training is necessary to take account of local environmental conditions, legislative requirements, and emergency management frameworks. However, these differences should not impede the ability of fire and emergency

services personnel to work across jurisdictions. As natural disaster risk increases, greater consistency in training standards and common base competency requirements for roles typically used in large scale natural disasters and requiring resource sharing, such as incident management roles, would be beneficial.

6.122 Some fire and emergency services agencies and personnel have shown support for more consistent standards for training and competency nationally.[184] Victoria and the ACT suggested that there was scope for the harmonisation of minimum training standards for firefighters and emergency services personnel to the extent necessary to ensure transferability of qualifications.[185] A standard package of base training could then be supplemented by additional agency-specific training.

6.123 AFAC suggested the development of an agreed 'passport', that is, a set of agreed minimum set of skills needed for particular roles commonly requested under resources sharing arrangements.[186] This passport would provide a level of confidence that deployed personnel had common and appropriate skills for their roles.

6.124 However, the drive for consistency should not create new barriers or deterrents for volunteers.[187]

6.125 The emergency management sector is working together in a number of ways to improve national consistency around state and territory training, including the EMPS, Jurisdictional Emergency Management Education Network (JEMEN),[188] the Public Safety Industry Reference Committee and AFAC's Learning and Development Group.[189] For example, the 'curriculum mapping' project undertaken by JEMEN has identified where collaboration and standardisation of emergency management training can be facilitated between jurisdictions.[190] It is appropriate to consider how existing training groups, frameworks and projects could be harnessed to further improve national consistency and agree to common base competency standards.

6.126 We also heard concern about the low number of enrolments in higher level incident management qualifications.[191] We heard that there are low numbers of specialist and incident management roles such as aviation specialists, fire behaviour analysts and level 3 incident controllers.[192]

6.127 Some jurisdictions see benefit in the Australian government playing a greater role to support and raise national training and competency standards.[193] For example, Commissioner Darren Klemm AFSM, Fire and Emergency Services Western Australia, suggested:

> *The emergency management sector would benefit from Commonwealth support to raise the standard required within the PSTP to ensure a higher level of professionalisation for personnel entering and progressing through respective agencies.*[194]

6.128 Until 2015, nationally coordinated and funded training was delivered by the Australian Government through the Australian Emergency Management Institute (AEMI) at Mt Macedon in Victoria.[195] AEMI delivered education, research and training in national emergency management and disaster resilience, including fire and emergency services, local government and some humanitarian aid organisations.[196] We heard strong support from some states and territories for the re-invigoration of the AEMI, or an equivalent national training program.[197]

6.129 In particular, some states and territories identified value in national delivery of higher level emergency management training and advanced level incident management roles (such as Level 2 and Level 3 Incident Management Courses).[198] We heard that the long-term investment in the Australian Institute of Police Management has been successful in creating improved interoperability in approaches to policing.[199] A similar approach to joint training for fire and emergency services leaders could build relationships, provide understanding of other jurisdictions' emergency management arrangements and, over time, support harmonisation of positions, protocols and terminology.

6.130 We also heard concerns from local governments that the closure of AEMI impacted the quality of, and opportunities for, emergency management training that was available to them.[200] Following the closure of AEMI, the Australian Institute for Disaster Resilience (AIDR) has provided some national online training and professional development events. However, there are functions of AEMI that have not been transferred.[201]

6.131 **Improving national consistency of training and competency standards will require collaboration between Australian, state and territory governments**.

6.132 **Australian, state and territory governments should consider whether national training for incident management roles would assist to increase numbers of trained personnel and support interstate deployments. These governments should also consider the development of an appropriate base standard of training or competency for roles that would obtain automatic national recognition.**

6.133 The development of a national register of qualified fire and emergency service personnel was broadly supported in principle by Australian state and territory governments and AFAC.[202] However, AFAC maintained that the NRSC and NAFC capabilities should be retained by AFAC. WA did not support a register on the basis that interstate resource sharing should not be limited to nationally accredited personnel, however, that is not our suggestion. Victoria supported the management of such a register by EMA and Queensland stated:

> *Queensland recommends that the national register be hosted and funded by a national body with standardised accreditation data that is inclusive of the paid and volunteer workforce.*[203]

6.134 The AFAC EMPS provides some accreditation, but it is in its early stages and uptake has been slow.[204] For an accreditation scheme to support resource sharing and inform a national picture of capability, broad participation of fire and emergency services is required. AFAC suggested that the existing EMPS framework should be used to develop a more comprehensive scheme.[205]

6.135 **There is merit in the states and territories considering further use and development of the EMPS, and how it could be used to support a national register.**

6.136 Over time, as states and territories work towards more consistent training and competency standards outlined above, fire and emergency services may reach a level of national consistency, such that personnel are automatically nationally accredited when a jurisdictional qualification is obtained.

6.137 **In the short-term, states and territories should consider the development and implementation of a national accreditation scheme for specialist and incident management team roles. National accreditation would help identify qualified fire and emergency service personnel for resource sharing and provide a national picture of personnel capacity and capability.**

National-level exercises

6.138 Exercises are an essential component of preparedness and are used to enhance capability and contribute to continuous improvement.[207] Multiagency, national-level exercises can improve interoperability by building relationships between jurisdictions and strengthening understanding of each jurisdiction's protocols and procedures.[208] These exercises can help evaluate resource sharing arrangements and identify capability gaps on a national scale.

> An exercise is a controlled, objective-driven activity used for testing, practising or evaluating processes or capabilities.[206]

6.139 Exercises can be tailored to test particular capabilities or capacity, and can include desktop, workshops and in-field activities. Exercising is used by all states and territories to test emergency management plans and frameworks.[209] It is typical for exercising to be required as a part of emergency management plans.[210] We heard that exercising is used to test cross border arrangements to ensure that relevant agencies and personnel are familiar with their roles and responsibilities.[211] However, we heard that some states do not regularly conduct joint exercises,[212] and multi-agency exercising is not regularly conducted to test national resource sharing arrangements under the AIA and NRSC.[213]

6.140 AFAC and some fire and emergency services agencies support exercising of national resource sharing arrangements.[214] Exercising could test national resource sharing arrangements with the goal of improving processes for the deployment physical and human resources. Queensland and Victoria suggested a role for the Australian Government in supporting national preparedness and capability development by coordinating interjurisdictional exercises and operational training.[215] Commissioner Darren Klemm, Fire and Emergency Services Western Australia, considered that:

> *Commonwealth supported and coordinated national training opportunities and exercising across States would provide greater exposure for jurisdictions and improved interoperability between states and territories in advance of a national deployment campaign such as that seen during the 2019/20 bushfire season.*[216]

6.141 While WA supported arrangements that improve capacity and capability development including national-level exercises, it stated that '[t]he scope and mechanisms for the sharing arrangements however need to be considered and agreed between jurisdictions.'[217] A number of states and territories referred to the significant resources required to deliver national-level exercises.[218] Both Queensland and Tasmania referred to the possibility of leveraging off the work of the

Australia-New Zealand Counter-Terrorism Committee's Exercise Management Capability.[219]

6.142 The CSIRO Climate and Resilience report suggests that national exercising is needed to prepare for climate scenarios:

> *While various emergency services organisations simulate their response to potential disasters within their jurisdictions (eg NSW SES conducted an exercise simulating a flood event in the Hawkesbury and Nepean floodplain), there is potential to extend such scenario testing and exercising to cross state and territory borders and simulate responses to coincident and consecutive events in terms of warnings, responses, deployment of resources and coordination of recovery efforts, and improve arrangements and plans before they are needed.*[220]

6.143 **Exercising should be used to ensure that the first time capabilities, systems and coordination are 'stress-tested' is not during an incident.**

6.144 National exercises should be used to evaluate plans, develop and assess competence of personnel, identify resource needs, gaps, and build relationships. They should not be limited to combat agencies but should engage broader emergency management sector and stakeholders. National exercises should use scenarios that assess response to, and recovery from, coincident and consecutive natural disasters, including severe weather event scenarios developed with the assistance of climate modelling. Among other things, it should use scenarios incorporating:

- infrastructure and supply-chain vulnerabilities
- cross border coordination, and
- resource sharing and prioritisation.

6.145 Where relevant, national exercises should include non-government actors, such as critical infrastructure owners and operators; and media representatives to test understanding of roles and responsibilities and information flow.

6.146 **Lessons learnt from national-level exercises should be used to inform capability development and support the continuous improvement of interoperability and national resource sharing arrangements.**

Recommendation 6.5 Multi-agency national-level exercises

Australian, state and territory governments should conduct multi-agency, national-level exercises, not limited to cross-border jurisdictions. These exercises should, at a minimum:

(1) assess national capacity, inform capability development and coordination in response to, and recovery from, natural disasters, and

(2) use scenarios that stress current capabilities.

Supporting the volunteer workforce

6.147 Australia has a strong culture of volunteerism with over 200,000[221] volunteer emergency responders nationally. Volunteers are willing to give their time to protect their communities, generally seeking no more than support and respect.[222] However, volunteers have competing demands that impact their availability and ability to participate in emergency response activities. This needs to be considered in emergency responder workforce planning and recruitment.

> *RFS volunteers don't fight fires for free, we volunteer our time to the community. We are not a cheap commodity to be used up and thrown away. Our time comes at a great cost to ourselves, our families and the community. For volunteerism in Australia to thrive, RFS firefighters need to be respected and looked after.*[223]

6.148 Volunteer emergency responders make up the majority of the emergency responder workforce in all states and territories.[224] Volunteers are the core responders for rural areas and provide the surge capacity needed to respond to large or concurrent natural disasters.[225]

6.149 During the 2019-2020 bushfire season, Australia's attention was drawn to the role volunteers play in natural disasters, placing themselves on the frontline of a national crisis. With natural disaster seasons becoming longer and more intense, greater expectations and demands are being placed on volunteers. Appropriate support is required for volunteers, including training to ensure appropriate safety standards and equipment for their health and wellbeing.

6.150 Supporting and sustaining an effective volunteer workforce is vital.[226] The need for volunteers will only grow as Australia faces increasing natural disaster risk.[227] The President of the Council of Australian Volunteer Firefighting Associations told us that Australia needs a 'vibrant, slowly expanding, volunteer emergency sector' to match the country's expanding population.[228]

6.151 Volunteers also need to be engaged and mobilised in a way that recognises the competing demands on their time.

6.152 Fire and emergency services each manage their own volunteer workforce. However, Queensland and Victorian governments suggest that a national approach to encouraging volunteer participation should be developed.[229] Queensland suggests there should be strategic national investment across fire and emergency services in volunteer recruitment. Victoria considers that the development of a national employment policy that provides incentives for volunteers and their employers, as well as increases employment protection for volunteers, would support volunteer participation nationally.[230]

Financial support for volunteers

6.153 Representatives of volunteer firefighting associations told us that the majority of their members do not want direct payment.[231] Volunteer firefighters are motivated by a desire to protect the community they live in and by the sense of fulfilment they gain from contributing to their community in a meaningful way.[232]

6.154 However, we heard that volunteers can face financial challenges as a result of their volunteering, especially in long campaigns, as was the case during the 2019-2020 bushfire season.[233]

6.155 In response to the challenges faced by volunteers in the 2019-2020 bushfire season, the Australian Government announced a volunteer support payment scheme. The scheme was a one-off payment for volunteer firefighters and SES volunteers in NSW, ACT, Queensland, SA and Tasmania, who were:

- self-employed or work for small and medium businesses, and
- called out for more than 10 days of service over the 2019-2020 season.

6.156 Payments were administered by state and territory governments and provided compensation for lost income of up to $300 per day, up to a total of $6,000 per person.[234] These payments recognised the extraordinary circumstances of the season and the impact on volunteers' livelihoods.

6.157 Numerous public submissions and several state and territory fire and emergency services welcomed the scheme. Some fire and emergency services suggested that ongoing support would ease the burdens and barriers to ongoing participation by volunteer firefighters.[235] Numerous public submissions support some type of compensation for volunteers, especially during long campaigns[236] and others have stressed the need to make these payments easy to access.[237]

6.158 A large number of volunteers are self-employed, for example as farmers. These individuals make financial sacrifices to leave their business and deploy to the frontline.[238] In long responses, such as was seen during the 2019-2020 bushfire season, financial losses for these volunteers can be significant.

6.159 Volunteer firefighting associations point out that, while not seeking payment, volunteers should not be 'worse off' as a result of their volunteering.[239] Volunteer firefighters told our inquiry they can sometime be worse off, for example, as a result of paying for additional personal protective equipment (PPE) and small tools they are not provided by their agency.[240]

6.160 States and territories have acknowledged the need to provide consistent support to all emergency responders. To address inadequate PPE, the NSW Inquiry into the 2019-2020 bushfires recommended that all operational members should be provided with two sets of personnel protective clothing.[241] Additionally, the NSW RFS has committed to making suitable face masks, goggles and flash hoods available to volunteers.

6.161 Volunteering Australia, a representative body for volunteers more broadly, suggested the need to clarify the government's volunteer compensation position for future emergencies,[242] explaining that any compensation scheme should be developed in consultation with volunteers.[243] Commissioner Darren Klemm, Fire and Emergency Services Western Australia, told our inquiry that discussion around how volunteer compensation should be structured must engage volunteers and be considered nationally.[244]

Box 6.1 Australia's majority volunteer fire and emergency services workforce

Australia's fire and emergency services workforce is predominantly volunteer. The *Report on Government Services 2020* shows that in 2018-2019 volunteers made up approximately 90% of the firefighting and emergency services workforce across Australia.[245] This trend was consistent across states. However, volunteers make up less of the workforce in the ACT (78%) and the NT (70%).

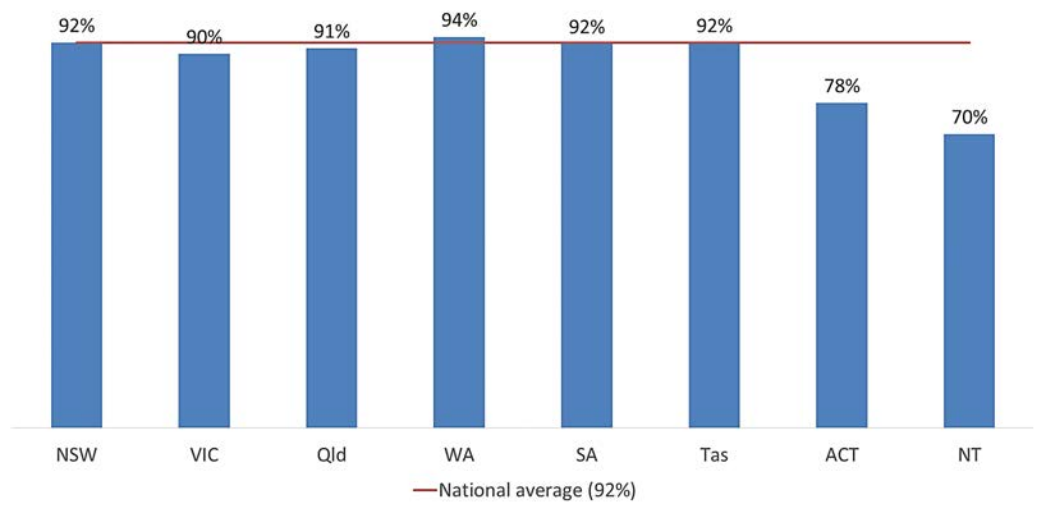


Figure 24: Volunteers as percentage of the fire and emergency services workforce 2018-2019[246]

The Report on Government Services 2020 shows that the total number of fire and emergency services volunteers has remained over 200,000 for the decade from 2009-2019. Volunteer numbers rose to approximately 250,000 in 2015-2016 and have decreased slightly to 231,000 in 2018-2019.



Figure 25: Number of fire and emergency services volunteers 2009-2019[247]

6.162 We recognise that direct payment does not align with the values of volunteerism.

6.163 **Fire and emergency service volunteers should not suffer significant financial loss as a result of prolonged periods of volunteering during natural disasters.**

6.164 **State and territory governments should continue their work to support and recognise fire and emergency services volunteers, including self-employed volunteers.**



Figure 26: Victorian CFA protecting house from Floodwater 2016[248]

Employer support

6.165 We heard that the impact of extended periods away from work is not just felt by the volunteers but also by the business for which they work.[249] We heard from volunteer firefighting associations that greater support and recognition of their employers would support volunteer participation.[250] Volunteers suggest that financial assistance for employers to cover the wage of volunteers who are away for extended periods could be beneficial.[251]

6.166 Some fire and emergency services have recognised the need to support and engage with employers of their volunteers as a means of supporting volunteer participation.[252] For example, the SA CFS employer recognition program includes material for volunteers to provide to their employers that outlines relevant 'legislation, leave arrangement suggestions and other information about the benefits of employing emergency service volunteers.'[253] The Victorian CFA recognises employers through a number of initiatives including providing Certificates of Appreciation and Volunteer Friendly Employer Stickers.[254]

6.167 States and territories offer payroll tax exemptions on wages paid to an employee while performing their volunteer duties.[255] Volunteer Fire Brigades Victoria told us

that payroll tax exemptions are poorly promoted and, in their view, are 'only of minor benefit' to employers.[256]

6.168 Some fire and emergency services have suggested more support, recognition and incentives should be made available to employers including 'options to make the release of volunteers easier or less impactful on business'.[257] ACT ESA suggested the 'establishment of employer support payments to assist employers (especially small businesses) to release volunteers and engage casual staff to backfill roles.'[258] We have been told about the ADF Employer Support Payment Scheme as a successful employer support model.[259] The payment scheme provides financial assistance to employers of Reservists and self-employed Reservists, when the Reservist is absent from their civilian workplace on eligible periods of Defence service.

6.169 **State and territory governments should continue to support, recognise and incentivise employers who release employees to serve as fire and emergency services volunteers.**

Employment protections

6.170 Volunteers should not be at risk of losing their jobs as a result of their contribution to natural disaster response. The ACT Emergency Services Agency explained that, due to the prolonged nature of the 2019-2020 season, they experienced periods where employers of volunteers were reluctant to release their staff to support response operations, especially for 'out of area support, where an employer might not see a direct threat to their local area.'[260]

6.171 As the seasons lengthen, and the call upon volunteer time expands, there is a need to ensure volunteers are protected to support their continued service.

6.172 We heard from the Australian Government that all workers in Australia are covered by the Commonwealth *Fair Work Act 2009* (Cth).[261] The Act supports employees who volunteer by providing:

- community service leave entitlements that allow employees to take leave for the purpose of voluntary emergency management activities including dealing with a natural disaster[262] (community service leave is unpaid), and
- protection from dismissal based on a temporary absence from work for the purpose of engaging in a voluntary emergency management activity.[263]

6.173 Some jurisdictions provide employment protections beyond those set out in the *Fair Work Act*.[264] For example, NSW and SA provide protection above dismissal, stating that a person absent due to volunteering should not be 'victimised' or 'prejudiced' in their work place.[265] Under NSW legislation when a Volunteer Protection Order is in place it is a criminal offence for an employer to victimise an employee based on their absence to volunteer in emergency operations. 'Victimise' is defined as:

- dismissal
- negatively altering the employee's position, or

- otherwise injuring the employee in his or her employment with the employer.[266]

6.174 In addition, WA emergency management legislation provides that a volunteer who is away from their job because they are responding to a declared state emergency is entitled to be paid by their employer for the period they are responding.[267] This exceeds the obligations imposed nationally by the *Fair Work Act*. However, additional provisions applicable to WA volunteers only apply when a volunteer is responding to a declared state of emergency in WA. They are not provided to volunteers who are deployed to respond to interstate emergencies.[268]

6.175 Volunteers and some fire and emergency services support increased volunteer employment protections. We heard from volunteers who suggest employment protections should be increased and standardised across jurisdictions.[269] The Victorian, ACT and SA fire and emergency services all raised the need for greater employment protections and employer support to assist volunteers, drawing attention to the Australian Defence Force Reservist protections as a potential model to adapt for emergency service volunteers.[270]

6.176 Volunteers' employment should not be negatively impacted by their volunteering, regardless of the state or territory they are volunteering in. Legislative changes to the *Fair Work Act* to ensure that individuals are not discriminated against, disadvantaged or dismissed for reasons associated with their volunteer service with an emergency service organisation would harmonise employment protections for volunteers across the country. Legislative changes would also have the effect of acknowledging the value provided by volunteers.

Recommendation 6.6 Employment protections for fire and emergency services volunteers

The Australian Government should consider whether employment protections under the *Fair Work Act 2009* (Cth) are sufficient to ensure that fire and emergency services volunteers will not be discriminated against, disadvantaged or dismissed for reasons associated with their volunteer service during natural disasters.

Chapter 7 Role of the Australian Defence Force

Summary 186

Defence's role in natural disasters 187

- Public perceptions 187
- ADF and Defence roles 187
- Role of the ADF in the 2019-2020 bushfires 189
- Call-out of the Reserves 190
- Other assistance provided by Defence 192

Awareness of ADF role and capabilities 192

- Importance of planning 193

Current processes for obtaining ADF assistance 194

- Use of DACC process during 2019-2020 bushfires 196

Improvements to existing arrangements for obtaining ADF assistance 197

Legal basis for DACC 199

Financial considerations relevant to ADF assistance 200

Legal protections for ADF assistance 200

Call-out of the ADF Reserves 201

Summary

7.1 The primary role of the Australian Defence Force (ADF) is defending and protecting Australia. Although not its primary role, the ADF provides assistance, to the benefit of the nation, through its capabilities and resources during and after natural disasters. In some cases, ADF assistance is significant, such as during, and in the aftermath of, the 2019-2020 bushfires.

7.2 There appears to be a lack of understanding about the role, capacity and capability of the ADF in relation to natural disasters. The ADF does not have the capacity or capability to fight bushfires. It does, however, have unique capabilities to provide ancillary support. Understanding of ADF capabilities and processes needs to be improved to ensure that it is used effectively.

7.3 The approach adopted by the ADF to respond to requests for assistance from states and territories after 7 January 2020, which included a devolved decision-making process, was more flexible and responsive than earlier in the season. Consideration should be given to adopting this approach for future natural disasters.

7.4 Processes for requesting ADF assistance require clarification – they should be clearer, making it easier for states to request the assistance of the ADF. However, states and territories remain primarily responsible for responding to and recovery from natural disaster.

7.5 The legal protections afforded to Defence personnel during assistance operations and administrative arrangements for the call-out of Reservists should be enhanced. We note steps are in train to do so.

Defence's role in natural disasters

Public perceptions

7.6 Over the course of our inquiry a significant number of individuals, organisations, and government agencies identified the ADF, through its special capabilities or available resources, as a source of support in natural disasters. Over 340 public submissions (almost 20%) referred to the ADF. Many of those noted that the ADF has capacity and capabilities to assist in the response to, and immediate relief and recovery from, natural disasters and suggested that greater use be made of the ADF in responding to natural disasters. Some submissions noted the intangible role that the ADF plays, offering comfort to communities by its presence.

7.7 Generally, the public perception was that the ADF could assist in every aspect and was always readily available.

7.8 This is not, in fact, the case. Nor is it a reasonable expectation of the ADF.

ADF and Defence roles

7.9 The ADF and the Department of Defence (Defence) sit within the Australian Government Defence portfolio. The ADF is commanded by the Chief of the Defence Force (CDF) and is comprised of uniformed permanent and Reserve personnel from the Royal Australian Navy, the Australian Army and the Royal Australian Air Force. Defence is headed by the Secretary of the Department of Defence and staffed by Australian Public Service civilians.

7.10 The key priorities of the Defence Portfolio are to defend Australia and its national interests, protect and advance Australia's strategic interests, and promote regional and global security and stability, as directed by government.

7.11 ADF personnel are deployed overseas, currently in areas such as Afghanistan, Iraq, and the Gulf region. ADF personnel are also involved in United Nations operations in Lebanon, Israel, South Sudan and Cyprus, and regularly participate in maritime operational activities in South-East Asia and further afield.[1]

7.12 In order to perform these roles, the ADF maintains significant military capability supported by comprehensive logistics support and employs advanced technology. These capabilities can be used in a broad range of circumstances, including warfighting, securing Australia's maritime boundary, support to counterterrorism capabilities, search and rescue, and humanitarian assistance and disaster relief.



Figure 27: Enhanced medical team from HMAS Choules[2]

7.13 In the natural disaster context, some ADF capabilities and resources have been, and continue to be, particularly useful in providing assistance to states and territories during the response to and recovery from natural disasters. These capabilities and resources include providing logistics, communications, transport by sea, land and air, and additional personnel. The ADF does not, however, have the capability or resources to fight bushfires and does not train to do so. While the ADF has some trained firefighters, these are for narrow purposes. For example, due to the remote work that naval personnel undertake, they must be able to fight a fire on a ship.[3] We discuss the ADF's role in supporting aerial firefighting in Chapter 8: National aerial firefighting capabilities and arrangements.

7.14 While the ADF does not have capabilities or resources to fight bushfires, it does have capabilities to provide ancillary support. It can provide evacuation assistance, surveillance of fire fronts, and delivery of food and water to communities and farms, among other assistance. The ADF provides this support in accordance with the processes outlined in the Defence Assistance to the Civil Community (DACC) manual, described later in this chapter.

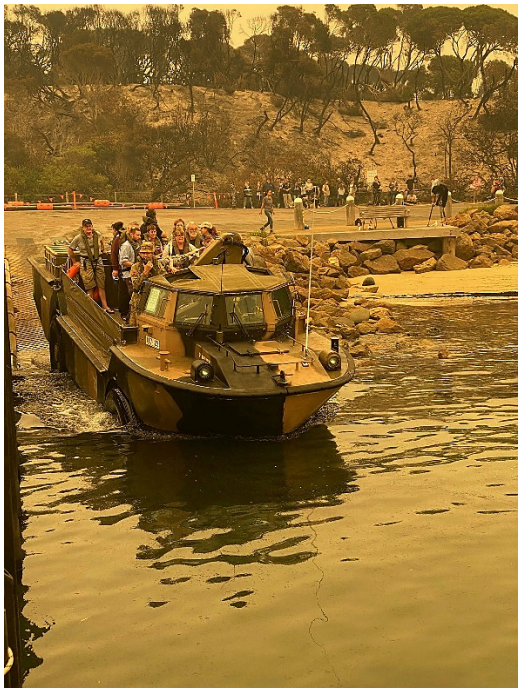


Figure 28: Evacuees are transported from Mallacoota, Victoria to awaiting ships as part of Operation Bushfire Assist 2019-2020[4]

7.15 Consistent with this, the Department of the Prime Minister and Cabinet stated:

> *…while the ADF will often form the larger component of Commonwealth material support to crises response, it cannot always be relied or called upon, particularly in circumstances where it is fully engaged on its primary mission, or its resources are already mobilised to a disaster event elsewhere in Australia or overseas.*[5]

7.16 **The ADF has finite capacity and capability. The capacity and capability of the ADF to respond to natural disasters can be affected by its commitment to its priorities, both domestic and international. The ADF should not be seen as a first responder for natural disasters, nor relied on as such.**

Role of the ADF in the 2019-2020 bushfires

7.17 The ADF provided assistance across the period 6 September 2019 until 26 March 2020 in response to the 2019-2020 bushfire season. This was known as Operation Bushfire Assist.[6] Assistance included logistics, bases for firefighting aircraft, catering, recovery efforts, engineering assistance, evacuation operations, search and rescue, and surveillance.[7] The ADF also drew on personnel and assets from overseas forces. For example, Papua New Guinea provided engineers who were deployed to Victoria to provide assistance.[8]

7.18 The ADF undertook over 1,500 tasks during Operation Bushfire Assist. Throughout the bushfire season, the ADF received requests for assistance from NSW, Victoria, Queensland, WA, SA, and the ACT. The significant assistance provided by the ADF is summarised in the table below. For example, the ADF provided 10 million litres of drinking water to assist with recovery efforts at Kangaroo Island in SA and Bega in NSW.[9]

Table 3: Defence assistance provided during Operation Bushfire Assist 2019-2020[10]

8,236 ADF members deployed (including **2,556** Reservists)	**469** international military personnel	Over **4,850kms** of road access provided and barriers cleared	Over **240kms** of fire breaks cleared
10 million litres of drinking water provided	**77,000** meals provided for civilians	Over **1,280kms** fences repaired	**527** evacuees accommodated
67 fixed-wing and rotary wing aircraft	**3** maritime assets	**65** heavy machinery units	**3** water purification systems

7.19 Defence assistance spanned two distinct phases:

- **Phase 1** covered the period 6 September – 31 December 2019, and
- **Phase 2** commenced on the evening of 31 December 2019 and continued until 26 March 2020.[11]

7.20 During **Phase 1**, NSW, Victoria, and Queensland initially required local assistance. As conditions worsened, those states required more significant emergency assistance.[12] At a meeting of the National Crisis Committee (NCC) held on 11 November 2019, state and territory government representatives were advised that the Prime Minister had directed the ADF 'to provide all the support that it can, within its capabilities', and that the Chief of the Defence Force had 'ordered that units respond locally and proactively to assist State authorities'.[13] We heard that the assistance provided by the ADF was of significant benefit to the states and local communities.[14]

7.21 **Phase 2**[15] involved the provision of more direct emergency assistance by Defence.[16] This involved establishing an ADF Joint Task Force (JTF) to support NSW and the ACT, and one to support Victoria, on 1 January 2020. A JTF was also established on 4 January 2020 to support SA and Tasmania.[17]

7.22 The establishment of a JTF is not a new process – a JTF may be established under existing arrangements depending on the anticipated location, scale, complexity and duration of the requested support. It is a partnership model involving delegated authority.

7.23 In **Phase 2** the ADF provided increased support to state and territory firefighting efforts, such as providing additional aircraft and logistical support. It also provided immediate relief and recovery support.[18]

Call-out of the Reserves

7.24 The Reserves are a surge component of the ADF and give the ADF the ability to scale up its forces.[19]

7.25 On 4 January 2020, in response to the extreme bushfire events, the Governor-General, on advice from the Minister for Defence, authorised the compulsory call-out of ADF Reserves 'to provide emergency functions to support and enable firefighters and emergency services' initially to NSW, Victoria, and SA.[20]

Box 7.1 Evacuation of Mallacoota



Figure 29: People being evacuated on HMAS Choules[21]

As the 2019-2020 bushfires burnt properties in Mallacoota in Victoria, around 4000 people were forced to shelter on the Mallacoota foreshore. Evacuation by road was not possible because road access to the town was completely cut-off.

HMAS Choules (pictured above) and MV Sycamore were able to assist Victoria with the evacuation of more than 1,100 people from Mallacoota, including the elderly, children, and pets. Some evacuees who required more immediate care were evacuated by aircraft.[22] Emergency Management Victoria described the evacuation of people from Mallacoota by air and by sea as part of the largest maritime evacuation of Australian citizens in a natural disaster.

7.26 This order was the first time that a call-out of the Reserves had been authorised under the *Defence Act 1903.* The effect of the call-out order was that Reserve forces, who usually provide service to the ADF on a voluntary basis, were obliged to provide full-time service for the duration of the call-out order. Defence conducted a preliminary call-out exercise in November-December 2019 to test the call-out process, given it had not been undertaken before, and in anticipation of requests for assistance.[23]

Other assistance provided by Defence

7.27 The ADF has, on request from states and territories, previously provided a range of assistance in the response to and recovery from natural disasters. For example, in the 2018-19 financial year, Defence provided significant emergency and non-emergency assistance in the response to and recovery from floods, cyclones and bushfires:

- around 3,000 ADF members contributed to JTFs which assisted recovery operations in North Queensland after significant flooding in February 2019
- in March 2019, approximately 200 ADF members assisted evacuation and recovery operations in the NT in the wake of Tropical Cyclone Trevor, and
- support to firefighting efforts in Victoria, Queensland, WA and, Tasmania, such as providing temporary accommodation for up to 300 people.

7.28 ADF assistance has likewise included, over the last decade, a broad range of assistance in response to significant natural disasters across the nation, including but not limited to:

- Operation Vic. Fire Assist, including logistics and emergency sleeping arrangements in Victoria (2008-2009)
- Operations Queensland Flood Assist and Yasi Assist, and assistance in response to Victorian floods (2010-2011)
- flood relief in NSW, Queensland and Victoria (2011-2012), and
- flood and fire relief in NSW, Queensland, WA and Victoria (2012-2013).

Awareness of ADF role and capabilities

7.29 Notwithstanding the prominent role that the ADF has played in significant natural disaster responses, some governments and organisations, particularly local governments and some fire and emergency service agencies, told us that they did not have a good appreciation of what the ADF can do, how to request ADF assistance or, at times, how to interact with the ADF once it was deployed.[24] For example, Blue Mountains City Council noted that, while the ADF personnel who were deployed 'were highly adaptable and committed to their tasking', there was an overall lack of clarity at the local level about what capabilities the ADF had and what specifically they could do to assist local residents. They described the resulting engagement between council and the ADF as being akin to arrangements of '…spontaneous volunteers'.[25]

7.30 During the 2019-2020 bushfires, the DACC manual was not publicly available, which may have contributed to the limited understanding. This manual sets out the process for requesting ADF assistance. A revised version of the DACC manual – dated 11 August 2020 – has since been published on the Defence website.[26] We welcome this development.

Importance of planning

7.31 Local governments and recovery coordinators, in particular, expressed a desire for greater cooperation, integration and understanding of the role and capabilities of the ADF.

7.32 Positive experiences of ADF involvement were generally associated with a good understanding of ADF capabilities and inclusion of the ADF in local planning. The Queensland Inspector-General Emergency Management noted a seamless contribution between the ADF and relevant authorities in the Canungra area during the bushfires – the ADF's Kokoda Barracks is located in Canungra in south-east Queensland.[27] The Queensland Fire and Emergency Services shared this view, noting the strong connections between local disaster management groups and the ADF where the ADF has a local presence.

7.33 This sentiment was shared by other local governments that have Defence bases or establishments within their jurisdiction.[28] Townsville is a major hub for Defence bases and the ADF's presence in North Queensland. The Queensland Inspector-General of Emergency Management's 2019 Monsoon Trough and Rainfall Review noted that the ADF was an advisory member on the Townsville local disaster management group and that 'the ability for service [personnel] and their families to interact within the community of Townsville was an important aspect in planning.'[29]

7.34 Shoalhaven City Council in NSW told us that, by virtue of the proximity of ADF bases in Jervis Bay, there is an ADF representative on the Shoalhaven Local Emergency Management Committee. The Shoalhaven City Council acknowledged the value of having local ADF representatives on local emergency management committees.[30]

7.35 We note, however, that not all local government areas have the benefit of an ADF presence. This may mean that those local governments have a less developed understanding of the capacity and capability of the ADF as they may have less frequent engagement with it.

7.36 During the 2019-2020 bushfires, there was noticeable benefit when state emergency responders, local emergency management committees, and the ADF were involved in local decision-making, and resource prioritisation, and decisions were able to be made locally. This was particularly noted by Ms Prendergast of Resilience NSW*:*

> *…once they embedded with us from 6 January, we saw the power of us being partners and working together at every level, from state, regional and local with ADF and the call-up and the prioritisation was so much easier and efficient.*[31]

7.37 Greater interaction and understanding, including in planning processes, will likely produce better relationships and understanding of the ADF's role.[32]

7.38 **There should be greater representation by the ADF in state, territory and local government exercises, briefings, and planning for natural disasters.**

7.39 Revisions to the ADF's arrangements to facilitate the creation of ongoing relationships with state and territory emergency management services and police are likely to further assist. Defence has told us that the 'Brigades under 2nd Division Headquarters have a permanent posture in all states and territories, except the NT, which enables the development of relationships with state and territory emergency management authorities'.[33] The recent assignment of responsibility to the 2nd Division of the Australian Army to plan, prepare and support the ADF response to national domestic emergencies is welcome, and should facilitate better readiness to perform DACC tasks nationally.

7.40 In discharging their responsibility for responding to and recovering from natural disasters, it falls to state and territory governments to request ADF assistance where required. As such, they should be primarily responsible for building a greater understanding of the role and capabilities of the ADF within their fire and emergency service agencies and local governments.

7.41 Emergency Management Australia (EMA) in the Department of Home Affairs is responsible for managing requests for significant emergency assistance and emergency recovery assistance. Increased liaison by Defence with states' and territories' emergency management agencies should be conducted in collaboration with EMA to help ensure that local governments receive whole of system advice on the role and capabilities of the ADF and processes for requesting its assistance.

7.42 **Defence, through EMA, should undertake increased liaison with state and territory governments to enhance their awareness of the ADF's role, capability and operations in responding to and recovering from a natural disaster.**

Recommendation 7.1 Improve understanding of Australian Defence Force capabilities

State and territory governments should take steps to ensure that there is better interaction, planning and ongoing understanding of Australian Defence Force capabilities and processes by state and territory fire and emergency service agencies and local governments.

Current processes for obtaining ADF assistance

7.43 Except in circumstances where a state or territory government is incapacitated, the Australian Government is currently authorised to provide ADF assistance in response to natural disasters only if requested by a state, territory, or local government. A request must be made in accordance with the DACC manual and the Australian Government Disaster Response Plan (COMDISPLAN).[34]

7.44 COMDISPLAN outlines the coordination arrangements for the provision of non-financial assistance from the Australian Government in the event of a disaster or emergency within Australia or its territories.

7.45 The DACC manual outlines the types of assistance Defence can provide, and the thresholds to make requests for assistance. The DACC manual recognises the

responsibilities of state and territory governments and their role in seeking assistance from Defence.[35]

7.46 DACC is divided into two classes: emergency and non-emergency responses, each with three categories. We have focused on DACC arrangements for emergency assistance, that is, DACC 1-3, being most directly relevant to natural disaster response and recovery.

Table 4: DACC categories 1-3[36]

DACC category	Process	Approving authorities	Cost recovery
DACC 1: local emergency assistance	Requests are usually made by local, state or territory governments directly to the Senior Australian Defence Force Officer (SADFO) or Defence.	SADFO, Unit Commander, or designated JTF or DACC Commander	No cost recovery, but may accept payment if offered.
DACC 2: significant emergency assistance	Requests are usually made by local, state or territory governments to EMA which will, in turn, liaise with Defence.	CDF or delegate	No cost recovery, but may accept payment if offered.
DACC 3: emergency recovery assistance	Requests are usually made by local, state or territory governments to EMA which will, in turn, liaise with Defence.	CDF or delegate	Direct cost recovery, unless a cost waiver, or variation is approved.

7.47 Defence resources are intended to be used primarily for national defence. For this reason, before DACC is provided, it must be requested by states and territories, and the resources must be available for commitment.

7.48 The decision to provide DACC and commit Defence assets to DACC 'will depend on each circumstance and is to be made in full consideration of prevailing operational, fiscal and policy considerations [by Defence]'.[37]

7.49 The DACC framework supports the provision of emergency assistance, but does not extend to the use of force by the ADF. Force includes the restriction of freedom of movement of the civil community, whether there is physical contact or not.

7.50 The current threshold for making a request for assistance under the COMDISPLAN and DACC are set out in the table below.

Table 5: Thresholds for assistance

Source	Threshold
COMDISPLAN, paragraph 1.4.6	'Before a request is made under COMDISPLAN a jurisdiction must have **exhausted all government, community, and commercial options** to prove that effect' (emphasis added).
COMDISPLAN, paragraph 2.3	'…**when the total resources (government, community and commercial) of an affected jurisdiction cannot reasonably cope with the needs of the situation** the nominated official can seek non-financial assistance from the Australian Government' (emphasis added).
DACC manual, Part A, Annex 1A, definition of 'emergency assistance'	'…Where the scale of the emergency or disaster **exceeds or exhausts the response capacity and capabilities of the state or territory (government, community and/or commercial) or where resources cannot be mobilised in sufficient time**, they may seek Australian Government non-financial assistance, including from Defence' (emphasis added).

7.51 As outlined in Table 5, these thresholds are internally inconsistent. We heard that this has given rise to a different understanding by states and territories of the thresholds. This is discussed in more detail further below.

Use of DACC process during 2019-2020 bushfires

7.52 Defence managed its coordination, response and contribution during **Phase 1** of its assistance in response to the 2019-2020 bushfires in a manner that closely reflected the framework then provided for in COMDISPLAN and the DACC manual. As Defence explained:

> ***Request for assistance – Phase 1 (6 September 2019 – 31 December 2019)***
>
> *During this phase, the states (QLD, NSW and then VIC) submitted requests for assistance for individual tasks through EMA. Initially, state government emergency management authorities sought local (DACC 1) emergency assistance directly from Defence for local ADF commander approval under the DACC manual.*
>
> *As bushfire conditions worsened and state and territory governments required more significant emergency assistance, they submitted requests (DACC 2) to EMA who worked with Defence (Military Strategic Commitments (MSC) to determine appropriate support. MSC initiated and coordinated the response by Defence.*
>
> *Once a request for assistance was approved by CDF, The Chief of Joint Operations (CJOPS) was directed to execute the task via a CDF Task Order*[38]

7.53 Defence adopted a different approach for **Phase 2**.[39] On 7 January 2020, recognising the worsening situation, and evolving threat, Defence devolved decision-making on requests for assistance to the respective commanders of the JTFs. The JTF commanders and their staff worked directly with state and territory government representatives and emergency services coordinators to respond to requests.[40] We

heard that these arrangements streamlined decision-making and resulted in timely decisions and support to communities impacted by the bushfires.[41]

7.54 The process adopted in **Phase 2** supported faster ADF assistance to states and territories than the process in **Phase 1**. This better enabled those states and territories to respond to, and recover from, the 2019-2020 bushfires.

7.55 **Authority to approve tasks under authorised DACC assistance should be devolved to ADF Joint Task Force commanders in certain prescribed circumstances, including natural disasters, such as occurred in 2020 during the bushfire season.**

Improvements to existing arrangements for obtaining ADF assistance

7.56 The existing processes for use of the ADF under COMDISPLAN and DACC are dependent on a state or territory requesting assistance. This recognises that states and territories are responsible for the response to, and recovery from, natural disasters. The use of the ADF should remain dependent on a request from a state or territory, except in the limited circumstances proposed in Chapter 5: Declaration of national emergency.

7.57 The arrangements for the utilisation of ADF resources in natural disasters should not promote reliance or dependence on the ADF. The ADF has broader responsibilities to protect the nation. Reliance or dependence on the ADF could lead to poor outcomes if the ADF was not able to assist because of other significant or competing priorities.

7.58 Nevertheless, we note that in some states there was an apparent reluctance to seek ADF assistance, or delay in seeking assistance. We also heard of the desirability of facilitating ADF assistance when it was required and the ADF was available. We heard that there was some uncertainty about the thresholds that must be met before seeking the assistance of the ADF. The reluctance or delay may have been due, at least in part, to the apparent confusion on the thresholds for request.

7.59 This uncertainty is perhaps not surprising – the COMDISPLAN and DACC thresholds are, as set out previously, expressed differently. Moreover, they were in turn interpreted differently by states and territories, even by those who had previously requested support. For example, NSW stated that from their experience, they had 'to demonstrate complete exhaustion of state resources and civilian resources before we can contemplate a request through to the Commonwealth.'[42] Tasmania and WA approached the question of exhaustion by reference to potential, rather than in present, absolute terms. Chief Officer Arnol, Tasmanian Department of Fire and Emergency Services, noted:

> *Sometimes it's a matter of timeliness as here, Commissioner, because if we said we need to get something in place in a certain time, and private enterprise is going to take five weeks, whilst it might be available, it is not something that we can do readily, like in emergency. So in that term, we term that as we've exhausted it.*[43]

7.60 Similarly, we heard that the ACT Emergency Services Agency focused on practicality in determining whether to seek Commonwealth assistance:

> *We very quickly identified in the ACT that concurrent activity would be the key to establishing a more defensive stance to the bushfire threat, which included ensuring that our firebreaks, our fire trails, and our defensive posture was consistent. … We had already assessed that we would exhaust all of the civilian plant available here in the ACT, and so noting that the ADF had clearly articulated an availability of resources, in particular engineers, we put in a very early request through the Defence Aid to the Civil Community, through well-rehearsed for protocols through Defence and EMA Australia, and we were very fortunate to be allocated significant resources.*
>
> *The Defence came and assisted us with preparation work with our threat to the west of the ACT, well before the Orroral fire started…So Defence were engaged very early before there was even a fire within the ACT.*[44]

7.61 State and territory agencies expressed an interest in simplifying the COMDISPLAN and DACC thresholds to allow earlier and more flexible assistance to be provided by the ADF. Examples include:

- Queensland Fire and Emergency Services: *The DACC criteria could be adjusted to allow more agile use of the ADF capability, such as by removing the need for local resources to be exhausted before ADF assets are deployed. In some circumstances, ADF assets may be more appropriate, and this should be determined by the state in liaison with ADF and could be bolstered with joint planning preseason.*[45]

- South Australian Country Fire Service: *Changes are required to the provisions of COMDISPLAN to enable the planned request for Commonwealth, and in particular ADF resources, to support an emergency operation at a level less than the current threshold. DACC processes could be streamlined and simplified, to provide clearer and simpler 'rules of engagement' for emergencies with the potential to quickly overwhelm a state or territory's capability and capacity.*[46]

- Commissioner Klemm, Western Australia Fire and Emergency Services: *Change the requirement to have exhausted all government, community, and commercial options before a request is made.*[47]

7.62 The COMDISPLAN and the DACC manual should not create confusion in obtaining ADF assistance. In particular, waiting until a state or territory has exhausted all government, community, and commercial options risks delaying the provision of ADF support. This can result in a state or territory being unable to respond to or recover from a natural disaster, risking further escalation of the disaster and endangering lives. The ADF should be able to be requested where it is likely that a state or territory's capacity will be overwhelmed. On one view, this is already the case – but it is far from clear. This approach needs to be clearly outlined in the COMDISPLAN and the DACC manual so that there is no confusion. We recommended in Chapter 3: National coordination arrangements that the Australian Government should revise

the COMDISPLAN thresholds to provide that a request for assistance, including Defence assistance, is able to be made by a state or territory government when:

- it has exhausted, or is 'likely to exhaust', all government, community and commercial resources
- it cannot mobilise its own resources (or community and commercial resources) in time, or
- the Australian Government has a capability that the state or territory does not have.

7.63 The Australian Government has indicated that it will work with states and territories to update the COMDISPLAN to take into account new structural arrangements that have been introduced to respond to COVID-19, including the National Cabinet and the National Coordination Mechanism.[48] The COMDISPLAN and the DACC manual should be reviewed together to clarify consistent thresholds for activation.

7.64 These thresholds should be made consistent regardless of whether a declaration of a state of national emergency is made. If a declaration is made, we suggest that a JTF model could be adopted to provide assistance to states and territories, similar to that used in **Phase 2** of Operation Bushfire Assist.

Recommendation 7.2 Review of Defence Assistance to the Civil Community manual

The Australian Government should review the content of the Defence Assistance to the Civil Community manual to ensure consistency of language and application with a revised COMDISPLAN.

Legal basis for DACC

7.65 DACC is undertaken in accordance with the Australian Government's executive power; it is not legislated.[49] We have considered whether the DACC process should be underpinned by legislation to provide additional clarity and certainty.

7.66 Defence considers that the current non-legislative DACC arrangements have been 'largely effective for many years, allowing frequent adjustments to DACC policy to adapt to changing requirements.'[50] Defence has also indicated that the benefits 'of legislating for DACC would be marginal, and disproportionate to the risks of doing so.'[51]

7.67 Generally, legislation should only be introduced for matters that require legislation to give them effect;[52] it is not normally used for processes that can otherwise operate without legislation. DACC is provided by the Australian Government by, and with the consent of, states and territories. Legislation typically provides greater certainty of authority – necessarily however, in its prescriptiveness, legislation generally limits flexibility. In the context of DACC, legislated arrangements are likely to limit flexibility and agility in response – and it is these characteristics of DACC assistance that are most valuable in responding to natural disasters.

7.68 **DACC process need not be specified in legislation. It has worked effectively without legislation and provides flexibility to the ADF in assisting states and territories to respond to natural disasters. Uncertainty in the future of natural disasters requires flexibility – there could be adverse, unintended consequences in restricting the timeliness, adaptability, and flexibility of the DACC process.**

Financial considerations relevant to ADF assistance

7.69 Assistance from the ADF has the potential to involve significant financial costs. Defence indicated that the cost incurred as part of Operation Bushfire Assist 2019-2020 was approximately $68.6 million.[53]

7.70 The DACC manual provides that recovery of the costs incurred by the ADF will not be sought where assistance has been provided under the local and significant emergency assistance DACC categories 1 and 2 (unless agreed otherwise before the provision of assistance).[54] Recovery of costs will be sought, however, where assistance has been provided under the emergency recovery assistance DACC category 3, unless a waiver is approved.

7.71 Part of the costs incurred by Defence as part of Operation Bushfire Assist related to DACC 3 tasks.[55] The Minister for Defence, Senator the Hon. Linda Reynolds CSC, authorised cost-waivers for tasks for the period 1 January – 31 March 2020.[56] Before 31 December 2019, there was some cost recovery, mainly related to the provision of fuel.[57] Cost-waivers allow states and territories to focus their financial efforts on other disaster response and recovery aspects. However, states and territories should not rely on a cost waiver being issued – they will need to pay for ADF assistance in the event that a cost-waiver is not authorised.

7.72 Care also needs to be taken to ensure that the use of the ADF does not take business away from local tradespeople and businesses (such as petrol stations), as this may compound the effect of the disaster. We heard that while DACC category 3 assistance was welcomed by the states, some expressed concern about the effect that use of the ADF might have on local businesses, contractors, and tradespeople.[58]

Legal protections for ADF assistance

7.73 Defence has indicated that the absence of any legislative framework means that ADF members and other Defence personnel providing assistance to states and territories in relation to natural disasters have not been provided with the same protections as their state or territory emergency service colleagues.[59]

7.74 Immunity provisions, such as those provided in state and territory legislation, give protection from civil or criminal liability and authorise acts or omissions that would otherwise be a tort or a crime. Nevertheless, conferring immunities can limit individual rights and requires careful justification.[60]

7.75 Defence told us that both individual ADF personnel and members of foreign forces providing assistance were exposed to some legal risk in the course of Operation Bushfire Assist 2019-2020, including exposure to criminal or civil liability, such as for trespass or damage to property.[61]

7.76 We also note that immunities (of various degrees) are available to Defence Force counterparts overseas when undertaking similar natural disaster relief and response operations in their own country.[62]

7.77 Defence has advised that recent legislation introduced into the Australian Parliament – the Defence Legislation Amendment (Enhancement of Defence Force Response to Emergencies) Bill 2020 – will, if passed, provide ADF members and authorised foreign force members with additional legal protections insofar as it will:

> *…provide immunity to protected persons from civil and criminal liability in relation to acts or omissions done in the good faith performance of their duties, in the course of providing certain assistance to prepare for, during, or in recovery from natural disasters and other emergencies.*[63]

7.78 The need for such an immunity arises because it would be undesirable if response and recovery actions were not undertaken due to concerns about potential liability. The protections proposed in the Bill would only apply where the Minister (or a delegate) has directed, in writing, the provision of assistance in relation to a natural disaster or emergency. The Minister must be satisfied that:

- the nature or scale of the natural disaster or other emergency makes it necessary, for the benefit of the nation, for the Commonwealth, through use of the ADF's or Defence Department's special capabilities or available resources, to provide the assistance, and/or
- the assistance is necessary for the protection of Commonwealth agencies, Commonwealth personnel, or Commonwealth property.

7.79 The Australian Government should also consider whether appropriate immunities are in place if it introduces a regime for the making of a declaration of a state of national emergency – see Chapter 5: Declaration of national emergency.

Recommendation 7.3 Legal protections for Australian Defence Force members

The Australian Government should afford appropriate legal protections from civil and criminal liability to Australian Defence Force members when conducting activities under an authorisation to prepare for, respond to and recover from natural disasters.

Call-out of the ADF Reserves

7.80 As noted above, on 4 January 2020, the Australian Government invoked the compulsory call-out of the ADF Reserves (section 28 of the *Defence Act 1903* (Cth)), in preparation for and response to the evolving bushfire crisis. This mechanism increased the size of the force available as it required members of the ADF Reserves to provide service even though they had not volunteered (ordinarily they are only required to provide services where they have agreed). Although this was the first compulsory call-out of the Reserves, ADF Reservists are nonetheless routinely employed, together with ADF full-time personnel, during natural disasters.[64]

7.81 Defence identified to us a series of challenges with mobilising the required Reserve personnel. This included the existing requirement for the call-out of ADF Reserve

members only on continuous full time service, and the need to exclude certain categories of members from the order (for example, where those members were involved with the civilian state or territory emergency or medical response). It has advised that the Defence Legislation Amendment (Enhancement of Defence Force Response to Emergencies) Bill 2020 seeks to address these challenges.

7.82 The legislative structure for the call-out of the ADF Reserve force should allow the right personnel to be called out quickly without impacting on critical non-ADF functions, such as emergency services. To the extent that this is not possible, consideration should be given to amendments that allow greater flexibility in specifying the Reservists who are subject to the call-out order.

7.83 **The Australian Government should consider amendments to the Defence Act 1903 to provide more flexible call-out options for the ADF Reserve force for use in national natural disasters where the scale and situation warrants call-out of the Reserves.**

7.84 We acknowledge that the Australian Government has introduced the Defence Legislation Amendment (Enhancement of Defence Force Response to Emergencies) Bill 2020, which seeks to achieve this outcome.

Chapter 8 National aerial firefighting capabilities and arrangements

Summary 204

Roles performed by aircraft 205

Aircraft used 205

Fixed-wing aircraft 206

Helicopters 209

Remotely Piloted Aircraft Systems 209

Effectiveness of aerial firefighting 210

Limitations 210

Benefits of aerial firefighting 210

Research into effectiveness of aerial firefighting 211

The National Aerial Firefighting Centre 212

Funding arrangements for aerial firefighting 212

Aircraft procurement 213

Development of an Australian aerial firefighting industry 214

Australian Defence Force 215

Tasking and deployment of aircraft 216

Pre-determined dispatch 217

Supporting systems 217

Sharing aircraft and aviation services between states and territories 218

Competition for aviation services 219

Overlapping fire seasons in the northern and southern hemispheres 219

Increasing length and intensity of bushfire seasons in Australia 220

Sourcing aircraft from overseas 220

Civil Aviation and Safety Authority 221

A sovereign aerial firefighting capability 222

Summary

8.1 Aviation is an essential component of Australia's natural disaster arrangements. Its importance was reflected in the unprecedented use of aircraft, across a range of applications, during the 2019-2020 bushfire season.

8.2 Each state and territory manages its own aerial firefighting capabilities comprising owned or leased aircraft. Additional aircraft are provided by the National Aerial Firefighting Centre (NAFC), a business unit of the Australasian Fire and Emergency Service Authorities Council (AFAC). NAFC procures and allocates a fleet of aircraft and support services, from within Australia and overseas, to supplement the capabilities of the states and territories.

8.3 The severity and duration of the 2019-2020 bushfire season placed strain on the existing arrangements for sharing aerial firefighting capabilities between the states and territories. Predicted longer northern and southern hemisphere fire seasons also expose risks associated with Australia's reliance on overseas-based aircraft.

8.4 The prospect of lengthening and increasingly severe fire seasons will only increase the demand for aerial firefighting services in the future. This warrants a reassessment of Australia's current reliance on overseas-based aviation services, and a focus on developing Australia's sovereign aerial firefighting capability.

Roles performed by aircraft

8.5 Aircraft have unique capabilities that can be employed in response to, and recovery from, a range of natural disasters. For example, they can:

- deploy quickly and over great distances to gain situational awareness and respond to natural disasters
- access remote communities to deliver essential supplies or conduct evacuations, and
- transport emergency or recovery teams to remote areas.

8.6 Aircraft are generally categorised as either fixed-wing or rotary-wing (helicopters). In the context of bushfires, aircraft are particularly useful for providing situational awareness, fighting fires, and transport and logistics roles:

- Situational awareness roles include fire detection, strategic mapping, line-scanning to track the progress of fires, and assessing infrastructure or communities at risk.
- Firefighting and bushfire management roles include:
  - dropping incendiary devices (aerial ignition) to ignite back burns or prescribed burns
  - providing a rapid response to bushfires before ground crews have arrived at the scene by dropping suppressant (that is retardant, water, foam or gel) to prevent the fire from spreading, and
  - directly and indirectly attacking bushfires with suppressant to slow or prevent the spread of fires, and dropping suppressant to protect communities and critical infrastructure.
- Transport and logistics roles include supporting ground crews during bushfires, and transporting firefighters to remote locations.[1]

8.7 Aircraft use fire suppressant to directly or indirectly attack bushfires.[2] Direct attack involves dropping suppressant directly on the fire, whereas indirect attack uses suppressant near a fire, most commonly in its path to stop or slow its spread.[3]

Aircraft used

8.8 No single aircraft type is universally more effective than others in aerial firefighting. The most appropriate aircraft will depend on a number of factors, including:

- the specific objectives, strategy and tactics being adopted in response to the bushfire
- bushfire behaviour
- weather conditions
- terrain type, and
- distance from a refilling source.[4]

8.9 Fixed-wing aircraft require an airfield or landing strip to take-off and land[5] and tend to be able to travel greater distances and at higher speeds than helicopters.[6] Fixed-wing aircraft include very large air tankers (VLAT), large air tankers (LAT), single-engine air tankers (SEAT) and other conventional fixed-wing aircraft.[7]

Fixed-wing aircraft

8.10 SEATs are an effective option in aerial firefighting because they can operate from regional and remote airfields and can be deployed quickly in response to a bushfire. SEATs carry approximately 3,000 litres of suppressant,[8] but can be tasked in groups of two or more aircraft to increase their overall effectiveness.[9] In addition to dropping suppressant, SEATs can also perform coordination, fire detection and mapping roles.[10] Some SEATs are also fitted with amphibious floats which afford them the ability to land on and scoop water from lakes, rivers or reservoirs.[11]



Figure 30: SEATs can be used to drop suppressant on bushfires.[12]

8.11 LATs and VLATs (together referred to as LATs) are capable of carrying larger quantities of suppressant (up to approximately 35,000 litres[13]). These large aircraft are generally employed to drop suppressant over long containment lines to limit the spread of bushfires or protect critical assets. They can fly for longer than smaller aircraft and fly at higher speeds[14], but they need longer runways.



Figure 31: A DC-10 LAT[15]

8.12 LATs have a number of advantages over other aircraft types. NSW has described the ability of LATs to build long, good quality containment lines of suppressant as critical to stopping and containing the spread of bush and grass fires.[16] LATs can also operate in worse conditions than smaller aircraft.[17] Furthermore, their endurance and speed give them the ability to travel longer distances to respond to fire incidents across all jurisdictions.[18] A LAT is able to transit across Australia in one day, whereas a heavy helicopter will take a few days to travel the same distance.[19]

8.13 We heard that LATs can also be particularly effective when being used to protect critical assets or infrastructure.[20] During the 2019-2020 bushfires, LATs played an important role in protecting significant cultural, environmental and utilities assets in the ACT.[21] A LAT was used to build containment lines to protect key sites within Namadgi National Park, including communications towers located at Mount Tennent and Mount Clear and some known habitats of the endangered Northern Corroboree Frog.[22]



Figure 32: Suppressant can be used to protect critical infrastructure such as telecommunications towers.[23]

8.14 LATs are not without limitations. They are relatively more expensive to operate than smaller aircraft; require significant supporting infrastructure with longer runways; have slower turnarounds; sometimes have less fire attack accuracy than smaller aircraft; and can be harder to integrate into firefighting operations as they often require an additional lead aircraft to help coordinate their bushfire attacks. [24]

8.15 Other fixed-wing aircraft types used in aerial firefighting include line-scanning aircraft, which are small aircraft equipped with specialised intelligence gathering and mapping equipment; and lead aircraft, which are used to coordinate and guide suppressant drops of larger aircraft such as LATs. Lead aircraft also communicate directly with ground teams to ensure that firefighting strategies are coordinated.[25]

Helicopters

8.16 Because of their vertical take-off and landing capability, helicopters are an essential element of aerial firefighting capability. Although they have a shorter range than fixed-wing aircraft, they have the capability to re-fill tanks or buckets from a variety of water sources[26] and transport people and equipment to remote locations.[27] Owing to their higher manoeuvrability, helicopters can operate more effectively than fixed-wing aircraft over mountainous terrain and deep valleys.[28]

8.17 Helicopters are generally categorised as Type 1 (heavy), Type 2 (medium) or Type 3 (light) models.[29] Heavier helicopters are generally used for firebombing and transportation, whereas lighter helicopters are used for command and control, mapping and aerial ignition roles.[30]

- Type-1 helicopters are capable of carrying large volumes of suppressant (approximately 7,500 litres), lifting heavy supplies or equipment, and transporting firefighting teams and support crews.[31]
- Type-2 helicopters can be used to drop suppressant[32] and deploy Remote Area Fire Teams, Rapid Response Teams and Aerial Extraction Teams.
- Type-3 helicopters are primarily used for situational awareness, aerial ignition or night operations, but some models also have the ability to drop relatively small quantities of suppressant.[33]



Figure 33: A Type-1 helicopter refilling its water tank[34]

Remotely Piloted Aircraft Systems

8.18 Australian fire agencies also use Remotely Piloted Aircraft Systems (RPAS).[35] Although RPAS are not currently used for direct aerial firefighting,[36] they can use camera technologies to live-stream the location and behaviour of bushfires.[37] RPAS can also

operate in conditions which may be unsafe for other aircraft, such as in low light or during the night.[38] We heard that although RPASs were used during the 2019-2020 bushfire season, their integration into the wider firefighting effort is immature.

Effectiveness of aerial firefighting

8.19 The effectiveness of aerial firefighting depends on a number of factors, including the distance and time it takes to travel to the location of the fire; the type of aircraft deployed; weather conditions; fire fuel type, intensity and size; pilot skill; the type of suppressant used; and the tactics employed to respond to the fire.[39]

Limitations

8.20 Aircraft alone are not a solution to fighting bushfires. Interaction between aircraft and fire crews is necessary to bring a fire fully under control.[40] Even after an aircraft has dropped suppressant on a bushfire, spot fires and smouldering can remain,[41] requiring fire crews to ensure that all fires are extinguished. This reliance on the integration of operations with fire crew support is confirmed by aerial firefighting research.[42]

8.21 In addition to needing to be integrated with ground crews, poor weather conditions can limit and sometimes prevent the use of aircraft. For example, requirements for pilots to maintain visibility of terrain can limit the use of aircraft in severe conditions (eg low visibility in heavy smoke or cloud); and turbulence caused by strong winds and the terrain can make operating aircraft unsafe, especially at low altitude.[43]

8.22 Poor weather conditions can also restrict the effectiveness and use of aerial firefighting. For example, during the 2019 SA Cudlee Creek and Kangaroo Island fires, weather conditions prevented all attempts by aircraft, including LATs, from containing the forward spread of the fires.[44] Furthermore, extreme weather conditions experienced periodically throughout the 2019-2020 bushfire season meant there were a number of days when aerial firefighting could not be employed.[45]

Benefits of aerial firefighting

Firefighting

8.23 Most states and territories employed firefighting aircraft, to varying extents, during the 2019-2020 bushfire season.[46] NSW made the greatest use of firefighting aircraft, describing it as crucial to its firefighting efforts.[47] Using a range of fixed-wing and rotary-wing aircraft,[48] NSW fire response agencies conducted approximately 2,500 missions during the 2019-2020 bushfire season;[49] LATs alone dropped a total of 24 million tonnes of retardant. [50] The ACT deployed approximately 20 different fixed-wing and rotary-wing firefighting aircraft during the 2019-2020 bushfires.[51]

Situational awareness

8.24 Aircraft have many benefits in addition to suppressing bushfires. High altitude line-scanning aircraft provide invaluable information regarding the location of fires.[52]

Line-scanning aircraft operate at altitudes between 10,000 to 25,000 feet and map fire activity by detecting infra-red radiation generated by a bushfire.[53] A line-scanning aircraft was used extensively throughout the 2019-2020 bushfire season by the ACT:[54]

> *During daylight hours, the aircraft supplied…dynamic situational awareness of fire location [and] fire behaviour. The aircraft is fitted with the latest advanced camera technology including an infra-red ability which can see through smoke. Its onboard … laser was used to extensively and accurately map current fire perimeters, spot fires as well as assess assets at risk and feed this information dynamically to the…Incident Management Team. This led to regular updates to the…website incident map showing the current location of the fire perimeters…*[55]

8.25 Fire and Rescue New South Wales (FRNSW) is one of a number of agencies that used RPAS throughout the 2019-2020 bushfire season. RPAS provided reconnaissance on bushfires and assisted fire agencies to develop response tactics.[56] RPAS were particularly useful during periods where smoke conditions prevented the safe operation of conventional aircraft.[57] FRNSW also used RPAS during recovery operations to assess property damage and identify debris requiring removal.[58]

Supporting ground crews

8.26 Aircraft are also particularly useful for operations over remote or rugged terrain that is difficult to access from the ground. Helicopters can insert firefighting ground crews (remote area firefighters), or drop suppressant to stop or slow the spread of fires. [59] The ACT used a Special Intelligence Gathering (SIG) helicopter equipped with an infra-red camera during the 2019-2020 bushfires to detect a fire in a remote area of bushland. After helping to coordinate the insertion of a team of firefighters by two Bell 412 winch-capable helicopters, the SIG helicopter remained at the scene to provide situational awareness to the team on-the-ground.[60] After inserting the firefighters, the Bell 412 aircraft remained to provide support to the ground team with water bombing attacks on the bushfire.[61]

Research into effectiveness of aerial firefighting

8.27 Aerial firefighting remains integral to strategies to monitor, contain and control bushfires in Australia. Its importance was highlighted during the 2019-2020 bushfires when aerial assets were deployed on an unprecedented scale across the country. NAFC estimates that aerial activity during the 2019-2020 bushfire season was up to four times greater than in previous years.[62]

8.28 Research conducted by the Bushfire Cooperative Research Centre in 2007 found that the time it takes for aircraft to respond to bushfires is critical to the success of aerial firefighting strategies, particularly on days of high fire danger rating.[63]

8.29 Research conducted by the South Australian Country Fire Service found that the effectiveness of rapid aerial attack on bushfires on days of elevated fire danger rating was limited.[64] The researchers suggest increasing the number of aircraft initially responding to a bushfire in conditions of elevated fire danger rating could improve the chances of effective suppression.[65] We heard, however, that when bushfires

develop to a certain size there are no aerial, or indeed ground-based, firefighting techniques or strategies which can effectively contain or suppress them.[66]

8.30 The Victorian Inspector-General for Emergency Management observed that:

> *The effectiveness of aerial firefighting resources and the deployment system in Victorian environments has not been extensively evaluated. A greater understanding of how aerial assets can support suppression efforts including first attack would allow Victoria to make more informed requests for aerial firefighting assets and ensure any assets provided are used to their greatest effect.*[67]

8.31 The governments of ACT, SA and Victoria also told us that they consider further research is required to improve aerial firefighting tactics, products and their effectiveness.[68]

The National Aerial Firefighting Centre

8.32 We heard that it would not be 'practical, sensible or cost-effective' for any one state or territory to maintain all the necessary specialised aerial assets to address all its possible aerial firefighting needs.[69] NAFC is responsible for 'providing a cooperative national arrangement for the provision of aerial firefighting resources for combating bushfires'.[70] NAFC performs this function by leasing a fleet of specialised aerial firefighting aircraft on behalf of the states' and territories' emergency services.[71]

8.33 NAFC does not own or operate any aircraft itself.[72] NAFC aggregates the capability requirements of each state and territory and then approaches the market for bulk procurement.[73] NAFC procures the aircraft, along with their maintenance, fuelling, crew and insurance.[74]

8.34 NAFC was formed in 2003 by AFAC with the agreement of the states and territories, and support of the Australian Government.[75] Since 2018, NAFC has been a business unit of AFAC.[76]

8.35 AFAC refers to NAFC as a 'relatively small, facilitating unit'.[77] NAFC generally only operates within normal business hours[78] and does not have the resources to provide operation-enabling functions for extended periods.[79] Such functions include sourcing and contracting additional resources, dealing with offers of assistance, and supporting resource sharing efforts.[80]

Funding arrangements for aerial firefighting

8.36 Aerial firefighting is expensive.[81] The majority (about two-thirds) of all aerial firefighting assets in Australia are owned or contracted directly by states and territories, who are responsible for meeting those costs. The remaining one-third of aircraft are contracted through NAFC. The states and territories are responsible for the costs of aviation services procured through NAFC. Some of the fixed costs of these services are reimbursed by the Australian Government through NAFC.[82]

8.37 The Australian Government has provided financial support to NAFC since 2003.[83] NAFC receives funding from the Australian Government through grant agreements.[84] The NAFC Strategic Committee, an AFAC subcommittee including state and territory

fire and emergency services representatives,[85] allocates this funding to states and territories in accordance with a Strategic Committee guidance note which requires funding to be allocated in a manner that is 'as equitable as far as practicable in terms of fleet composition and addressing the bushfire risk and other requirements of Members'.[86]

8.38 The Australian Government is committed to providing approximately $15 million per year during the period 2018 to 2021, with total funding amounting to $44.79 million over three years.[87]

8.39 The costs of aviation services procured through NAFC for each state and territory vary.[88] The proportion of these costs funded by the Australian Government (through NAFC) also varies between jurisdictions.[89]

8.40 For the 2019-2020 bushfire season the Australian Government provided NAFC with an additional $11 million in December 2019, and a further $20 million in January 2020, increasing its total contribution to approximately $46 million for 2019-2020.[90] This additional funding recognised that the 2019-2020 bushfire season was 'unprecedented in terms of scale and impact' and merited additional resources to support response efforts.[91] The increased funding helped finance the procurement of an additional four LATs for the 2019-2020 bushfire season.[92]

Aircraft procurement

8.41 Each state and territory has its own organisational arrangements for aerial firefighting.[93] The NAFC fleet of aircraft supplements aircraft owned or directly contracted by state and territory governments. Approximately 500 aircraft are used in aerial firefighting operations across Australia, with the NAFC fleet accounting for approximately 160 of these aircraft.[94]

8.42 Aerial firefighting capabilities vary between the states and territories, with some jurisdictions, such as the ACT[95], not owning any aircraft. Other jurisdictions own aircraft. For example, NSW owns a fleet consisting of three helicopters and the 'Marie Bashir' LAT,[96] and has purchased a further four aircraft (two fixed-wing and two helicopters) which are expected to be available in 2020.[97]

8.43 A Resource Management Agreement between NAFC and the states and territories outlines how aviation services are brokered by NAFC.[98] Aviation services are typically procured by NAFC through a master national contract,[99] which nominates a state or territory as having primary responsibility for the aircraft (including its day-to-day operational management and deployment).[100] The aircraft is then exclusively available for bushfire response during the nominated service period.[101] In some cases, a service may be shared by multiple states and territories over the same service period.[102]

8.44 The majority of aircraft are contracted to be exclusively used for bushfire response.[103] Most contracts are for three years (three fire seasons) with an option to extend by a further two. One service provider may be responsible for supplying multiple services across the states and territories.[104] For example, NSW and the ACT currently share a Type 2 (medium) helicopter service.[105]

8.45 State and territory governments are also able to procure additional aviation services at times of high demand through 'call when needed' (CWN) arrangements from a panel of approved suppliers at pre-agreed prices.[106] CWN arrangements generally cost more than aircraft exclusively contracted over several seasons.[107] During the 2019-2020 bushfire season, NAFC started using a national CWN contracting system. This was intended to improve standardisation, reduce duplication, and streamline processes for potential suppliers.[108] NAFC told us that it plans to extend the national CWN contract framework for the 2020-2021 bushfire season.[109]

8.46 We heard from the Aerial Application Association of Australia, an association of aircraft service operators, that in some circumstances CWN arrangements encourage a practice referred to as 'tow-trucking', whereby aircraft service operators, at their own cost, attempt to 'game' the system by pre-positioning their aircraft around the country in the areas they believe are most likely to be used by states and territories during periods of high demand.[110] We heard that surge capacity for aviation services in bad fire seasons could be better managed by the states and territories maintaining aviation services on contracts with nominated service periods.[111]

8.47 NAFC has provided the states and territories with an effective mechanism to realise greater efficiencies in the procurement of aviation services. NAFC only accounts for a portion of the capabilities used by the states and territories.

8.48 **There is merit in considering what further benefits could be derived from even greater collaboration in the use of available aerial firefighting resources.**

Development of an Australian aerial firefighting industry

8.49 We heard that the current terms of aircraft service contracts are a disincentive for some Australian-based service providers. The majority of the providers we heard from told us that short contracts and minimal work during the off season make it unviable to invest in expensive aviation equipment.[112] Contracts traditionally engage providers for 84 service days (70 in Tasmania) within the fire season, but we heard that more contracted service days would allow providers to invest in more equipment and offer greater value for money to fire agencies.[113]

8.50 The Aerial Application Association of Australia also told us that the length of contracts is insufficient to encourage industry to invest in aircraft and creates significant uncertainty in securing long-term finance.[114] The Aerial Application Association of Australia also criticises the short lead times for developing contract proposals with NAFC:

> *The delays in the announcement of a contract to a winning contractor are such that there is seldom sufficient time for a contractor to be innovative or source potential aircraft – with most contractors being forced because of this to only offer aircraft already available in Australia. Australian private companies are able to purchase aircraft worldwide, but require suitable lead times for these transactions. In some cases, the time from contract announcement to start of the contract has only been a few weeks. There is also a significant impact on unsuccessful tenderers who are also not advised of their situation until close to the start date.*[115]

8.51 However, one aircraft service provider told us that longer-term contracts may have the potential to encourage more overseas-based providers to enter the market and consequently lock out Australian-based providers.[116] Longer-term contracts could also place additional financial burden on those Australian-based service providers unsuccessful in their contract bids as they are without business for longer periods.[117]

8.52 **The short duration, short lead time, and low number of service days in aircraft service contracts could discourage long-term investment in the industry by Australian-based aviation service providers.**

Australian Defence Force



Figure 34: A RAAF C-130J Hercules transporting firefighting personnel.[118]

8.53 Australian Defence Force (ADF) aircraft were used to provide assistance to states and territories during the 2019-2020 bushfire season.[119] This assistance included providing platforms for fire service air observers; transporting fire service strike-teams; conducting impact assessments; conducting evacuations; search and rescue; and supporting logistics and community recovery tasks.[120]

8.54 The ADF has few aerial assets equipped for firefighting, although its aircraft have been used to provide aerial firefighting support in the past.[121] We heard that the Royal Australian Navy has four underslung water buckets which can be fitted to rotary-wing aircraft to perform water bombing.[122] However, the ADF considers these buckets to be 'inferior' to those more commonly used in aerial firefighting.[123]

8.55 Aerial firefighting is not a task that the Australian Government requires the ADF to perform. The ADF has emphasised that safe and effective aerial firefighting is a specialised skill requiring training.[124] Moreover, modification of the limited number of existing aircraft for aerial firefighting would reduce ADF capacity to perform other

tasks,[125] including responding to other natural disasters, such as floods and cyclones, and broader national security tasks.

8.56 NAFC stated that the most important assistance that the ADF can provide is seamless use of Defence airbases, including the provision of fuel, refuelling equipment, crew welfare facilities and administrative support.[126] Defence airbases were used during the 2019-2020 bushfires to support state and territory aerial firefighting operations, including LAT operations.[127]

8.57 **The ADF does not directly combat bushfires, but the assistance it provides to the states and territories is an important component of the response to, and recovery from, bushfires and other natural disasters.**

Tasking and deployment of aircraft

8.58 States and territories usually coordinate the use of aerial assets through a central mechanism, such as an Air Desk.[128] Air Desks receive and manage requests for aviation resources from emergency management agencies and arrange dispatch of aircraft.[129]

8.59 All fire and state emergency services in Australia use the Australasian Inter-service Incident Management System (AIIMS) when coordinating a response to natural disaster incidents, including bushfires.[130] AIIMS involves the use of an Incident Action Plan for response to bushfires. The Incident Action Plan details the objectives of the response effort and is designed to ensure an integrated and coordinated response.[131] When aerial operations are involved in a response, an Air Operations Plan forms part of the Incident Action Plan.[132]

8.60 The AIIMS structure includes aerial support roles within the incident management team; including an Air Operations Manager to manage the Air Operations Unit in larger and more complex incidents, and an Air Attack Supervisor, responsible for direct tactical coordination with ground crews.[133] The Air Attack Supervisor directs the tactics that the pilot of the aircraft is to employ when attacking the bushfire, in accordance with the objectives of the Incident Action Plan.[134]

8.61 NAFC reported challenges in finding sufficient numbers of aviation support personnel to share between jurisdictions during the 2019-2020 bushfire season.[135] NAFC told us that:

> *…these roles are harder to source than general incident management roles, owing to the increased training and currency requirements for these safety-critical roles and jurisdictions wanting to conserve their resources, to maintain capability within their geographical areas of responsibility.*[136]

8.62 NAFC anticipated there would be difficulties in sharing personnel between jurisdictions during the 2019-2020 bushfire season[137] and sourced a number of aviation support personnel from overseas to support aerial firefighting operations, including Aerial Observers, Aircraft Officers, Air Attack Supervisors (LAT), Air Operations Managers and an Airtanker Base Manager.[138]

8.63 **The limited availability of aviation support personnel in Australia during the 2019-2020 bushfire season limited the sharing of personnel between jurisdictions and led to a greater reliance on personnel sourced from overseas.**

Pre-determined dispatch

8.64 The optimal use of aerial firefighting is in the early stages of a bushfire.[139] For an aircraft to provide effective assistance in the suppression of a bushfire it needs to be rapidly dispatched with minimal travel time and with necessary logistical support systems in place.[140]

8.65 Victoria, SA and WA each employ 'pre-determined dispatch'- the purpose of which is to reduce the time for the aircraft to reach the fire - described as a 'game changing system that should be adopted nationally'.[141] In Victoria, when the fire danger index is high, the aircraft are dispatched as soon as a fire call is paged, rather than waiting to receive a call through the state Air Desk.[142] The aircraft, which is then the first to arrive, is able to attack the fire and provide intelligence until ground support arrives. One aircraft service operator noted that the use of pre-determined dispatch helped reduce the number of flight hours for its aviation services by 30% due to fires being contained in the early stages.[143]

8.66 The potential value of pre-determined dispatch was acknowledged in the Final Report of the NSW Bushfire Inquiry, which recommended that:

> *…in order to improve early fire suppression, the NSW RFS trial initial aerial dispatch in areas of high bush fire risk. The trial should identify the most appropriate and cost-effective mix of aircraft, and any associated infrastructure improvement that will be required.*[144]

8.67 **Pre-determined dispatch arrangements have the potential to reduce the time it takes to effectively respond to bushfires.**

Supporting systems

8.68 NAFC uses the web-based ARENA system to maintain a registry of aircraft, operators, crew and pilots.[145] ARENA provides visibility of the location and availability of aircraft through a national tracking system.[146]For the last two fire seasons, ARENA has also had a dispatch capability, which is currently used by authorities in Queensland, NSW, ACT, Victoria and Tasmania to task aircraft to incidents.[147]

8.69 NAFC states that ARENA could be used to develop the dispatch and automated accounting functions in all states and territories, which would provide increased real-time information on aircraft activity and additional data for post-incident analysis and reporting.[148]

Sharing aircraft and aviation services between states and territories

8.70 Sharing aviation services between states and territories during bushfire seasons is a feature of aerial firefighting in Australia and is reflected in the Resource Management Agreement between AFAC and the states and territories. [149]

8.71 AFAC explained that one of the reasons for the sharing of aircraft through NAFC is that:

> *…it would not be practical, sensible or cost-effective for each individual state and territory to maintain the necessary specialised resources required to deal with all situations. One of the main benefits of the national arrangements is the ability of states and territories to access increased capacity, or surge capacity, for aerial fire suppression at times of peak bushfire activity.*[150]

8.72 State and territory response agencies contact each other directly to determine the availability of additional aircraft and to make arrangements for their relocation.[151] The decision to share a service with another jurisdiction ultimately rests with the relevant chief or commissioner of the requested state or territory.[152]

8.73 States and territories shared aerial firefighting services on a number of occasions during the 2019-2020 bushfire season. For example, during the 2019-2020 bushfire season NSW loaned its LAT to WA, SA, Tasmania and Victoria.[153] SA sourced two LATs from Victoria and NSW to assist with bushfires in Yorketown, Nangwarry, Cudlee Creek, Kelira and Kangaroo Island.[154] WA also hired a LAT from the NSW Rural Fire Service in December 2019 for three days to respond to bushfires in the south-west of the state.[155]

8.74 We heard of some instances where requests for aerial firefighting assistance were not fulfilled because there were no aircraft available.[156] Victoria states that a number of its requests to NAFC for additional Type-1 helicopters and SEATs during the 2019-2020 bushfires were not met.[157] Victoria states that 'while [it] has access to Type-1 helicopters through the Resource Management Agreement, all Type-1 helicopters were deployed to NSW and QLD fires' at the time of its requests.[158]

8.75 The ACT Emergency Services Agency also told us that resource sharing between jurisdictions during times of high demand for aircraft was not optimal, particularly in relation to LATs, '…which were subject to what, on occasion, appeared to be embellished reasons for requests'.[159]

8.76 We also heard of aircraft being interrupted during operations and being compelled to return to their home jurisdiction. On one occasion an aircraft sourced from another jurisdiction to respond to the 2019 Cudlee Creek Fire in SA was re-deployed to respond to an operational need in its home state.[160]

8.77 Distance can also be a factor in the availability of aircraft. WA has identified some difficulties in obtaining aircraft due to its distance from jurisdictions.[161] The process of obtaining aircraft deployment approval, release and deployment from another jurisdiction to WA is time consuming – combined with the time required to prepare

the aircraft for operations, the delay may result in missing the window of opportunity for using the aircraft.[162] Queensland also cited approval times and manual dispatch protocols as sources for delay.[163]

8.78 NAFC considers that the mechanisms for sharing aerial resources have worked well, but acknowledges that effective sharing would be enhanced by all states and territories using a common system, such as ARENA, for dispatch and monitoring.[164] Following the 2019-2020 bushfire season the Commissioners and Chief Officers Strategic Committee of AFAC (CCOSC) determined to facilitate future sharing of aviation services through the National Resource Sharing Centre.[165] NAFC's role is further discussed in Chapter 3: National coordination arrangements.

8.79 On some occasions during the 2019-2020 bushfire season states and territories were unable to call upon additional aviation services when needed.

8.80 **Aviation services funded, in whole or in part, by the Australian Government should be shared between jurisdictions according to the greatest need.**

Competition for aviation services

Overlapping fire seasons in the northern and southern hemispheres

8.81 Fire seasons between the northern and southern hemispheres have historically been separated by a number of months, which has permitted contractual arrangements allowing for the sharing of aircraft to cover fire seasons in both hemispheres.[166] This has boosted the availability of aircraft services in both hemispheres. However, the increasing duration of fire seasons in both hemispheres threatens the effectiveness of these arrangements, particularly in relation to sourcing LATs.[167]

8.82 The South Australian Independent Review found that:

> *The use of northern hemisphere-based firefighting aircraft is becoming problematic as the bushfire season is extending in both hemispheres, making it difficult to call on additional resources from overseas*.[168]

8.83 Similarly, the Victorian IGEM observed that:

> *The extended fire seasons in the northern and southern hemispheres place pressure on the availability of significant aerial and incident management resources*.[169]

8.84 Although longer fire seasons are yet to directly cause aviation services to be unavailable,[170] if fire seasons continue to occur outside historical periods there is likely to be a risk that Australian states and territories will no longer be able to rely on overseas sources for aviation services in the future.[171]

8.85 **The availability of overseas-based aviation services during Australian fire seasons, particularly LATs, may be reduced by the increasing convergence of fire seasons in the northern and southern hemispheres.**

Increasing length and intensity of bushfire seasons in Australia

8.86 The 2019-2020 bushfire season has been identified as an example of increasingly severe and longer-lasting fire seasons in Australia.

8.87 Historically, the fire season in northern Australia has occurred before the fire season in southern Australia, but in recent years these fire seasons have begun to overlap.[172] More frequent and higher intensity fires, driven by extreme fire weather conditions, will likely lead to a corresponding increase in demand for aviation services in the future.[173]

8.88 The scale of the 2019-2020 bushfire season presented resourcing challenges for aerial firefighting capabilities in Australia.[174] As noted, with bushfire incidents occurring within and across multiple jurisdictions at the same time, the capacity to share aircraft between states and territories was compromised.[175] Furthermore, the unusually high numbers of hours flown caused pilots to reach statutory flight time limits sooner; and aircraft required maintenance earlier than normal.[176] The consequent increase in required downtime for crews and aircraft, to manage fatigue and maintenance, restricted their ability to relocate to other jurisdictions.[177]

8.89 In previous years, aircraft were able to redeploy to other jurisdictions throughout the fire season, but the scale of the 2019-2020 bushfires saw reduced opportunities for such redeployment.[178] For example, the 2019 fire season in the NT ended in December 2019, when it more commonly ends in October with the onset of the wet season. As a result of the extended fire season, requests from southern Queensland for aerial firefighting support in November and December could not be accommodated by the NT.[179]

8.90 The length, intensity, and extent of the 2019-2020 bushfire season placed additional demands on available aviation services in Australia, which sometimes further limited the ability of states and territories to share services.

Sourcing aircraft from overseas

8.91 During the 2019-2020 bushfire season, approximately 66 foreign-registered aircraft were sourced for aerial firefighting operations.[180] This reliance on overseas aircraft is particularly notable in relation to LATs. With the exception of the single LAT owned and operated by NSW, all of the approximately 11 LATs[181] used during the 2019-2020 bushfire season were contracted from overseas.[182]

8.92 The severity of the 2019-2020 bushfires highlighted the difficulties in obtaining additional aircraft from overseas at short notice. Obtaining LATs and Type-1 helicopters at short notice was particularly difficult as the operators of these aircraft do not usually maintain their services on stand-by, due to the prohibitive costs involved.[183] Typically, the break between the fire seasons in the northern and southern hemispheres is used to undertake maintenance and modifications to aircraft, and provide crews with training or annual leave.[184]

8.93 Before an aircraft is used in Australia, NAFC takes a number of steps. These include negotiating contracts which meet fairness, probity and integrity requirements;

undertaking due diligence checks to ensure the aircraft, crew and operator meet Australian standards; and in some cases, obtaining approval from an international authority to allow the transit of aircraft to Australia.[185] Transiting the aircraft to Australia presents its own difficulties and delays, and the aircraft also require significant support equipment in Australia, not all of which can be imported at short notice.[186] AFAC told us:

> *Experience has shown that securing additional heavy fixed-wing and rotary-wing assets from overseas at short notice is problematic and unreliable. This was reinforced during 2019-2020 by late advice regarding availability of funding for acquiring large airtankers, leading to delayed and problematic delivery.*[187]

8.94 On 4 January 2020, NAFC sought to obtain additional LATs from overseas[188] with additional funding provided by the Australian Government in December 2019 and January 2020.[189] On receiving this request, one service provider accelerated maintenance being undertaken on two of its aircraft but was unable to provide a further two aircraft which were also undergoing maintenance.[190] A delay in obtaining a spare part meant that one of the aircraft provided was not available for operations in Australia until four weeks later.[191]

8.95 The Aerial Application Association of Australia describes Australia's reliance on overseas-based aviation services as a 'sovereign risk' to Australia.[192] We note that it is self-evident that this risk is heightened by the restrictions on international travel caused by the COVID-19 pandemic, which are still in effect at the time of writing. These restrictions threaten Australia's ability to procure aviation services from overseas, particularly at short notice.

8.96 There were problems sourcing aviation services at short notice from overseas during the 2019-2020 bushfire season, particularly in relation to LATs and Type-1 helicopters.

Civil Aviation and Safety Authority

8.97 A further obstacle to obtaining aircraft from overseas in a timely manner is the requirement to obtain the necessary approvals from the Australian Civil Aviation Safety Authority (CASA).

8.98 CASA told us[193] that before an agreement to procure an aircraft from overseas can be finalised, CASA must first enter into an agreement with the national aviation authority of the country where the aircraft is registered.[194] These agreements specify who will be responsible for the airworthiness and flight operations oversight of the relevant aircraft.[195] Before such an agreement can be entered:

> *…CASA needs to be provided with the specific details of the relevant aircraft, including its make and model, its serial number and its registration mark. CASA has found that these details are frequently not available until such time as a contract is in place with the NAFC (or relevant emergency services agency) and a lease agreement has been signed with the proposed Air Operator Certificate holder to operate the aircraft. Delays in the provision of this aircraft-specific information can delay the signing of formal agreements with foreign national aviation authority, which is necessary before operations can commence.*[196]

8.99 We also heard that Australian-licensed pilots were not licensed to operate foreign-registered aircraft used in Australia during the 2019-2020 bushfire season.[197] For example, with the exception of the NSW-owned LAT, none of the LATs used in Australia during the 2019-2020 bushfire season were Australian-registered, and therefore Australian-licensed pilots were precluded from operating them.[198]

8.100 The Australian Federation of Air Pilots told us that it has approximately 5,000 Australia-based members employed as commercial pilots.[199] This suggests Australia may have the potential to recruit and train the necessary expertise to operate firefighting aircraft currently sourced from overseas, including LATs, if such aircraft were owned and registered in Australia.

A sovereign aerial firefighting capability

8.101 A mix of aviation services is an essential element of Australia's ability to fight and control bushfires and the availability of some of these assets is limited. Existing arrangements facilitated through NAFC have historically provided a cost-effective means of collectively enhancing Australia's aerial firefighting capabilities, although these same arrangements have left Australia reliant on overseas-based aviation services, particularly in relation to larger aircraft types such as LATs.

8.102 We heard that in some cases aviation services could not be shared between the states and territories due to the intensity and length of the 2019-2020 bushfire season. Furthermore, there is a limited number of aviation support personnel based in Australia and some states and territories retain those they have for operations in their own jurisdictions. The limited availability of aerial firefighting resources sometimes resulted in jurisdictions being unable to satisfy operational demands.

8.103 As set out above, the increasing duration of fire seasons in the northern and southern hemispheres, and the increasing duration and severity of fire seasons in Australia, will make it increasingly difficult to share aircraft domestically, and to acquire aviation services when we need them, particularly at short notice.

8.104 In some instances, contracting arrangements do not incentivise the development of Australian-based aviation services, particularly with respect to larger aircraft types like LATs. Australian-licensed pilots are also precluded from operating foreign-registered aircraft. These features of Australia's aerial firefighting arrangements further increase Australia's reliance on overseas providers.

8.105 Individually, these challenges point to capability gaps in the availability of aircraft and the arrangements for their allocation and use. Cumulatively they pose a growing challenge to Australia's aerial firefighting capabilities. We therefore believe that there is merit in the Australian, state and territory governments together ensuring the development of a sovereign aerial firefighting capability of sufficient size and versatility to better meet national needs.

8.106 Australian, state and territory governments should work together to continue to improve Australia's collective, Australian-based and operated, aerial firefighting capabilities. Though we see merit in the continued use of overseas-based aviation services and air crew in some instances, Australia's current reliance represents a vulnerability, as demonstrated during the 2019-2020 bushfire season.

8.107 We define Australia's sovereign aerial firefighting capability as the collective Australian-based aerial firefighting capabilities of the states and territories, supported by a national capability which is jointly funded by the Australian, state and territory governments. These capabilities should be maintained through procurement and contracting strategies that support the Australian-based aerial firefighting industry.

8.108 The development of a modest Australian-based and registered national fleet of VLAT/LAT aircraft and Type-1 helicopters, jointly funded by the Australian, state and territory governments, will enhance Australia's bushfire resilience. A standing national fleet would ensure that the states and territories have the necessary resources to call upon during periods of high demand, without the need to reduce the operational capabilities of other jurisdictions. This standing fleet should also include situational awareness and support capabilities which may benefit from a nationally coordinated approach.

8.109 Australia's sovereign aerial firefighting capability should be supported by ongoing research and evaluation to inform specific capability needs, and the most effective aerial firefighting strategies.

8.110 Australia's sovereign aerial firefighting capability may be supplemented by overseas-based aviation services, where additional capacity is forecast to be required and available.

Recommendation 8.1 A sovereign aerial firefighting capability

Australian, state and territory governments should develop an Australian-based and registered national aerial firefighting capability, to be tasked according to greatest national need. This capability should include:

(1) a modest, very large air tanker/large air tanker, and Type-1 helicopter capability, including supporting infrastructure, aircrew and aviation support personnel, and

(2) any other aerial firefighting capabilities (eg Light Detection and Ranging (LiDAR), line-scanning, transport, and logistics) that would benefit from a nationally coordinated approach.

Recommendation 8.2 Research and evaluation into aerial firefighting

Australian, state and territory governments should support ongoing research and evaluation into aerial firefighting. This research and evaluation should include:

(1) assessing the specific capability needs of states and territories, and

(2) exploring the most effective aerial firefighting strategies.

Recommendation 8.3 Developing the aerial firefighting industry's capability

Australian, state and territory governments should adopt procurement and contracting strategies that support and develop a broader Australian-based sovereign aerial firefighting industry.

Chapter 9 Essential services

Summary 226

The importance of essential services 227

The impact of natural disasters on essential services 227

The causes of outages during the 2019-2020 bushfires 229

Shared responsibilities 230

Supply chains risks 231

Availability of essential goods 232

Reliance on international supply chains for essential resources 233

Transport corridors 233

Critical infrastructure risks 236

Awareness of risks to critical infrastructure 236

How critical infrastructure risks are mitigated 239

Critical infrastructure coordination 240

Improving coordination between critical infrastructure operators 240

Improving coordination between government and critical infrastructure operators 242

Summary

9.1 Essential services are relied on by each and every individual, household and community for meeting basic, everyday needs. The provision of essential services is especially critical before, during and after a natural disaster – when people are at their most vulnerable. Despite this, we heard that disruptions to essential services were a common occurrence during the 2019-2020 bushfire season for many regional communities in disaster-affected areas. These disruptions, among other difficulties, meant that people could not access information on the threat posed by the fires, purchase essential goods due to either supply chain issues or the inability to use EFTPOS, or contact friends or family.

9.2 At best, these difficulties add to the stress of an already stressful situation, and at worst, they place the lives and safety of individuals, households and communities at risk. The impact of these difficulties merits consideration of the ways in which risks to essential services and their supporting infrastructure are identified and addressed.

9.3 On supply chains, we heard three key considerations for understanding and assessing supply chain risks: do we have enough essential goods to respond and recover; can we get essential goods to the people who need them in a timely and equitable manner; and are we able to rely on international supply chains for essential goods and, if not, do we have the ability to manufacture those goods in Australia.

9.4 Unclear messaging and interrupted supply chains cause frustration and distress, as it is not always possible to provide essential goods to affected communities. As such, the viability of alternative options should be considered, including the ability to scale up domestic production of essential goods, where appropriate, or to source enough supply to meet requirements if domestic production is not possible.

9.5 There is also scope for more to be done to improve the identification, and mitigation, of natural disaster risks to electricity and telecommunications critical infrastructure assets. We heard that awareness of natural disaster risks to specific assets (such as powerlines and telecommunications mobile towers) varies between government and sectors, as do the actions taken to mitigate these risks. Given that electricity and telecommunications are highly interconnected, a holistic understanding of risks and the mitigations applied is required to prevent outages and facilitate the rapid restoration of services.

9.6 We also heard that existing processes for facilitating coordination and information sharing between critical infrastructure operators and government are not necessarily working as effectively as they need to be, and that there are opportunities for improvements to be made.

The importance of essential services

9.7 Essential services are the systems that we rely on for our everyday needs. They include, but are not limited to, electricity, communications, water and transport.

9.8 Essential services are especially important in the lead-up to, during and after a natural disaster. For example, electricity and telecommunications outages can prevent communities from receiving timely information, advice or warnings about the threat posed by nearby fires. They can prevent communities from making informed decisions about how best to ensure their own safety, or the safety of those in their care (eg when to evacuate).[1] They can limit contact between friends and family members in fire-affected regions. Disruptions to essential services during the 2019-2020 bushfires brought about all of these.

9.9 Supply chains, being the distribution of essential goods and services across the country, are critically important to our economy.[2] Working supply chains deliver petrol to service stations, fresh food to supermarket shelves, household waste to landfill and essential pharmaceuticals to hospitals.[3] In a natural disaster, the continuity, or rapid restoration, of supply chains is vital to the response and recovery phases.

9.10 Communities cannot receive essential services without the underlying critical infrastructure. Critical infrastructure refers to the physical assets (eg power lines, water pumps, roads, mobile telecommunications towers, sub-stations etc) that are relied upon to deliver essential services.

The impact of natural disasters on essential services

9.11 A disruption to one essential service can trigger failures in dependent services (see Figure 35).[4] For example, a damaged powerline can cause a power outage to a mobile telecommunications tower, which can then cause an outage in mobile telecommunications coverage.

9.12 Natural disasters can interrupt transport routes. During the 2019-2020 bushfires, some firefighting assets could not be transported between communities due to fires and road closures,[6] which had a direct impact on the emergency response. Road closures also impeded the ability for communities to evacuate during the bushfires and disrupted the transportation of essential goods, such as food, across the country – impacting relief and recovery efforts.

> The road closures had consequences for other sectors as it made it difficult to resupply towns with water, food, fuel and medical supplies[5]

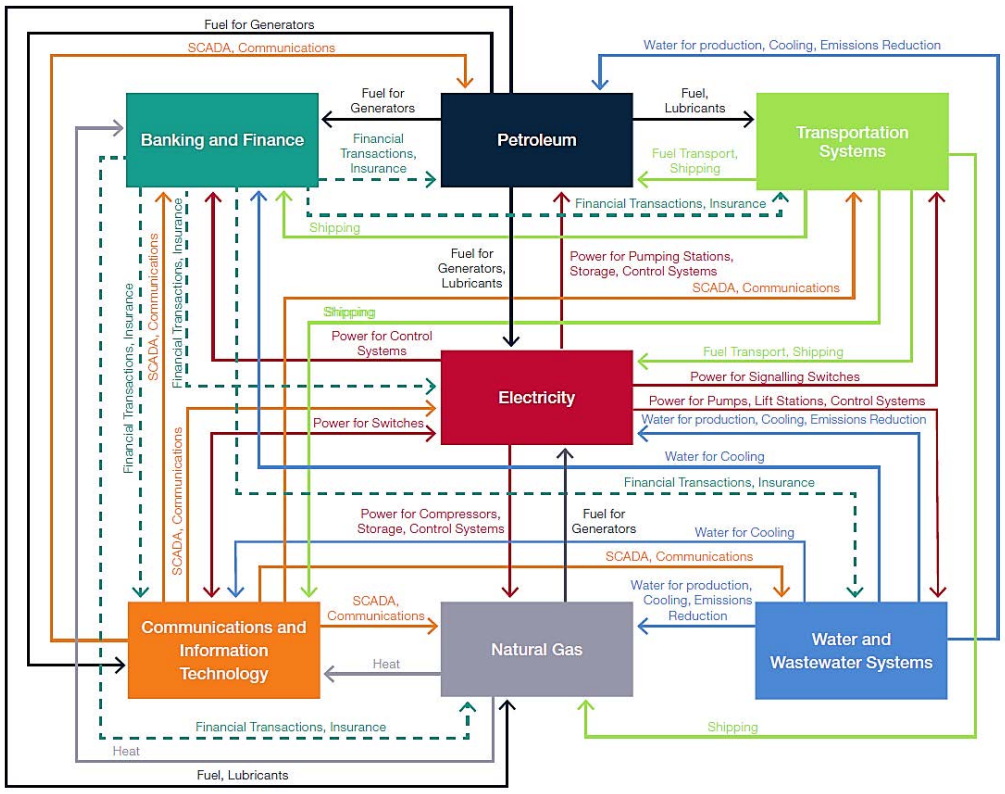


Figure 35: Example of interdependencies[7]

9.13 We heard of power and telecommunications outages affecting fuel service stations, ATMs and EFTPOS during the 2019-2020 bushfires. The lack of power, and consequential inability to access payment, prevented people from buying fuel to be able to follow evacuation orders issued by emergency services.[8] Power outages also prevented people from using EFTPOS to buy essential goods and ATMs to get cash. [9] These cascading failures caused significant difficulty for fire-affected communities:

> *Once the shops opened, they were cash only, as there was no communications and for some, no power. A lot of people did not have cash. We fortunately had a little, and were able to lend some to our neighbours. We met people who were begging or trying to do small jobs for cash, just so they could buy food … No banks were open, nor were any ATM operational so getting cash through this route was not possible.*[10]

9.14 We also heard from those who experienced essential service outages during the 2019-2020 bushfires how these outages prevented them from accessing emergency information in the lead-up to and during the disaster:

> *When the internet and power failed we had no means of communicating with the outside world, [nor] could we receive information on the status of the fires … There was scant information available on the commercial station and the information was, at times, frivolous and not relevant to our specific area.*[11]

9.15 Essential service outages also had a distressing impact on those located in disaster affected regions, particularly in preventing people from contacting friends and family:

My husband went missing on New Year's Eve while on a work shift. I didn't hear from him for 24 hours as we both lost reception and the radio even went out as well. [In] my last contact with him [he] was telling me that he could see flames up ahead … I was so scared that he had been caught by the fire and that I might not ever see him again.[12]

9.16 In addition, outages of essential services impacted the ability of governments to coordinate and respond to the bushfires. For example, the Snowy Valleys Council indicated that outages in telecommunications resulting from power outages cut-off its ability to contact the southern part of its local government area, preventing it from understanding the difficulties they were facing and the support needed.[13] These outages also affected government agencies in other ways, such as requiring them to rely on backup generators to ensure communications equipment remained operational during the bushfires,[14] preventing coordination efforts by emergency operations centres,[15] and preventing firefighting crews from being able to obtain fuel from petrol stations.[16]

9.17 The electricity transmission network, an interconnected system that runs from northern Australia to Tasmania, including SA is 'oblivious to the State borders'.[17] We heard that during the 2019-2020 bushfire season, the interconnectors between eastern states were threatened and it was reported that they 'may fail', which would have affected power supplies locally and nationally.[18] A transmission grid separation between NSW and Victoria did occur on 4 January 2020,[19] which we heard was remedied 'fairly quickly'.[20]

The causes of outages during the 2019-2020 bushfires

9.18 Although the 2019-2020 bushfires affected a wide range of critical infrastructure assets and essential services, the impacts of power and telecommunications outages – and the dependencies these cascading failures highlight – were the subject of many public submissions to us.

> When disasters occur…there can be multiple failures, or failures of multiple assets, leading to cascading impacts, as impact in one aspect of life, sector or service flows on to others.[21]

9.19 Australia's electricity network 'has a large number of very long lines which are expensive to maintain and vulnerable to natural hazards'.[22] Power outages were a widespread cause of cascading failures during the 2019-2020 bushfires. We heard that during the 2019-2020 bushfire season, more than 280,000 customers from various energy providers experienced a bushfire-related power outage at some point.[23] These outages were largely attributed to fire damaging more than 10,000 power poles[24] and thousands of kilometres of powerlines, including those located underground.[25]

9.20 These power outages caused significant disruptions to telecommunications services. The Australian Communications and Media Authority's review into the impacts of the 2019-2020 bushfires on the telecommunications network found that, of 888 telecommunication outages observed between December 2019 and January 2020, 779 – or 88% – were caused by mains power outages.[26] In comparison, fire damage accounted for only one per cent of telecommunications outages.[27] The remaining

11% of outages were caused by a variety of other factors (eg damage to an upstream facility in the telecommunications provider's network). Telecommunications providers including Telstra, Optus, NBN Co, and Vodafone confirmed that telecommunications outages were predominantly caused by mains power failures.[28]

Shared responsibilities

9.21 Resilience to natural disasters, including with respect to critical infrastructure and essential services, is a shared responsibility. Governments, critical infrastructure operators and individuals and communities all have a role to play in understanding the risks of disruptions to critical infrastructure, ensuring that others are aware of these risks as appropriate, and managing the consequences of outages.

9.22 All levels of government — Australian, state and territory and local — have responsibilities for building critical infrastructure resilience:

- Local governments are well placed to identify critical infrastructure on which their communities rely – whether this be an important transport corridor, an electricity substation or a mobile telecommunications tower.[29] Local government's role requires working with others, such as adjoining local governments, local emergency services, government agencies and critical infrastructure operators to identify and mitigate critical infrastructure risks.[30] They also have a role in educating communities to ensure they are aware of the risks of essential service disruptions, and how these risks can be managed.[31]
- State and territory governments have an important role in setting legal and regulatory requirements for critical infrastructure and coordinating resilience measures across their jurisdictions.[32] State and territory governments may also have ownership of critical infrastructure operators (such as Essential Energy in NSW). They are also responsible for managing the emergency response to natural disasters, which involves (among other responsibilities) facilitating operational coordination with critical infrastructure operators and emergency service agencies.
- The Australian Government regulates critical infrastructure operators in the telecommunications sectors though the Australian Communications and Media Authority,[33] and in substantial parts of the electricity and gas sectors through the Australian Energy Regulator.[34] The Australian Government also has an important role in protecting critical infrastructure from national security risks.[35]

9.23 Critical infrastructure operators have responsibility for the day-to-day management of their infrastructure assets and networks, including continued supply of the service and restoring service following outages. Part of this responsibility involves identifying and assessing risks to their assets and networks, and taking appropriate action to mitigate these risks.[36] This includes ensuring others are aware of these risks, such as government and dependent infrastructure. Critical infrastructure operators can be subject to legal, regulatory and business requirements that prescribe minimum service levels or standards.[37]

9.24 In addition, critical infrastructure operators can be owned privately, publicly, or through a mixture (eg public-private partnerships). This means that operators may also have responsibilities to their shareholders, in addition to consumers and governments.

9.25 Individuals and communities have a responsibility to understand that natural disasters can lead to disruptions, and prepare for those circumstances. They should access information made available to them by governments as to the risks to which they are exposed, understand how these risks could affect their situation and their households and, where necessary or appropriate, mitigate those risks and be prepared to manage any consequences.

9.26 We should not expect critical infrastructure to be completely resistant to damage, or for essential services to be immune to disruption. Individuals and communities should be aware that they may lose power, water and electricity (including information-technology services) and may be unable to access essential goods such as food at critical moments.

Supply chains risks

9.27 When understanding and assessing risks in supply chains during a natural disaster, we heard three key considerations:[38]

- do we have enough essential goods to respond and recover?
- can we get essential goods to the people who need them in a timely and equitable manner?
- are we able to rely on international supply chains for essential goods, and if not do we have the ability to manufacture those goods in Australia?

9.28 These three considerations must form part of routine planning and preparation processes for communities, businesses and governments. Awareness of, and planning for, interruptions to supply chains can assist to avoid or reduce the impacts of some of the interruptions that we heard of over the 2019-2020 bushfires.

The National Freight and Supply Chain Strategy

9.29 Government and industry recognise that national freight and supply chains are a shared national priority.[39] From that recognition flows the need to consider and implement measures that build natural disaster resilience.

9.30 On 22 November 2019, Australian, state and territory governments, under the auspices of the Transport and Infrastructure Council, endorsed the arrangements presented by each jurisdiction to implement a National Freight and Supply Chain Strategy (Strategy) and associated National Action Plan.[40] These plans provide an opportunity for Australian jurisdictions to address freight and supply chain vulnerabilities associated with, among other things, natural disasters.[41]

9.31 The Strategy sets an agenda for coordinated and planned government and industry action across all freight modes, with the intention of achieving:

- improved efficiency and international competitiveness
- safe, secure and sustainable operations
- a fit for purpose regulatory environment
- innovative solutions to meet freight demand
- a skilled and adaptable workforce, and
- an informed understanding and acceptance of freight operations.[42]

Availability of essential goods

9.32 We received many submissions from the public, and evidence from government organisations, describing the difficulties in obtaining essential goods during the 2019-2020 bushfires.

9.33 The fact that the bushfires occurred during the holiday season exacerbated the strain on the supply of local goods and services. The Bega Valley Shire Council noted that during the peak of the bushfire emergency, the Shire had over 70,000 tourists, and a number of evacuees from East Gippsland, requiring assistance.[43] The influx of additional people to small communities over the holiday period stretched community resources. Understanding the demands on community resources and the impact on the availability of essential goods must take into account seasonal or tourist, in addition to resident, populations. See Chapter 12: Evacuation planning and shelters for further discussion.

9.34 We heard that a domestic stockpile or reserve capacity of essential community resources may be necessary to ensure supply during disasters.[44] The domestic stockpile of relief supplies could include blankets, sanitary items including soap or nappies,[45] food, fuel and generators.[46] This stockpile could operate similarly to the National Medical Stockpile[47] which was called upon during the bushfires.

9.35 A national stockpile could complement the presence or establishment of localised stockpiles, such as community or regional caches.[48] These stockpiles could be useful to provide immediate disaster relief and allow time for additional resources to arrive when roads can be opened to heavy vehicles, or when airdrops are possible. Disaster relief can take time as key transport routes may not go near, or are required to detour around, disaster impacted regions.[49]

9.36 However, the development and management of facilities to hold localised supply caches are likely to be costly. There may also be significant wastage if the caches are not used within defined periods.

9.37 Additionally, personal responsibility should be acknowledged. In northern Australia, where riverine flooding and cyclones may isolate towns and cities for significant periods of time, it is not unusual for residents to have a 14 day stockpile of essential goods such as dry food, clean water, sanitary items, fuel for generators and batteries for radios and torches, which can be used until supply chains are restored.[50]

9.38 **Supply chain risks should be communicated to communities and individuals to enable them to better prepare for natural disasters.**

Recommendation 9.1 Supply chains – government review

Australian, state and territory governments, in consultation with local governments and the private sector, should review supply chain risks, and consider options to ensure supply of essential goods in times of natural disasters.

Reliance on international supply chains for essential resources

9.39 Natural disaster events can also strain supply chains for various essential goods[51] such as Australia's aerial firefighting retardant supply – a key resource for our emergency services.

9.40 The demand on retardant was heightened in the 2019-2020 bushfire season because many states and territories were fighting bushfires at the same time. Australia is currently reliant on a single supplier from the United States of America for aerial firefighting retardant,[52] and generally only procures enough for a standard bushfire season. Emergency Management Australia secured additional aerial firefighting retardant over the summer to ensure that national stocks were maintained.[53]

9.41 Some suggested that Australia should consider the domestic manufacturing of essential resources, specifically aerial firefighting retardant.[54] Domestic manufacturing would mitigate risk in the supply chain to ensure that Australia has access to the essential resources when they are needed most. We heard that, due to the compounding disruptions caused by COVID-19, supply chains will 'take a long time to recover and the impact on global manufacturing remains to be seen'.[55]

9.42 **Governments should ensure that Australia's procurement plans match, or can accommodate, anticipated requirements.** If these cannot be met, consideration should be given to domestic manufacturing.

Transport corridors

Opening transport corridors after natural disasters

9.43 Supply chains are directly affected by the ability to open road and rail corridors in disaster affected regions. Roads may be closed due to debris, or other unsafe conditions, including damaged or destroyed infrastructure, signs, guide posts and guard rails, or the transport corridors being made unsafe.

9.44 For example, the NSW State Government stated that, due to the 2019-2020 bushfires, 24 local government bridges were damaged and 39 were destroyed, 880kms of state roads were repaired, 2,000 signs and 30kms of guardrail were replaced, and an estimated $77 million was needed to restore rail corridors.[56]

9.45 Clearing debris and restoring transport corridors is a resource and time intensive task, often requiring large sections of roads to be closed[57] and specialists, including arborists and engineers, to be engaged. Transport routes are especially important as the majority of goods are moved around Australia by heavy vehicles.[58] As such, the time taken to restore roads to safe conditions can further disrupt supply chains.

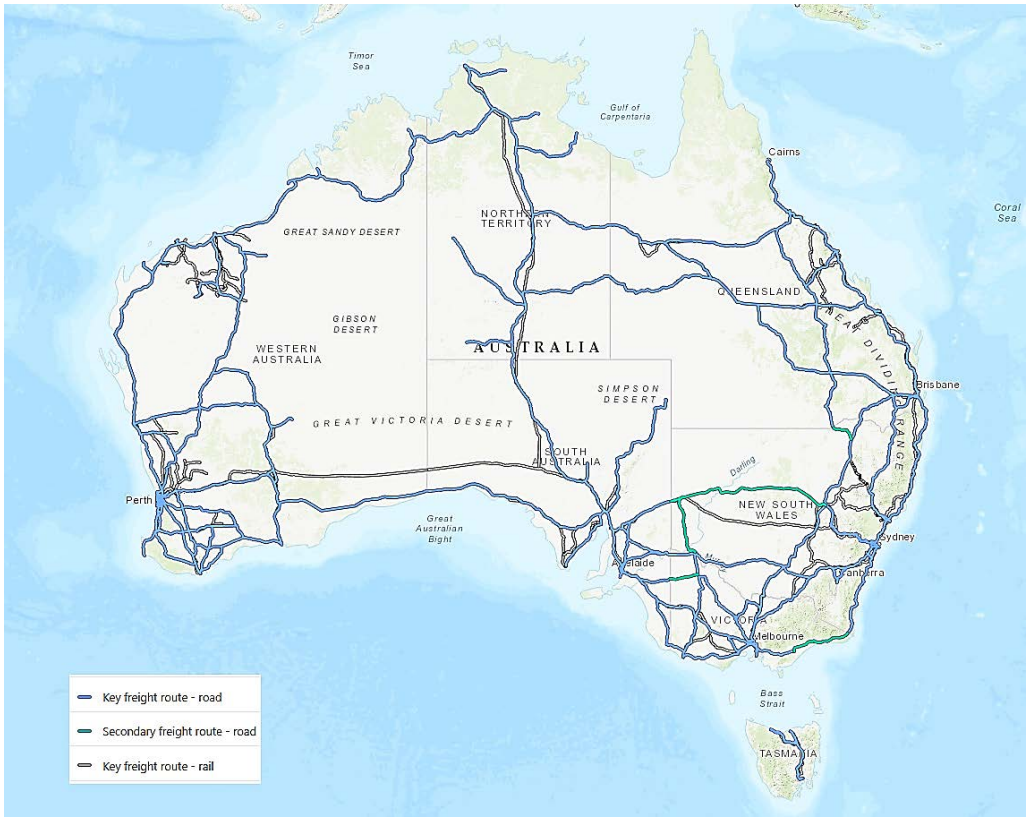


Figure 36: Australia's national freight (road and rail) routes[59]

9.46 We heard that, in NSW during the 2019-2020 bushfires, multiple alternative critical supply routes were lost at the same time.[60] We also heard that some jurisdictions do not have alternate supply routes. The NT told us that it does not have redundant supply chain routes and that to provide alternative road transport routes would be very costly. 70% of the road network is unsealed with restricted access for up to six months of the year during the wet season.[61] Communities therefore generally ensure that sufficient supplies are available.

9.47 Freight routes can encompass road, rail, air and sea routes. While 85%[62] of freight in Australia is transported on roads, some communities are entirely reliant on other methods including air and sea routes. **States and territories should ensure that each community is served by at least one freight route that is resilient to natural disasters.**

Inconsistent information – lack of nationally available data

9.48 We heard that information on road closures can often be difficult to find, or require users to access and reconcile multiple sources of information. Information provided may not be current, may stop at borders, or may not be comprehensive.

> In order to gain information you essentially set up your own intelligence network.[63]

9.49 For example, the NSW Inquiry into the 2019-2020 Bushfires noted that state managed road closures are made public through the *Live Traffic NSW* app. The app, however, does not include information on the closure of council-managed roads.[64]

9.50 With local roads comprising 75% of Australia's road network,[65] should an evacuation route move through multiple local government areas or states, assessing accessibility would require review of the app and multiple websites.[66] Similarly, we heard that, in other states and territories, road closure information was primarily provided on state-controlled roads, although in some instances, information provided by local governments was included during an event.[67]

9.51 Representatives from transport associations expressed their frustration that official information about road closures did not extend across state and territory borders.[68] State and territory information tended to stop at state and territory borders.[69] Further, different symbols or information may be presented differently on either side of the border.[70]

9.52 During the 2019-2020 bushfires, Transport for NSW and Queensland Transport and Main Roads collaborated to ensure that consistent information was available across borders.[71] We heard that NSW has upgraded or will shortly upgrade its website and mobiles apps to include cross-border information from Queensland, SA, ACT and Victoria.[72] We also heard that the Northern Rivers Regional Organisation has developed the *MyRoadinfo* website which includes road closure information from *NSW LiveTraffic*, *Qld Traffic*, and *Vic Roads* as well as local road information.[73]

9.53 Difficulties were experienced by some states in ensuring that information was coordinated with third party apps including *Google Maps*, *Apple Maps*, and *Waze*. For example, information on the third party apps was different to the information provided by states and territories, creating confusion for users.[74] We heard that manual work-arounds were used and that steps were, or are being, taken in NSW to improve data integration with third party apps in some states and territories.[75]

> Having consistent data is very important but then providing that to various platforms in a consistent way I think is the really critical solution in the future. So it shouldn't matter whether a user is on that individual State-based app or on a proprietary third party app, that they've got the same information.[76]

9.54 The Victorian IGEM stated that Victorian users found that their traffic app did not initially provide enough information to determine whether they were able to access a road. While the app was later updated, a 'significant amount of frustration' with inconsistent messaging was experienced by residents of disaster impacted regions.[77] However, the Department of Transport was subsequently able to adjust the app provide greater clarity of messaging.[78]

9.55 We heard that due to the inconsistency of public information, transport associations in WA, southern Australia and the industry peak body initiated contact with governments and emergency management organisations, but felt that there was no 'real engagement' on transport difficulties.[79] The South Australian Road Transport Association submitted that this was in 'stark contrast'[80] to the practice and crisis response procedures of previous emergencies, when it was embedded in the Crisis Coordination Centre.

9.56 We heard some state transport departments did take some steps to engage with and support the freight sector during natural disasters.[81]

9.57 While some states and territories advised that they already provide freight organisations with information on road closures, Queensland stated that providing information to freight organisations would be an 'unnecessary burden' as they already make this information publicly available.[82]

9.58 We also heard that road closures had significant impacts on freight and supply chains. During the peak fire events in the northern parts of NSW, the five main transport routes were closed simultaneously, forcing drivers on a 600kms detour, in some cases costing more than the value of the freight contract.[84]

> If a road is closed unexpectedly, there are very few facilities in remote and regional Australia that would allow a road train to turn around or detour.[83]

9.59 Additionally some detours were not appropriate for heavy vehicles due to the width or shape of the roads.[85] While options for alternative routes during natural disasters may be few, whether the route can support heavy vehicles should be considered before the direction to use a particular route is issued.

9.60 **Real-time and national information on road closures can assist freight operators to plan transport routes in-line with industry regulations and to ensure the safety and wellbeing of drivers.**

Recommendation 9.2 Comprehensive information

State and territory governments should include road closure and opening information on all roads within their borders on public apps.

Recommendation 9.3 Provision of information

State and territory governments should provide information to the public on the closure and opening of roads. Information should be provided in real-time, or in advance based on predictions, where possible.

Critical infrastructure risks

Awareness of risks to critical infrastructure

9.61 Given the interdependency of critical infrastructure, awareness of natural disaster risks needs to be understood and shared across dependent services. We have seen that different operators have varying degrees of awareness about the risks to which their assets, and those on which they depend, are exposed. We have also seen that different operators assess risks in different ways, which may be at odds with community expectations.

9.62 By way of example, telecommunications providers acknowledge their dependence on electricity for continuity of service. In understanding and undertaking risk assessments, telecommunications providers appear to focus on the impacts to overall volumes of customers (eg per cent of total traffic disrupted) and on core networks, rather than on the impacts or duration of outages to specific communities, individuals or dependent services.[86] Consumers, however, told us that they expect telecommunications providers to understand and mitigate the specific impacts of service outages, particularly extended outages, on those relying on their services. This indicates that telecommunications providers' assessment of risks may not be aligned with consumer expectations and that there is scope for telecommunications providers to review, amend and communicate their risk processes accordingly.

9.63 Energy providers appeared to us to have good awareness of the risks to their networks and the risks electricity outages pose for others, including on dependent services, communities and individuals. Factors considered by energy providers in assessing risk include not only the number of customers affected, but also particular characteristics of customers impacted (eg those relying on life support), the duration of outages (even for small volumes of customers[88]), the isolation of the area, weather and vegetation near infrastructure assets.[89] Risk assessment processes by energy providers also appear reasonably sophisticated, with many energy providers adopting light detection and ranging technologies (LiDAR) to map and manage vegetation around infrastructure assets, for example. They acknowledged, however, that awareness of outages to specific sections of electricity grids (eg specific households) could be improved, such as by allowing energy providers to access data through smart meters.[90] They also identified that their awareness of who owns dependent infrastructure assets could be improved.[91]

> In many areas, the lack of electricity also meant no mobile phone coverage, no water, no petrol and no access to credit facilities to pay for basics. Assessing and reconnecting electricity following a bushfire is critical to supporting an ongoing effective response.[87]

9.64 The Australian Government maintains a register of critical infrastructure assets for national security purposes. The Australian Government, however, does not maintain a register of assets requiring priority protection from natural disasters,[92] nor does it currently undertake risk assessments of critical infrastructure in relation to natural disasters.[93]

9.65 The Australian Energy Market Operator has a national coordinating function as it relates to the National Electricity Market (NEM).[94] It conducts an annual 'summer readiness program' for the NEM, involving:[95]

- working to minimise planned outages and mitigate unplanned outage or fuel supply risks
- continuing operational improvement to better forecast and manage increased uncertainty related to supply, demand and reserve levels
- contingency planning with governments, generators, Transmission Network Service Providers and others to identify relevant summer risk scenarios,

briefings and emergency exercises to test contingency plans, communication processes, and decision-making at all levels, and

- collaboration and communications across government and industry, and identifying opportunities to improve communication with businesses and households around supply risks.

9.66 State and territory governments appear to have a broad awareness of the critical infrastructure important to the state or territory (such as Victoria maintaining its own register of critical infrastructure assets),[96] but this information is not necessarily used or analysed for emergency planning purposes. We heard from local governments, for instance, that critical infrastructure assets were not necessarily identified in emergency plans,[97] were detailed at a very high-level,[98] or where they were identified, the importance of the asset was unknown.[99] As one local government described:

> *We weren't fully aware of the importance of [a] telecommunications facility. It became quite evident when … somebody found out that it was actually a strategic location for the Defence Department, and [that] changed the ball game for us. It changed the way we responded to that event because, although we knew it was critical infrastructure, it was very, very critical infrastructure.*[100]

9.67 **Awareness of critical infrastructure assets and their importance is vital to informing preparedness and response efforts.** The lack of this information means state and territory governments may not be able to make informed decisions on which assets require priority protection or restoration during a natural disaster. Further, information sharing between all levels of government on critical infrastructure assets may not always occur.[102]

> All mobile sites need to be mapped and locations provided to the authorities so that asset protection efforts can be concentrated in the right areas. During a bushfire, the authorities concentrate on protecting people's homes and buildings. If the mobile sites were considered amongst these 'important assets', efforts could be coordinated to provide protection – for example, fire retardant could be dropped around these areas in advance of the fire.[101]

9.68 The Australian Government should facilitate the identification and assessment of risks in advance of a natural disaster**,** given its existing role in identifying sensitive infrastructure assets and in mapping infrastructure interdependencies and vulnerabilities through the Critical Infrastructure Program for Modelling and Analysis.[103] This could involve the Australian Government leading a process, with contributions from state and territory governments and critical infrastructure operators, to determine key risks to critical infrastructure from severe or catastrophic natural disasters. This information could then be shared with governments and critical infrastructure operators to enable effective planning for and mitigation of risks, and inform response priorities.

How critical infrastructure risks are mitigated

9.69 The actions undertaken by critical infrastructure operators to mitigate risks can depend on a variety of factors. These include risk appetite and commercial considerations, such as volumes of customers affected, the level of market competition and the cost of the mitigation relative to the anticipated benefit. The cost of mitigating risks can also have implications for customers, such as by increasing the cost of services.

9.70 We heard that before, during and after the 2019-2020 bushfires, critical infrastructure operators undertook a range of actions to mitigate risks including:

- deploying technologies and equipment to restore telecommunications outages for an affected community, such as Cells on Wheels (COWs), Mobile Exchanges on Wheels (MEOWs), and NBN Road Muster Trucks[104]
- deploying equipment to maintain an electricity supply during outages, such as diesel generators or battery backups to provide power to a remote community and critical infrastructure assets during an outage[105]
- clearing vegetation[106] and dropping fire retardant[107] around infrastructure assets, and
- replacing timber power poles with concrete poles as they are less-flammable.[108]

9.71 Throughout the course of our inquiry, we also explored a range of additional actions that could be taken to mitigate natural disaster risks to critical infrastructure assets, including:

- strategic hazard modelling to inform infrastructure locations to minimise exposure to hazards, and to establish the optimal time to replace or relocate infrastructure in hazard prone areas[109]
- placing infrastructure (eg powerlines and telecommunications cables) underground to reduce exposure to natural disasters[110]
- conversion of core telecommunications networks into distributed cloud networks[111]
- stand-alone power systems, and
- extending the duration of battery backups for telecommunications infrastructure.[112]

9.72 On shifting infrastructure assets underground, it was noted that this is not always possible due to the terrain,[113] is significantly more expensive, and that, in any event, underground infrastructure may still be susceptible to damage from fires or flooding.[114] Energy providers agreed that stand-alone power systems would increase network resilience and reduce the exposure of energy infrastructure assets, and therefore communities, to power outages,[115] but the Australian Energy Market Commission assessed that uptake of these solutions would likely be relatively small.[116]

9.73 Telecommunications providers told us that extended battery backup is costly and would not necessarily prevent outages where the disaster lasts for weeks (such as the 2019-2020 bushfires).[117] Nevertheless, greater resilience in backup power for disaster-prone areas merits greater consideration. There may also be opportunities in permanently deployed solar powered/hybrid generators and enhanced satellite services to increase community resilience.[118]

9.74 While we acknowledge the actions of critical infrastructure operators to mitigate natural disaster risks, particularly those in the energy sector, the extent of service outages during the 2019-2020 bushfire season indicates that there are opportunities for improving the resilience of critical infrastructure to natural disasters. The Australian Government's $37.1 million investment towards enhancing telecommunications resilience in disaster prone areas, announced on 12 May 2020, is a positive step forward in this regard.[119]

9.75 Critical infrastructure resilience to natural disasters is a shared responsibility. Critical infrastructure operators have a leading role in managing and maintaining their infrastructure assets and networks.

9.76 **Critical infrastructure operators need to continue working with stakeholders, such as government and other dependent infrastructure operators, in identifying natural disaster risks and ensuring that others are aware of and able to mitigate these risks.**

Recommendation 9.4 Collective awareness and mitigation of risks to critical infrastructure

The Australian Government, working with state and territory governments and critical infrastructure operators, should lead a process to:

(1) identify critical infrastructure

(2) assess key risks to identified critical infrastructure from natural disasters of national scale or consequence

(3) identify steps needed to mitigate these risks

(4) identify steps to make the critical infrastructure more resilient, and

(5) track achievement against an agreed plan.

Critical infrastructure coordination

Improving coordination between critical infrastructure operators

9.77 Due to the potential for cascading failures, critical infrastructure operators need to coordinate to respond to natural disasters. Information sharing, both before and during natural disasters, is essential to understand the impacts on networks, including the length of an outage.

9.78 We heard of challenges faced by some critical infrastructure operators in obtaining relevant information across sectors during the 2019-2020 bushfire season. Telecommunications providers told us that coordination with energy providers was

variable. Telecommunications providers reported that they relied on publicly accessible information to ascertain power status, restoration priorities and timeframes in the absence of more formal mechanisms. They also told us that they often did not have prior warning of plans by energy providers to de-energise or re-energise the electricity grid.[120]

9.79 Telecommunications providers reported that their inability to readily access this information significantly affected their ability to predict and manage disruptions to their networks, as they could only respond, rather than proactively prepare, for power outages. The lack of warning of power outages meant telecommunications providers were unable to predict the need to deploy resources (eg backup diesel generators and other temporary equipment to restore services) to communities most at risk.[122] Further, telecommunications providers found it difficult to determine if backup measures in place (eg battery backups) would endure the length of outages, and if other measures were required to increase power redundancy.[123]

> Telstra must respond reactively to events such as the loss of mains power. Apart from the potential for duplicated or unnecessary effort, such as refuelling generators, or transporting and connecting a generator at a site just as power resumes, it can also put Telstra staff at risk attempting to reach sites or may occupy emergency service organisations unnecessarily in providing escorts into affected areas.[121]

9.80 Energy providers, on the other hand, reported difficulty in identifying which telecommunications providers owned which assets – which prevented them from contacting and warning the appropriate telecommunications provider in advance when de-energising the grid.[124]

9.81 We heard that the peak bodies of both industry sectors, being the Communications Alliance and Energy Networks Australia, through a working group chaired by NBN Co, are currently developing guidelines aimed at improving information sharing and coordination arrangements during disasters, and we encourage them, and their members, in this effort.[125]

9.82 Governments have led a range of mechanisms to facilitate information sharing between critical infrastructure operators. One such mechanism is the Trusted Information Sharing Network (TISN), managed by the Department of Home Affairs. The aim of the TISN is to facilitate engagement between various sectors on improving critical infrastructure resilience in an all-hazards context. We heard that the TISN has supported information sharing on natural disaster preparedness,[127] but has been less helpful in facilitating information sharing during incidents[128] and that participation in the TISN is voluntary.

> I didn't feel that the coordination through TISN was really adding a lot of value, certainly for something of this scale.[126]

9.83 The need for improvement to the TISN is acknowledged by the Department of Home Affairs, with it stating 'the experience of the 2019-2020 bushfire season and COVID-19 has demonstrated that we need to do more to build close partnerships

with industry and to connect them with the information and capabilities of the Australian Government'.[129] We note that the Department of Home Affairs is currently updating the TISN,[130] and as part of this process we encourage it to consider how the TISN could better facilitate operational coordination between critical infrastructure operators during large-scale natural disasters.

9.84 Emergency operations centres at the local, regional and state levels can also facilitate information sharing between critical infrastructure operators during a natural disaster response. Energy providers told us that emergency operations centres play a vital role in facilitating information flows not only with government during an emergency response, but also with other critical infrastructure operators.[132] During the 2019-2020 bushfire season however, key critical infrastructure operators (particularly telecommunications providers) were not included in some emergency operations centres.[133] This lack of representation prevented or limited opportunities for critical infrastructure to share information between each other, and with emergency managers.

> In my experience with Endeavour Energy, we didn't have the representation from the [telecommunications providers] in the local emergency operations centres, and that made it very difficult, particularly in those early days.[131]

9.85 There are opportunities to improve existing mechanisms for facilitating information sharing between critical infrastructure operators. While existing information sharing mechanisms used by critical infrastructure operators are valuable in a specific context or role, these mechanisms appear to have limitations and are not adequately facilitating the prevention of outages or rapid restoration of services during and in the aftermath of natural disasters. **It is vital that mechanisms are in place to facilitate seamless coordination between critical infrastructure operators before, during and after a natural disaster.** This could include, for instance, better ensuring relevant representatives from relevant sectors are co-located in emergency operations centres.

Improving coordination between government and critical infrastructure operators

9.86 We heard positive accounts of mechanisms for information sharing between government and critical infrastructure operators during emergencies – such as a model employed by the NSW Telecommunications Authority. Those mechanisms appear however, to be one way, with service providers providing information but receiving limited information in return. There is scope for improvement in this regard.

Effectiveness of existing mechanisms during the 2019-2020 bushfires

9.87 Emergency operations centres facilitate the flow of information between government and critical infrastructure operators during the response to a natural disaster. We heard that some, but not all, telecommunications providers were invited to these centres. The lack of representation at these centres reportedly presented a number of difficulties for telecommunications providers – such as

limiting access to up-to-date information, limiting their ability to obtain permits to access infrastructure in fire-affected areas, and limiting their ability to share the location of infrastructure assets which required priority protection.[134]

9.88 More generally, telecommunications providers (including those represented in emergency operations centres) commented on the limited information sharing with government agencies. This includes receiving limited information on:

- the establishment of evacuation and recovery centres to inform service restoration priorities[135]
- when roads were open or closed, which was critical to deploying personnel to assess and repair damage to affected assets[136]
- fire spread predictions, to enable forward planning
- assistance available from the Australian Defence Force, and
- current points of contact within emergency services (and within other critical infrastructure operators).[137]

The NSW Telecommunications Authority

9.89 The telecommunications sector commended the NSW Telecommunications Authority and the model it employed in facilitating government-to-service provider interactions. During the 2019-2020 bushfires, the NSW Telecommunications Authority acted as the conduit of information between the telecommunications sector and the NSW Government's response. This enabled key information, such as infrastructure locations and dependencies, evacuation centre locations, and fire prediction maps to be shared effectively.[138]

9.90 The NSW Telecommunications Authority's model for facilitating coordination was also valued by operators such as Vodafone, which reported it did not have a presence in emergency management centres.[139] Although NSW and Victoria are the only jurisdictions with telecommunications authorities (with the Victorian authority having a different role from the NSW Telecommunications Authority during natural disasters), telecommunication providers suggested that the sector would benefit from the NSW' model being expanded to other states and territories.[140]

Interactions with the Australian Government

9.91 Telecommunications service outages are reported by telecommunications providers to the Department of Infrastructure, Transport, Regional Development and Communications using the Voluntary Major Service Disruption Protocol. Reported outages are then passed directly to the Crisis Coordination Centre, within Emergency Management Australia, in support of its function of promoting situational awareness across the Australia, state and territory governments and to reduce duplication.[141]

9.92 Despite this, we heard that, during the 2019-2020 bushfires, information on service outages shared by telecommunications providers with the Department of Infrastructure, Transport, Regional Development and Communications via the Voluntary Major Service Disruption Protocol was not always passed to the Crisis Coordination Centre. This resulted in the Crisis Coordination Centre providing

incomplete reports to other government agencies on the status of the telecommunications sector.[142] One telecommunications provider described information sharing arrangements with the Crisis Coordination Centre as 'one-way'. Vodafone told us that:

> *As a national organisation Vodafone is required to discuss operational arrangements with each State/Territory jurisdiction separately, in effect the Crisis Coordination Centre is no more than a Commonwealth information sorting centre as there is very little coordination activity done between industry sectors providing information or seeking assistance and State/Territory jurisdictions.*[143]

9.93 **The Crisis Coordination Centre informs Australian, state and territory government agencies and should receive and share essential service outage information.**

9.94 Two-way information flows between government and critical infrastructure operators benefit both parties. This includes enabling a greater awareness of road accessibility, fire prediction forecasts, the types of assistance available and the location and importance of critical infrastructure. The 2019-2020 bushfires highlighted some of the limitations of existing mechanisms that should support information sharing between government and critical infrastructure operators.

9.95 **Information flows should be streamlined and enable relevant stakeholders to rapidly identify and engage with one another during natural disasters. Any improvements to information flows should avoid duplication with existing emergency management arrangements, where possible.** This could, for example, involve a single point of coordination across jurisdictions to streamline the provision of information.

Recommendation 9.5 Improving coordination arrangements between critical infrastructure sectors and with government

The Australian Government should work with state and territory governments and critical infrastructure operators to improve information flows during and in response to natural disasters:

(1) between critical infrastructure operators, and

(2) between critical infrastructure operators and government.

Chapter 10 Community education

Summary 246

Learning to survive natural disasters 247

Summary

10.1 Preparing for natural disasters is not the sole domain of governments and agencies. Individuals and communities also have an important role in ensuring that, if a disaster were to strike, they are prepared to manage the consequences.

10.2 While we heard that some individuals and communities were well prepared for the 2019-2020 bushfire season, this was not always the case. For other individuals and communities, although they did prepare, the intensity of the bushfires meant that no level of preparation would have been sufficient. For others, they were seemingly unprepared for what confronted them.

10.3 In encouraging individual and community preparedness for natural disasters, governments have a critically important role in providing information on disaster risks via community education and engagement programs. These education and engagement programs are key to informing and empowering individuals and communities, and they should be fit for purpose – accounting for changing risk profiles and community demographics.

10.4 We encourage efforts by governments to deliver, evaluate, and improve these programs, to ensure that individuals and communities are resilient to natural disasters.

Learning to survive natural disasters

10.5 Increasingly, Australians are living in areas at risk of natural disasters. Individuals and communities, particularly those in high-risk areas, have a responsibility to be prepared for natural disasters. For individuals and communities, planning and preparing for a natural disaster can minimise injury and damage to property or possessions while reducing harm and trauma. Most importantly, it can be the difference between life and death.

10.6 Although governments have a role in communicating and mitigating disaster risks, their ability to protect individuals and communities during a natural disaster is limited. Fire and emergency services only have finite resources, which means that individuals, particularly in natural disaster prone areas, need to plan and act on the basis that help might not arrive during a disaster.[2] Clearly, the risks to which an individual or community is exposed will depend on their circumstances and location. For example, exposure to risk might be increased for someone who is a 'vulnerable person' or for someone who lives in a flood or bushfire-prone area. Individuals and communities, if given the right information about the risks to which they are exposed, have the opportunity to act and take meaningful action to prepare for natural disasters.

> In significant emergencies and disasters, emergency management personnel do not, and never will, have the capability and capacity to solve the emergency threat for every individual at risk.[1]

10.7 Experiences of the 2019-2020 bushfire season, as well as experiences of other natural disasters, illustrate a continuing need to promote and encourage disaster-resilient communities. A disaster-resilient community, according to the National Strategy for Disaster Resilience, is one where people in that community have (among other elements):

- an awareness of the hazards and risks that affect them in their local area, including an awareness of who is most vulnerable, and understand what actions they need to take in order to prepare for and mitigate these risks
- taken action to anticipate disasters and protect themselves, their assets, their livelihoods and their possessions, and to commit the necessary resources to organise themselves before, during and after a disaster, and
- an understanding of the mechanisms and processes through which recovery assistance may be made available.[3]

10.8 Community education and engagement programs have an important role in educating and engaging communities. Governments, emergency service agencies and non-government organisations must continue to extend and use these programs to encourage disaster resilience within their communities and to provide accessible, accurate and authoritative information. This empowers people at all levels to become more self-reliant and better prepared.

> People were thinking that having a garden hose and two buckets [meant being] prepared. We need to educate people on what being prepared is.[4]

Box 10.1 Community preparedness for the 2019-2020 bushfires

We heard that during the 2019-2020 bushfire season, there were varying degrees of preparedness by individuals and communities in bushfire-prone areas.

Some were prepared in advance and were well aware of the risks they were exposed to:

- *[As the fires approached] we both had an inkling of hope that everything we had done would pay off; and it did – we still do have our house … [but] it was not a miracle that saved us – it was something we had worked hard for over many years, and on that day we believe chance favoured us because we were prepared.*[5]
- *…I've always been very fire conscious … it probably led to a passion to make sure we were fire safe [and had] fire safety plans in place … we have a generator and we have solar … making sure you've always got a water system that can saturate the place … even to having some loaves of bread and sandwiches in the freezer in case.*[6]
- *We prepared our property as best we could and prepared a bushfire emergency kit which we used during the bushfire event. The information provided by the [Country Fire Authority] leaflet and our actions meant that we were physically quite well prepared … I feel that the information leaflet was essential to our ability to survive the fire and psychologically prepare.*[7]

Others indicated that they had taken steps to be prepared, but the intensity of the 2019-2020 bushfire season meant that neither their level of preparation, nor indeed any level of preparation, would have been enough:

- *We had a cement house, a fire plan, had both previously been in the RFS, had no curtains in windows, a cement floor, no gardens against the house, paddocks of dirt with no grass or understory due to the drought… We were still not prepared enough*.[8]
- *Our Aged Services providers were well prepared with experienced and professional staff, and excellent evacuation plans in place. However, the extent of the fires, with associated road closures, often thwarted carefully thought-out plans and led to decisions having to be made 'on the ground'*.[9]
- *We have a big tank above the house. We turned the tap on when we drove away to hopefully just moisten the ground a little, it seemed to work and we were just lucky; that's all it was. [There's] just nothing you can do with a fire like that … if it hits [at] the right time and the right pace.*[10]

Others told us that they considered that their community was not prepared for the 2019-2020 bushfire season or was complacent about the risks.

10.9 All state and territory governments and their emergency service agencies already deliver a range of education programs. These programs target different groups, such as schools, local governments, and homeowners. For example, the Queensland Reconstruction Authority delivers the 'Get Ready Queensland' program – a year-round, all-hazards resilience building initiative to support communities to prepare for natural disasters.[11] The WA Government, as part of its bushfire awareness campaign, provides an online platform, 'Fire Chat', to support community preparedness for bushfires.[12] In NSW, the 'Get Ready' program provides local governments with free tools and resources to help them prepare their communities for natural disasters.[13]

10.10 To be effective, education and engagement programs should provide information that:

- ensures that individuals and communities, including children, are aware of the specific hazards and natural disaster risks to which they are exposed and understand the importance of being prepared
- develops awareness of local, regional and state emergency plans
- reinforces the responsibilities that individuals have (particularly those in high-risk environments) and reminds them of the importance of being prepared for natural disasters
- encourages individuals and communities to develop natural disaster survival plans, and ensures that they are aware of evacuation routes and the location of evacuation or relief centres
- ensures that individuals and communities understand that vital services, such as electricity and telecommunications (including internet-based services), might be disrupted and unavailable during a natural disaster
- encourages individuals and communities to ensure that they have adequate emergency supplies (such as water, food, a radio and batteries) to withstand essential service outages
- ensures that individuals and communities, especially those near a state or territory boundary, understand the meaning of emergency warnings and know where to find information during an emergency, and
- is in digital and non-digital formats, as well as in a range of languages that meet accessibility requirements.

10.11 We heard concerns from Tasmania that '[n]ot all emergency services organisations are adequately resourced to fully meet this community development expectation'.[14] We also heard from the ACT that '[a]ll education programs must use consistent language to ensure no confusion for communities that operate across borders'.[15]



Figure 37: Example of educational material supporting disaster preparedness[16]

10.12 A number of other inquiries have made recommendations on community education and engagement programs for natural disasters, including the 2009 Victorian Bushfires Royal Commission, the 2020 NSW Bushfire Inquiry and the Independent Review into SA's 2019-2020 Bushfire Season.[17] Continuing recommendations for improvements suggests there are opportunities to refine existing community education and engagement programs.

10.13 Education is key to informing and empowering communities. **Education and engagement programs should account for changing risk profiles and community demographics to ensure that they are fit for purpose and support individual and community resilience to natural disasters**. Programs must have all of the information people need to make informed decisions.

Recommendation 10.1 Disaster education for individuals and communities

State and territory governments should continue to deliver, evaluate and improve education and engagement programs aimed at promoting disaster resilience for individuals and communities.

Chapter 11 Emergency planning

Summary 253

A collective, collaborative approach to natural disaster planning 253

Local government disaster management capabilities 257

Summary

11.1 Proactive planning for natural disasters enables risks to be identified and addressed ahead of time across the social, built, economic and natural environments. Planning ahead ensures that the division of roles and responsibilities before, during and after a natural disaster are agreed in advance, supporting effective preparations for, responses to, and recovery from natural disasters. Due to its central role across preparation, response and recovery, emergency planning underpins many other issues explored in our report – from evacuation planning to wildlife management.

11.2 To be effective, emergency planning requires a collective and collaborative approach. Key stakeholders with potentially important roles and capabilities in response and recovery efforts – such as primary health providers, wildlife organisations and telecommunications service providers – are not always included in emergency planning processes. Consideration is required as to whether additional stakeholders should be included in appropriate emergency planning processes at all levels of government to draw on the full breadth of expertise, capabilities and resources to prepare us for increasingly frequent and intense natural disasters into the future.

11.3 State governments need to understand and be accountable for the capacity and capability of their local governments in order to ensure that they are able to perform their role in disaster management in their local areas. Part of planning ahead for an emergency is ensuring that persons or bodies which have been allocated disaster management responsibilities by state or territory governments, such as local governments, have the necessary capacity and capability to discharge those responsibilities effectively. Some local governments experienced significant difficulty in fulfilling their responsibilities during the 2019-2020 bushfire season.

A collective, collaborative approach to natural disaster planning

11.4 Planning is an essential element of being prepared for and responding to natural disasters. To be effective, that planning needs to address a wide range of factors and involve all levels of government, private sector entities, non-government organisations, communities and individuals.

11.5 Specifically, emergency planning must identify natural disaster risks and their possible consequences across the social, built, economic and natural environments. It must also address arrangements (including the division of roles and responsibilities) for preventing, preparing for, responding to and recovering from natural disasters, ensuring that they are agreed and established.[1]

11.6 Emergency planning informs prevention and preparedness activity across a wide range of areas. Emergency planning can be undertaken, for example, to identify evacuation routes and sheltering facilities, set emergency response coordination arrangements, flag information needs and sources, plan for recovery and establish available resources and other supports. Emergency planning also has a role in facilitating continuous improvement, and should be informed by ongoing monitoring

and review. Through these elements, emergency planning can reduce the impact and consequences of natural disasters and increase resilience.[2]

11.7 Planning requires a collective, collaborative effort.[3] As highlighted by the Australian Institute for Disaster Resilience 'Emergency Planning' Handbook:

> *The interconnectedness of systems in society causes cascading consequences in emergencies. Effectively managing risks therefore requires all sectors of society to plan for emergencies.*[4]

11.8 At the national level, the Australian Government plans for emergencies that are severe or catastrophic in nature, particularly where these emergencies can overwhelm a state's or territory's capability and capacity. Relevant national plans include the National Catastrophic Natural Disaster Plan (NATCATDISPLAN) and the Australian Government Disaster Response Plan (COMDISPLAN). We discuss these further in Chapter 3: National coordination arrangements.

11.9 State and territory governments undertake emergency planning to prepare for, respond to and recover from natural disasters in their respective jurisdictions. Each state and territory maintains emergency management and natural disasters plans at a jurisdictional, regional and local level, and systems for developing, reviewing and implementing those plans.

11.10 Although each state and territory has different arrangements, emergency planning is typically undertaken by emergency management committees (known as disaster management groups in Queensland). Some are supported by sub-committees or working groups, which may be responsible for developing plans on specific aspects (such as on particular hazards or on relief and recovery arrangements). Emergency management committees may also work across state borders to address shared risks, as is the case with the City of Gold Coast Local Disaster Management Group in Queensland and the Tweed / Byron Shire Local Emergency Management Committee in NSW (see Box 11.1).

11.11 Emergency management committees facilitate a consultative approach to emergency planning. They include input and expertise from a range of stakeholders representing various sectors. Membership of emergency management committees at the regional and local levels is typically outlined in state legislation. In general, the following are prescribed as members of relevant committees:

- representatives of government (eg members or employees of local governments, or from government service delivery organisations)
- representatives of emergency service organisations (eg police, fire, ambulance or search and rescue)
- representatives from other emergency management committees (eg a regional emergency management committee comprising of the chair of local emergency management committees within the region), and/or
- others involved in emergency management arrangements, such as those appointed to coordinate or control the response to, or recovery from, an emergency.

Box 11.1 Planning for natural disasters across borders

The City of Gold Coast in South East Queensland, and the Tweed and Byron Shire Councils in north-east NSW, are located in close geographic proximity to one another. A natural disaster affecting one local government (for example, flooding or a cyclone) can affect others in the surrounding region.

In recognition of this shared risk, the City of Gold Coast Local Disaster Management Group and the Tweed / Byron Emergency Management Committee worked in partnership across the Queensland/NSW border to develop a 'Cross Border Sub-Plan'.[5]

This plan aims to minimise challenges facing cross border communities and acknowledges differences in emergency management arrangements, command and control structures, language and communication channels. The plan enhances cross border coordination in preparing for, responding to and recovering from natural disasters between the two states.[6]

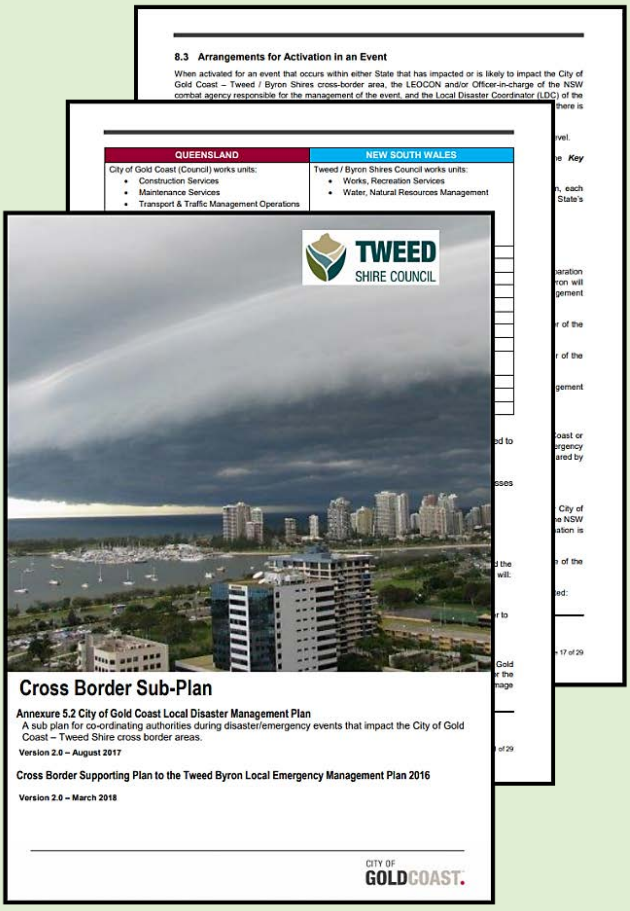


Figure 38 Cross Border Sub-Plan[7]

11.12 Emergency management committees generally have the ability to include representatives from other fields as needed, depending on, for example, local needs, contexts and other factors. Other functional areas that may be, but are not necessarily always, included in emergency management committees include:

- public health and mental health services
- energy infrastructure (eg electricity and gas)
- telecommunications services
- building and engineering services
- civil society organisations, such as charities and other non-government organisations (eg the Australian Red Cross)
- public information services
- transport services, and
- agriculture, primary production and wildlife management.

11.13 We heard from those representing non-government organisations that they see opportunities for greater inclusion and integration of these functional areas in emergency planning processes.[8] Most notably, this includes the functional areas of primary healthcare, wildlife management and telecommunications services – with each field representing capabilities relevant to preparing for, responding to, and recovering from natural disasters.

11.14 We heard that the involvement of primary healthcare providers in emergency planning processes was ad hoc and varied between local areas and jurisdictions[9] – which, in some situations, meant assistance from local general practitioners was unable to be accepted in some evacuation centres.[10] For wildlife management, we heard integration of wildlife organisations in emergency planning processes varies, with some being integrated into emergency planning in some jurisdictions (for example, in SA), but not elsewhere.[11] For telecommunications services, we heard from some providers that they were not always included in emergency planning processes, which meant that they could not contribute to disaster recovery and emergency plans and lacked information on, for example, the locations of evacuation and recovery centres during the 2019-2020 bushfires.[12]

11.15 We also heard suggestions that others with different capabilities need to be involved, or should have a greater role, in emergency planning. Some of these suggestions include architects, Indigenous organisations, neighbourhood houses, education authorities and schools, private land managers, peak volunteering bodies, insurance representatives, private aviation operators, and other charities not currently included in emergency planning (such as those involved with vulnerable groups), among others.[13]

11.16 Including a broader range of participants with various capabilities and expertise, at appropriate times in the planning process, can contribute to more holistic emergency planning. However, care is also required to ensure that emergency planning processes remain focused on core objectives, and involve participants who will provide necessary and complementary capabilities, skills and expertise. States and

territories (including their local governments) are best placed to determine which stakeholders need to be involved in their emergency planning processes and what capabilities they require, which may vary between jurisdictions. Stakeholders' views may inform that consideration, but ought not to be determinative.

11.17 **Australian, state, territory and local governments should include stakeholders with relevant capabilities and expertise, at appropriate times, in emergency planning processes.**

Local government disaster management capabilities

11.18 As part of their disaster management roles, state and territory government responsibilities include providing and resourcing emergency service agencies, developing and delivering education material for their communities, undertaking risk assessment and mitigating these risks, and ensuring warning systems are in place, among others.[14]

11.19 State and territory governments[15] delegate some responsibilities for disaster planning and recovery to local governments.[16]

11.20 Delegation is reflected in state and territory legislation and emergency management plans. This delegation recognises the principle of subsidiarity and that a local government will, in general, have a more detailed understanding of its local community (eg on specific risks, vulnerabilities and locally available resources) than other levels of government.[17] They may also lead the delivery of community services during and after a natural disaster, such as through operating evacuation centres, relief centres and safe places. Local governments also have an awareness of their local infrastructure and generally have primary responsibility for restoring local community infrastructure after a disaster.

11.21 The responsibilities delegated to local governments that relate to natural disasters differ from jurisdiction to jurisdiction and may include:

- delivering public education and awareness programs to support preparedness at a community level
- contributing to and implementing bushfire risk management plans
- managing firebreaks and asset protection zones around key assets, including enforcing asset protection zones on private land
- working with local fire agencies to undertake hazard reduction activities, such as prescribed burning
- land use planning, including zoning and administering development assessment applications
- maintaining fire trails and vegetation management programs with emergency service agencies on land managed by the local government
- providing operational and administrative support to the local emergency management committee and evacuation centres during emergencies

- preparing recovery plans for the local community and coordinating recovery following a natural disaster.[18]

11.22 **The capability and capacity of local governments to fulfil the responsibilities delegated to them appear to depend on factors including their relative size, natural disaster risk profile, demographics and the resources available to them.**

11.23 We heard that local governments with large geographical footprints and high natural disaster risk profiles but fewer resources experienced particular difficulties during the 2019-2020 bushfires (see Box 11.2).

11.24 We heard concerns regarding the level of capacity of some councils to fulfil their responsibilities. The Indigo Shire Council, for example, told us:

> *…small rural shires do the best they can with what they've got, but in some cases it's not much … it's quite a challenge for small rural shires and a very unfair expectation of government and communities to expect shires the size of ours and Towong and Alpine and others where … most of these natural disasters take place, particularly bushfires … to take the full load of relief and recovery responsibilities*[19]

11.25 Some jurisdictions have reviewed the capacity and capability of local governments to perform their responsibilities in preparing for, responding to, and recovering from disasters. The conduct and scope of such projects varies considerably. We were directed to reviews that had been conducted by a state itself,[20] by a local government association with support from the state and the Australian Government,[21] by an Inspector-General of Emergency Management[22] and by a State Emergency Management Committee on the basis of voluntary self-assessments.[23] Two such projects are described in Box 11.3.

11.26 Other states indicated they have not conducted a specific review of the capacity and capability of local governments as Victoria had, and indicated no intention to do so,[24] but referred to programs implemented to strengthen the capacity or capability of local government.[25]

11.27 An assessment or review of the capacity and capability of local governments may assist to identify deficiencies in local governments' ability to perform their role in relation to natural disaster management. This, in turn, may assist to redress any deficiencies and strengthen the capabilities of local government.

11.28 Where the capability or capacity of local governments to manage a disaster in their area is strained, local governments often coordinate and share resources with other local governments. We heard of a number of arrangements for resource sharing between local governments that were used during the 2019-2020 bushfires. In some circumstances, these were informal and ad hoc.[26] Others were based on pre-existing arrangements, facilitated for example by regional joint organisations or local government associations.

Box 11.2 Comparison of local government resourcing for disaster management

Example 1: Moreton Bay Regional Council, Queensland

The Moreton Bay Regional Council spans approximately 2,037 square kilometres, with 1,495 full-time equivalent staff as at 30 June 2019.[27] As with many other local governments across Australia, the Moreton Bay Regional Council experienced bushfires during the 2019-2020 bushfire season.

In managing disasters, we heard that the Moreton Bay Regional Council operates an emergency management department comprising of three teams, being the disaster management team, the fire management team and the public safety team – with some staff being permanently dedicated to these roles[28]. The Council also has a dedicated fire management capability, with 40 staff trained to support this function, 18 vehicles and 'numerous' water tanks and water carts.[29]

Example 2: Towong Shire Council, Victoria

The Towong Shire Council, in contrast, spans 6,673 square kilometres – more than three times the geographic size of the Moreton Bay Regional Council (refer to Figure 39) – but with just 76 full-time equivalent employees.[30] Towong also experienced bushfires during the 2019-2020 bushfire season, with 43% of its area reportedly being burnt.[31] Unsurprisingly, this placed significant strain on Towong.

We heard that staff of the council were required to undertake emergency management roles on top of their normal functions.[32] The council's resources were stretched to their limit during the season by managing the disaster and the council's business-as-usual activities, with the resources reportedly being 'effectively exhausted' within 72 hours.[33] With 22% of the council's staff members also reportedly impacted personally by the bushfires, this presented significant challenges for Towong performing its relief, recovery and coordination functions.[34]

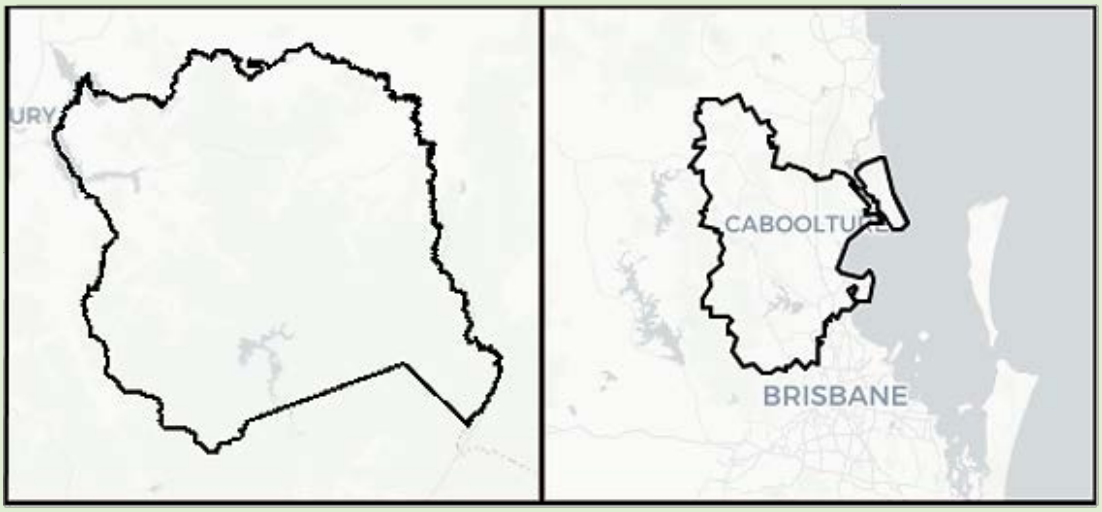


Figure 39: Side by side comparison of Towong Shire Council (left) and Moreton Bay Regional Council (right)[35]

Box 11.3 Reviews of the capacity and capability of local government

Victoria

Victoria is engaging in a multi-year 'Councils and Emergencies Project' that aims to enhance the capability and capacity of councils to meet their emergency management obligations. Phase 1 clarified and confirmed the emergency management responsibilities and activities of councils. Phase 2 aimed to understand councils' emergency management capability and capacity, based on the needs and risk profile of each municipality. All councils undertook a self-assessment.

The December 2019 *Councils and Emergencies Capability and Capacity Evaluation Report*[36] identified areas for improvement, and common challenges. It stated 'The most common reason councils identified for not achieving their target maturity was that they lack the capacity to undertake the required range of emergency management responsibilities'.[37] In Phase 3, councils, state government agencies and emergency management organisations will be engaged to develop strategies and action plans to address the areas for improvement. We have been told by Victoria that it is intended that Phase 3 will be completed by the end of June 2021.[38]

Queensland

The Queensland Emergency Risk Management Framework (QERMF) *Risk Management Process* provides the capability for local governments to assess resources available for disaster management.[39] That includes a review of the disaster risk profile of the local government area or district by the Hazard and Risk Unit within QFES, and an 'action plan' provided to the local or district disaster management group. The risk assessment process enables local governments to identify and take steps to rectify deficiencies in their resources. If rectification is not possible at the local government level due to a lack of capacity, funding or resources, the QERMF classifies this as a 'residual risk' which can be escalated to the district level for further evaluation and additional support if necessary.

The Queensland Inspector-General of Emergency Management (IGEM) also conducts reviews of district and local disaster management capability, through reviewing the self-assessments of local disaster management plans and reviewing district capability on an as-needs basis. We discuss the role of IGEMs further in Chapter 24: Assurance and accountability.

11.29 In Victoria for example, the Municipal Association of Victoria's *Protocol for Inter-Council Emergency Management Resource Sharing* provides an agreed process between local governments from across the state when sharing resources during emergencies.[40] Even with a resource sharing protocol in place, shortages of available resources still occurred during the 2019-2020 bushfires.[41]

11.30 In NSW, the City of Sydney, Office of Local Government, Resilience NSW and Local Government NSW established the Local Government Bushfire Recovery Support Group (LGBRSG) in November 2019. City of Sydney set up an online portal for other local governments to use – which we heard made making these requests an easy, timely and accessible process.[42] Through the LGBRSG, surrounding local governments were able to share personnel and resources to assist with their day-to-day business and on emergency-related tasks, such as assisting with recovery centres.[43] We heard that this was the first time this approach had been initiated in NSW and that the model may be considered in the future when necessary.[44]

11.31 The Local Government Association of Queensland coordinates the Council to Council Support Program.[45] This program is described as a 'streamlined method for providing assistance from one local government group to another within Queensland's disaster management arrangements', where requests for assistance may be lodged through the District Disaster Management Group. This assistance may be in the form of personnel, goods and/or services from local governments unaffected by the disaster.[46]

11.32 These examples highlight the reliance of local governments on the ability to access a 'surge capacity' during severe to catastrophic natural disasters. While the principle of subsidiarity suggests that 'risk should be managed by the lowest level of government that is capable of managing it', this does not suggest that local governments should have a self-contained capability to manage all disasters in their local area, nor have an understanding of the risks to adjoining local governments, or to the jurisdiction as a whole.

11.33 Given this, and the increasing natural disaster risk, it is important that resource sharing arrangements are adequate and sufficiently supported to provide surge capacity for local governments. While we heard that many resource sharing arrangements operate on a council-to-council basis, or are outsourced to local government associations, state and territory governments are ultimately accountable for managing disasters within their respective jurisdictions and need to ensure that the resource sharing arrangements are adequate, sufficiently supported and reflect all relevant risks facing that state or territory. We acknowledge that, in some jurisdictions, the local government associations are more formally integrated into emergency management (such as the Local Government Association of SA or the Local Government Association of Queensland), however, this does not absolve state and territory governments of their responsibilities.

11.34 The practice of state and territory governments delegating some of their responsibility for disaster preparedness, response and recovery to local governments is only effective if local governments are adequately resourced to meet those responsibilities. **As state and territory governments are ultimately accountable for managing natural disasters in their respective jurisdictions, they should be**

responsible for ensuring that their local governments are able to effectively discharge the responsibilities devolved to them.

11.35 Some states told us that they supported regular review of existing arrangements,[47] or already conducted regular reviews of the resource sharing arrangements between local governments.[48] WA on the other hand, stated that '[l]ocal governments should have the discretion to enter into any agreements as appropriate and relevant for their local context'.[49] A state or territory review of local government resource sharing arrangements does not exclude this. A review of arrangements (including agreements between councils) is consistent with the jurisdiction taking responsibility to ensure that arrangements are sufficient.

Recommendation 11.1 Responsibility for local government disaster management capability and capacity

State and territory governments should take responsibility for the capability and capacity of local governments to which they have delegated their responsibilities in preparing for, responding to, and recovering from natural disasters, to ensure local governments are able to effectively discharge the responsibilities devolved to them.

Recommendation 11.2 Resource sharing arrangements between local governments

State and territory governments should review their arrangements for sharing resources between their local governments during natural disasters, including whether those arrangements:

(1) provide sufficient surge capacity, and

(2) take into account all the risks that the state or territory may face during a natural disaster.

Chapter 12 Evacuation planning and shelters

Summary 264

Planning for evacuations 265

- Local involvement in planning 265
- Seasonal populations 266
- Evacuations and access routes 268
- Essential service outages and compounding events 271
- Inability to evacuate 272

Sheltering facilities 274

- Improving sheltering terminology 274
- Adequacy of evacuation centre facilities 277
- Planning for evacuations across boundaries 281

Evacuation messaging and education 283

Summary

12.1 Properly planning for evacuations is an important part of keeping communities safe from the harm caused by natural disasters. Planning for evacuations should occur early and involve local governments and communities. Evacuation planning should factor in key issues such as seasonal populations, evacuation routes, sheltering facilities, jurisdictional boundaries, messaging to communities and risks to safe evacuation. Evacuation plans should be regularly reviewed, where necessary, to ensure that they address all relevant issues.

12.2 The terminology used for, and functions of, the different sheltering facilities (such as evacuation centres and Neighbourhood Safer Places) during a natural disaster are not consistent across Australia. Inconsistency may cause confusion and risks to safety, particularly where community expectations of a sheltering facility do not align with the protection actually provided by that facility. The naming and designation of the various sheltering facilities should be made nationally consistent across jurisdictions, thereby minimising community confusion during an emergency, particularly for tourist populations.

12.3 Communities rely on evacuation and relief centres during natural disasters as safe places to avoid the effects of natural disasters. It is important, therefore, that these centres are selected and maintained appropriately to be able to accommodate those who seek short term shelter, sustenance and support.

Planning for evacuations

12.4 Planning for evacuations is one aspect of emergency planning which, if executed poorly, can create risks to people, communities and property, including bringing about life threatening circumstances. In some instances, evacuating an area in time could be the difference between life and death. For evacuations to be executed safely, they must be planned and those plans resourced, implemented and reviewed.[1]

12.5 Evacuation planning is led by different levels of government. In some jurisdictions, local governments and disaster management groups are primarily responsible for managing evacuations.[2] In other jurisdictions, management of evacuations is the responsibility of a state agency,[3] with local governments typically playing a supporting role.

12.6 The planning for evacuations is supported in all jurisdictions by evacuation planning and management guidelines, including guidelines developed by the Australian Red Cross for states and territories.[4]

12.7 We received evidence from a number of states and territories that the testing and review of evacuation plans occurs as part of the broader review or exercise of emergency management plans.[5] The timing of such reviews varied. Some state and territory governments acknowledge the importance of field and desktop exercises to evaluate evacuation plans and the operation of evacuation centres, and to test capability and functionality.[6]

12.8 Experiences during the 2019-2020 bushfire season demonstrated the importance of planning for evacuations. We have not investigated the adequacy or inadequacy of individual evacuation plans. However, themes raised in submissions, and in some instances in evidence, identified matters that those responsible for evacuation planning and related resources should take into account. It is important for those with responsibility for evacuation planning and related resources, including those responsible for developing guidance and assessment and evaluation of plans, to ensure that relevant factors are adequately incorporated. The factors considered below are not intended to be a comprehensive list of all matters to be considered in evacuation planning.

12.9 **Evacuation planning guidelines and evacuation plans should be regularly reviewed and incorporate lessons learned from significant evacuations nationally.**

Local involvement in planning

12.10 As with all disaster management, evacuation planning and implementation are shared responsibilities. In some circumstances, the responsibility to decide to evacuate, or seek shelter, falls on individuals, assisted by the warnings and information provided to them by governments.

12.11 Local governments have an important role in evacuation planning, often as part of their role in the local disaster planning committee or group. Planning for evacuations needs to consider local capacity and capability to manage the evacuation process.[7] This includes the sheltering facilities and community resources that are available,

managing evacuation routes, as well as identifying and communicating with vulnerable members of the community.[8]

12.12 Evacuations practically and necessarily involve more than one government agency. We heard of one example where, despite not having primary responsibility, local council officials conducted pre-evacuation door knocking and community meetings provided information on the location of Safer Places.[9] Non-government organisations also play a significant role in assisting during the immediate aftermath of a natural disaster, detailed in Chapter 21: Coordinating relief and recovery.

12.13 We heard that the planning of evacuation routes is assisted by local knowledge to understand not only the risks that could arise to the community in the face of a natural disaster, but also the knowledge of and availability of the routes themselves.[10] Local capabilities can also be utilised as a 'stop gap', to provide temporary support to the local community while awaiting assistance from state or, when requested, Australian government agencies.

Seasonal populations

12.14 Seasonal populations can make evacuations more challenging. Seasonal populations include tourists, seasonal workers, and other temporary visitors to an area. Visitors can be unfamiliar with local conditions and locations, limiting their awareness of the need to act,[11] what to do and where to go. Tourists, for example, can be unaware of local road closures,[12] alternative routes, and safe areas. This can, in turn, lead to an increased reliance on emergency services, in circumstances where they might be otherwise committed to immediate response.[13]

12.15 Evacuation planning guidelines in some states and territories require the consideration of transient populations, such as commuters and tourists. In others, evacuation plans are prepared on the basis of data that include seasonal population variation, or it is standard practice to take seasonal population into account. In Queensland, Local Disaster Management Groups that are impacted by seasonal population variations work with tourism bodies, such as Tourism Tropical North Queensland and the Working Tourist Safety Forum. In Tasmania, seasonal populations are considered and taken into account as a 'vulnerable population group'. In WA, any application for proposed land use that is classified as 'vulnerable development', including tourism land uses, is required to submit a Bushfire Emergency Evacuation Plan.

12.16 The presence of tourists placed additional pressure on the capacity of some communities to manage evacuations and evacuation centres.[14] The overlap between the bushfire season and the holiday period meant that the tourist populations in some bushfire-affected areas were high.[15] We heard that the presence of tourists increased the demand for food, fuel and other resources, which in some cases meant that these necessities were limited or quickly exhausted, to the frustration of some local communities.[16]



Figure 40: Beach evacuation at Lake Conjola, NSW[17]

> The peak tourist season coinciding with bushfires meant that people were stranded away from home for longer than expected. We have heard stories of interstate visitors being turned away from accessing services at evacuation centres.[18]

12.17 State and territory emergency services can find engaging tourists with messages about the danger and unpredictable nature of the fires challenging. Tourists are not always engaged with local news and other information channels. They are potentially unfamiliar with the geography of the local area and may misjudge the seriousness of the threat. This may be compounded by tourists deciding to travel to areas at risk, despite advice to the contrary.

12.18 Even where evacuation plans are in place, the last bushfire season shows room for improvement. The more detailed reviews by concurrent state and territory inquiries raised similar issues about the experience of seasonal populations in evacuations during the 2019-2020 bushfire season.[19] The Final Report of the NSW Bushfire Inquiry noted that the South Coast of NSW experiences a seasonal surge of tourism in the summer months and that local emergency management committees should be required to factor this into their planning.[20] Similarly, the Victorian Inspector-General of Emergency Management's inquiry into the 2019-2020 Victorian fire season recommended that Victoria Police – in collaboration with the community and the emergency management sector – review and enhance evacuation plans in light of the presence of tourists and non-residents, among other matters.[21]

12.19 **State and territory governments should be ready to stop people travelling into high-risk areas in the lead up to, and during, a disaster. Further training and exercising of evacuations could also improve evacuation planning to account for seasonal variations in population.**

Evacuations and access routes

12.20 It is important that the accessibility of evacuation routes is considered in planning, and that efforts are made to ensure these routes are resilient for the purposes of a natural disaster. These routes are important not just as a means to evacuate communities, but also to provide access to communities for first responders, for the purposes of recovery and to ensure continuity of supply chains during and after a disaster.

12.21 A key consideration in planning evacuations is identifying evacuation routes, including any impediments and alternatives in the event that primary routes become inaccessible. In a disaster, road closures can result from a range of causes, including flooding, proximity to a bushfire front and hazardous trees.

12.22 We heard that during the 2019-2020 bushfire season, the impact of the fires on the Princes Highway was of significant concern, given its role as a critical evacuation route for fire-threatened communities.[22] The Princes Highway is a major road in Australia, extending some 1,941 kilometres from Sydney to Adelaide via the coast through the states of NSW, Victoria and SA. The Princes Highway was closed for extended periods due to fire and falling trees,[23] with a different approach taken by road management agencies in different states.[24] This meant that movement in and out of many coastal communities was limited for both residents and emergency services. The closure of this major freight route also restricted the flow of essential resources in and out of some communities, including fuel and food.[25]

12.23 We also heard that a number of communities only had a single road that could be used as an evacuation route. In the event of an evacuation, those evacuating would be in danger if traffic could not freely move when threatened by fire. Similar risks will arise with single lane bridges, where movement will be easily restricted in the event of congestion. Indeed, we heard of a number of circumstances during the 2019-2020 bushfires where many in the community attempted to evacuate on the one accessible road at the same time. Further, self-evacuations – that is, where people evacuate an area prior to, or in the absence of an official warning to do so[26] – can lead to dangerous situations if a traffic jam occurs and evacuees have nowhere to shelter.[27]

12.24 The Australian Defence Force (ADF) played a vital role in assisting with the evacuation of some isolated communities during the 2019-2020 bushfires. Movement around some communities was 'seriously constrained' as a result of road closures from the fires,[28] with evacuations eventually having to be undertaken by sea and air. One local council noted that evacuation of those communities would not have been possible without ADF assistance.[29] Chapter 7: Role of the Australian Defence Force outlines in more detail the broader assistance that the ADF can provide to the community on request.

12.25 Possible evacuation by sea and air lends itself to exploring innovative evacuation routes that might not have been considered. In particular, further planning for high-risk communities – for example, those with a single evacuation route – could explore access to alternative routes, including waterways, integration with road and rail transport, or evacuation by sea and air.[30] In some communities in Australia, it

should be recognised that the only access is by air and water. This is not to suggest, however, that evacuation planning should rely on the availability of the ADF.

12.26 Considering evacuation routes in planning for construction of roads and communities when they can more easily be developed, would reduce the risk of isolating communities.[31]

12.27 Credible 'worst case' scenarios would assist in identifying whether alternative evacuation routes and plans should be developed. For example, evacuation routes through heavily wooded forest areas might not be accessible in a bushfire, or an evacuation route along an unsealed road might not be passable in flood conditions.[32] Determining suitable evacuation routes reduces the risk of placing communities in life threatening situations.[33]

12.28 Where alternative routes are not available, consideration should be given to the need to shelter in place and build more resilient sheltering facilities. The need for these facilities could also be identified through the use of 'worst case' scenarios in planning, to ensure sheltering facilities are appropriately resourced, fitted and protected in the event that evacuation routes become unusable.[34]

12.29 It is important that evacuation routes, including any alternative routes, are communicated to the community. The community should be notified of other ways to evacuate in the event that the main access route becomes unusable. These routes should also be appropriately reflected on emergency apps.

12.30 Beyond accessibility, it is essential that the resilience of evacuation routes is addressed in town and evacuation planning. This should include the identification of the risks to individual roads and road networks more broadly, and the development of strategies to mitigate those risks in the lead up to and during a natural disaster. One key risk to be considered is the capacity of local governments and communities to rapidly clear roads of trees and other debris. In the event that risks to evacuation routes cannot be appropriately mitigated, planning for evacuation routes should provide for appropriate sheltering facilities. These facilities should be properly prepared and able to be utilised where evacuation routes become inaccessible.

12.31 Some jurisdictions have taken steps to mitigate aspects of this risk. We heard that delivery of bushfire fuel management on the Queensland state-controlled road network is informed by the Roadside Bushfire Risk Assessment Model, which draws on QFES and CSIRO data to assess the consequence and likelihood, and overall bushfire risk on state-controlled roads.

12.32 **State, territory and local governments should consider the existence and condition of evacuation routes in evacuation planning, including for construction of roads and new communities.**

Access routes and roadside vegetation

12.33 A key risk to be mitigated in the context of natural disasters is roadside vegetation. In the aftermath of a natural hazard such as a bushfire, flood or storm it is not uncommon for vegetation debris to be present along roadsides. We heard that the ability to respond rapidly to clear this debris is critical to reopening roads.[35] The process of re-opening is resource intensive and potentially hazardous, often requiring

large sections of roads to be closed,[36] and long delays. We heard concerns from a number of communities about road closures and debris inhibiting evacuations during the 2019-2020 bushfires.[37]

12.34 Dense roadside vegetation can result in road closures on catastrophic fire days, with limited forewarning as to when these closures will happen and their likely duration. These road closures affect not just evacuations themselves, but also access to communities for the purposes of recovery – in some cases, for many weeks.

12.35 There are, of course, a number of matters to be considered in determining whether a road will qualify for vegetation clearing, including whether it is a supply or evacuation route, provides emergency service access, or is a main road.

12.36 Some local councils told us that their communities were severely impacted by road closures, and that effective roadside vegetation management could assist in preventing the restriction of these vital links by burning or falling trees in a future fire event.[38]

12.37 We heard some perceptions that there had been insufficient amounts of hazard reduction along roadsides in some areas.[39] For example, concerns were raised by Kangaroo Island Council that roadside corridors may act as 'wicks' for a fire.[40] We heard that some states and territories already have in place specific programs addressing roadside vegetation management issues and others are improving their existing plans and processes.[41] We discuss the need for continuing research in relation to land management in Chapter 23: National research and emerging technology.

12.38 Nonetheless, we heard of confusion within the community, and between responsible entities, about the breakdown of responsibilities for roadside vegetation management. We heard of arrangements where fire management agencies coordinate with managers and owners of roads, including local councils, to identify roads where they will undertake treatment. We also heard how such considerations are integrated into municipal fire management plans.[42]

12.39 We heard views that there are regulatory and legislative barriers to roadside vegetation management.[43] For example, Kangaroo Island Council in SA, as well as Corangamite Shire Council in Victoria, stated that legislative barriers hampered their hazard reduction efforts.[44] We heard from ForestrySA that 'at present, planning and approval requirements hinder the ability to use mechanical controls and prescribed burning to control woody weed species along roadsides.'[45] One council noted the complexities of working under two different local land service departments, each permitting different levels of management of roadside vegetation.[46]

12.40 The Final Report of the NSW Bushfire Inquiry recommended the establishment of a consistent framework for roadside vegetation management that 'analyses road priority, utility, amenity, strategic value and risk'.[47]

Recommendation 12.1 Roadside vegetation management

State and territory governments, working with local governments and fire and emergency service agencies, should ensure that there are appropriate arrangements for roadside vegetation management that take into account, among other things:

(1) priority access and egress routes

(2) road priority, utility and strategic value

(3) cost, and

(4) residual risk to national natural disasters.



Figure 41: Cars queueing to evacuate Batemans Bay, NSW[48]

Essential service outages and compounding events

12.41 It is important for evacuation planning to take into account the likelihood that there may be essential service outages during a natural disasters, such as communications or power.

12.42 This was acknowledged by the Final Report of the NSW Bushfire Inquiry, which recommended that the guidelines for identifying evacuation centres be updated to require a risk assessment of potential locations.[49] This should include identifying alternative power sources.

12.43 In Chapter 11: Emergency planning, we note that the increasing likelihood of compounding disasters necessitates a different outlook on emergency planning. For example, the COVID-19 pandemic brings a new perspective to evacuation planning. The pandemic has demonstrated that evacuation planning for disasters needs to consider how to manage the population in the context of concurrent emergencies. Such planning is underway in some areas, including how to comply with social distancing requirements.[50] For example, NSW developed a COVID-19 Supplement to

accompany its Evacuation Management Guidelines,[51] which acknowledges the new risks, and outlines controls to reduce the risk of contagion.

Inability to evacuate

12.44 Isolation, where a community is cut off from external access, must also be considered in planning, if only because evacuation may not always be the best or safest option, if it is an option at all. Communities need to prepare for this possibility, in particular those communities with 'one road in one road out'. Some groups require special consideration and arrangements to evacuate, including those in aged care facilities, people with families (particularly young children), and people with disabilities.

12.45 Chapter 9: Essential services illustrates some of the cascading failures that can occur where supply chains to communities are disrupted.

Recommendation 12.2 Evacuation planning – Evacuation routes and seasonal populations

State and territory governments should ensure that those responsible for evacuation planning periodically review those plans, and update them where appropriate, including in relation to:

(1) roles and responsibilities of state and territory governments, local governments and local communities

(2) education and signage about evacuations and evacuation routes, including education of seasonal populations

(3) the adequacy of evacuation routes; including contingencies if evacuation routes or centres are assessed as not being able to cope, and

(4) the potential inability to evacuate, either by reason of circumstances or personal characteristics.

Recommendation 12.3 Evacuation planning – Essential services and supplies

State and territory governments should ensure that those responsible for evacuation planning periodically review those plans, and update them where appropriate, including in relation to:

(1) key risks that essential service outages have on communities during a severe or catastrophic natural disaster (particularly communications and power)

(2) availability of essential supplies, including food and water, and

(3) consequence management and compounding events such as the loss of essential services or health impacts.

Box 12.1 Evacuation experiences during the 2019-2020 bushfires

Lake Conjola, NSW

Three people died and more than 130 homes were destroyed or damaged extensively when the Currowan fire reached Lake Conjola on New Years' Eve.[52] The community was isolated for eight days at the height of the crisis.[53] Around 5,000 visitors were in the area during the fires.

The evacuation was described in a submission as 'totally unplanned' and it was 'very lucky that there were not a lot more injuries, indeed deaths, occasioned during that evacuation'.[54] We also heard that evacuees did not use the designated safer place and evacuated to the beach, with the direct route going through the centre of a camping ground full of holiday-makers.[55]

Community members, of their own initiative, organised power boats and jet skis to go to Conjola Park and ferry people down to the beach. Once on the beach, no evacuation or other emergency support was available.

Mallacoota, Victoria

The evacuation of Mallacoota with the assistance of the ADF was one of the most significant evacuations during the 2019-2020 bushfire season. HMAS Choules and MV Sycamore assisted with the evacuation of more than 1,100 people from Mallacoota, including the elderly, children and pets. Some evacuees who required more immediate care were evacuated by aircraft, although their evacuation was at times impeded by visibility issues caused by smoke.[56] The presence of tourists in East Gippsland, and the decision of some to remain there despite warnings to the contrary, complicated evacuations in that area. East Gippsland Shire Council stated 'the decision by many visitors to stay resulted in an escalation of the provision of immediate relief to the Mallacoota community and ultimately to a significant evacuation approach that was only possible with the assistance of the Australian Defence Forces'.[57]

Kangaroo Island, South Australia

Kangaroo Island Council told us that evacuations were 'handled in an expert manner by all emergency services',[58] and that the ADF support provided during evacuations was appreciated.[59] However, Kangaroo Island Council submitted that there was some confusion among evacuees as to where they were meant to move to during an evacuation, including community confusion about the terms 'Bushfire Safer Place' and 'Bushfire Last Resort Refuge'. Kangaroo Island Council also identified the need for better signage around the Island directing people where to go during an evacuation.[60]

Sheltering facilities

12.46 Evacuation planning includes identifying appropriate sheltering facilities, including evacuation or relief centres. In addition to identifying sheltering facilities in planning, these facilities should be appropriately identified, maintained and sufficiently prepared for an emergency.

12.47 Responsibility for the identification and evaluation of sheltering facilities (such as evacuation or relief centres and Neighbourhood Safer Places) varies between jurisdictions, and differs depending on the sheltering facility. The responsibility may lie with the disaster management group or committee responsible for preparing the relevant disaster management plan,[61] local government,[62] or a government agency or department.[63] Responsibility for identifying, establishing and auditing Neighbourhood Safer Places rests with the relevant combat agency, the local council or relevant planning committee. Inspections and assessments of these facilities are typically conducted by the combat agency.[64] Responsibilities for evacuation centres in each of the states and territories is set out at Appendix 20: Responsibility for evacuation centres.

12.48 A number of sheltering facilities tend to be available to those evacuating in response to a natural disaster. Each of these provide different levels of protection, services and personnel.

Improving sheltering terminology

12.49 The terminology and features of sheltering facilities can differ across states and territories. Different terminology is used for the same type of facility. For example, a facility providing accommodation and other amenities to those evacuated in Victoria is called a relief centre; in NSW this same facility is typically called an evacuation centre. Table 6 captures the various labels that states and territories adopt.

12.50 The descriptions and functions of all the types of sheltering facilities available across Australia are, broadly, as follows:

- *Evacuation or relief centres* are locations at which people can seek accommodation and other amenities in a location not anticipated to be adversely affected by a bushfire or other natural disaster.[65] These centres are intended to house people who are unable to seek accommodation elsewhere and provide basic amenities.[66]
- *Neighbourhood Safer Places* can provide protection from the immediate life-threatening effects of a bushfire.[67] They are intended as places of last resort when a person's bushfire plan is no longer viable.[68] Locations used as safer places are often open-air spaces, such as parks or sports fields, but may also include community buildings such as halls.[69] Some jurisdictions do not have 'Neighbourhood Safer Places', but have similar facilities with similar terminology.[70] For example, the term 'Safer Place' is used instead in other jurisdictions.
- *Bushfire Safer Places* are used as a place for people to stay in or as a place of first resort for those who have decided that they will leave high risk locations early on a bad fire weather day.[71]

- *Bushfire Last Resort Refuges* are spaces or buildings that could be used as a last resort for individuals to go to and remain in during the passage of a bushfire through their neighbourhood. It is an area that provides a minimum level of protection from the immediate life threatening effects of radiant heat and direct flame contact in a bushfire.[72]
- An *emergency or cyclone shelter* is a public purpose-built building, usually constructed to meet a specific building standard, designed to be used during an emergency to shelter from its effects.[73] It is not intended to be long term accommodation. These buildings are commonly used in relation to cyclones.[74]
- A *place of refuge* is usually a building that will provide a level of protection from the effects of a cyclone as it passes, but has not been built or designed in accordance with the disaster-related standards or guidelines.[75]
- *Community Fire Refuges* are purpose-built or modified buildings that can provide protection from radiant heat and embers.[76] These facilities, like Neighbourhood Safer Places, are a last resort option when other plans have failed. They do not guarantee safety from a bushfire and cannot be relied upon as primary plan of action in a bushfire.[77]

Table 6: Use of sheltering terminology by states and territories

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Evacuation centre	✓	✓	✓	✓		✓		✓
Relief centre					✓		✓	
Neighbourhood Safer Place		✓		✓			✓	
Nearby Safer Place						✓		
Safer Place								✓
Place of Refuge				✓				
Community Fire Refuge							✓	
Emergency or cyclone shelter			✓	✓ Limited to public cyclone shelters				
Bushfire Safer Place					✓			
Bushfire Last Resort Refuge					✓			

12.51 In light of the differences in terminology for sheltering facilities between states and territories, understanding the differences in their functions can be challenging. Facilities that sound similar can perform entirely different functions. For example, a Bushfire Safer Place and Neighbourhood Safer Place use similar terminology but serve different purposes and provide different levels of protection.

12.52 State and territory governments already undertake public engagement and provide detailed information about the functions of each type of facility, including through websites. For example, NSW explained that the methods of communication included door knocking, media broadcasting, social media, local council websites, text messages, community meetings and emergency alerts.[78]

12.53 Despite this, we heard that people at risk appear to misunderstand the functions of each type of facility. We heard that individuals evacuated to sheltering facilities in the midst of the 2019-2020 bushfire season, appeared to misunderstand the functions of the facility. In some cases, evacuees thought that a Neighbourhood Safer Place could be used as an evacuation centre,[79] or that it would 'turn into' an evacuation centre if attended by enough people. We heard that people misunderstood the level of disaster protection that a facility can provide — for example, seeking shelter from an impending fire in facilities that were not fire proof.[80] Local governments suggested that individuals in their area were confused about the difference between sheltering facilities, with some suggesting that there was also confusion among emergency services personnel at times.[81]

12.54 One state conceded that similar misunderstandings had arisen in previous natural disasters.[82] Some local governments told us they were well aware of the misunderstanding and had previously undertaken local education campaigns to help to clarify the function of particular facilities.[83]

12.55 Concurrent and recent reviews also suggested that the community does not have a good understanding of differences in functions between each facility.[84] The Queensland IGEM 2017-2018 Cyclone Debbie Review in particular suggested that this lack of clarity extends beyond bushfires, and applies to other natural disasters.[85] Having regard to natural disasters more broadly, the Queensland IGEM 2017-2018 Cyclone Debbie Review identified the value in community education about sheltering facilities prior to disasters occurring, and that 'early community engagement about safer locations and what to expect in terms of services and facilities should form part of regular pre-season preparation'.[86]

12.56 We heard concerns from local governments that community confusion may arise from differences between sheltering terminology across borders.[87] We heard of confusion in other areas (most notably, emergency warnings) caused by differences in terminology across borders, and we are concerned that steps should to be taken to ensure that community confusion does not arise due to differences of terminology in the context of sheltering facilities.

National consistency in terminology

12.57 More consistent terminology nationally could reduce confusion, particularly among tourists and those in border communities. The main barriers to this process appear to be the costs and time required to change to consistent terms, and the difficulty of

jurisdictions agreeing on the national terminology. However, this process is necessary and must not take years.

12.58 There was strong support from the states and territories for nationally consistent terminology in relation to sheltering facilities. NSW observed that this has the potential to improve communication and understanding, inform an 'all hazards approach' and allow for a 'surge workforce' to support operations across jurisdictions.[88]

12.59 **Further education is needed to articulate the functions and limitations of different sheltering facilities. While such education is, in our view, needed even without a change in terminology to achieve national consistency, this provides an additional reason for governments to prioritise action to reach consensus quickly. Any change to the terminology of sheltering facilities for the purposes of national consistency would also require further community education.**

Recommendation 12.4 Sheltering terminology should be made nationally consistent

State and territory governments should, as a priority, adopt nationally consistent terminology and functions for the different sheltering facilities, including evacuation centres, Neighbourhood Safer Places, places of last resort and natural disaster shelters.

Recommendation 12.5 National community education

State and territory governments should provide further community education on the function and limitations of different sheltering facilities, including evacuation centres, Neighbourhood Safer Places, places of last resort and natural disaster shelters. This education should be nationally consistent.

Adequacy of evacuation centre facilities

12.60 Much of the information we received on the experience of evacuation centres came from public submissions. Evacuation centres need to be appropriately prepared and maintained for use in disasters, as some facilities identified for sheltering may not be appropriate for use during an emergency.[89] We have not investigated the adequacy or inadequacy of individual sheltering facilities. However, themes raised in submissions, and in some instances in evidence, identified matters that those responsible for evacuation planning and related resources should take into account.

Fitness for purpose of evacuation centres

12.61 We heard that evacuation centres were, at times, over capacity during the last bushfire season.[90] Some submissions told us that, at times, people slept on floors with limited to no bedding, and others slept in cars or other vehicles where accommodation inside the centre was not possible.[91]

12.62 Some evacuation centres appear to have experienced power and/or communications outages during the bushfires, and at times, may have also lacked sufficient storage for food and donated items.[92] Public submissions noted that bathroom and kitchen

amenities were not always equipped for the number of evacuees using the evacuation centre (especially where the centre was over capacity). Submissions also indicated that some centres experienced outbreaks of illness among evacuees.[93]

12.63 Additional or overflow evacuation centres were, in some instances, set up to cater for the large number of people evacuating. Other community facilities, typically Returned and Services Leagues clubs, life-saving clubs, golf clubs and gyms, were opened to accommodate overflow from designated evacuation centres.[94]

12.64 Some submissions pointed to impromptu facilities relying on the goodwill of local businesses for essential items – at times, at the expense of these businesses. While these actions were commendable, some concerns were raised in submissions about obligations and liabilities of those providing services in these overflow facilities that are not designated centres.[95] This leads to the need for better planning, identification and preparation of appropriate overflow facilities.

Vulnerable people in evacuation centres

12.65 **Evacuation centres must cater for all Australians**. Steps should be taken to ensure that they are able to accommodate vulnerable people.

12.66 Some submissions expressed concern that evacuation centres were not always appropriately equipped for people with disabilities, mobility issues or chronic health concerns.[96]

> Although there is a hospital less than 2kms from my house, there is no obstetric [doctor]. We would have been safe sheltering in our home but due to being 9 months pregnant I could not risk being cut off from the hospital 60kms away. As a result, my husband, 3 year old daughter, cat and dog had to evacuate for almost 2 weeks, and I gave birth to my son during our [e]vacuation. This put strain on finances and the mental health of our 3yo, who became traumatised during the fires.[97]

12.67 As set out in their terms of reference, the Royal Commission into Aged Care Quality and Safety has been tasked to inquire into, among other matters, the quality of aged care services provided to Australians, and the future challenges and opportunities for delivering accessible, affordable and high quality aged care services, including in remote, rural and regional Australia. Given the dedicated focus of the Royal Commission into Aged Care Quality and Safety, and the matters canvassed in their terms of reference, we referred the evidence we received relating to the evacuation of aged care facilities to that inquiry.

Box 12.2 Experience of the Corryong relief centre in Victoria during the 2019-2020 bushfires



Figure 42: Fires burning near Corryong[98]

On 31 December 2019, Victoria Police closed key road networks around Corryong and required people to evacuate to the relief centre. At the peak of activity, the relief centre provided refuge for an estimated 1,000 people, with over 600 people relocating there from a nearby music festival.

The sheer number of people and their vehicles created difficulties around the relief centre. Staffing at the centre was extremely limited, consisting of two council staff, two Red Cross volunteers and volunteers from the local community.

Telecommunications were severely impacted and there were no communication capabilities for an extended period. On 31 December 2019, power was cut to Corryong and despite sourcing a generator, the relief centre was not equipped to accommodate it. ATMs were not operating in the area. People needed cash to access fuel and food, and they turned to the relief centre for assistance.

Local volunteers, community organisations and businesses stepped up to provide food for people at the relief centre. On 1 January 2020, emergency services convoys allowed people to travel away from the area and this relieved the pressure on the relief centre.

On 2 January 2020, the number of people accommodated at the centre reduced to forty. Throughout its operation, the relief centre experienced a constant flow of people seeking information, support and company.[99]

12.68 Some submissions called for further consideration and planning for the health needs of pregnant women, infants and young children in evacuations and evacuation centres. We also heard of the need for appropriate designated spaces for children in evacuation centres.[100]

12.69 State and territory evacuation planning guidelines account for the consideration of vulnerable groups and persons in the community. For example, in Victoria, the Evacuations Guidelines include considerations for evacuating those on vulnerable persons lists and in vulnerable facilities.[101] The Final Report of the NSW Bushfire Inquiry considered the matter of vulnerable people during an evacuation, and recommended that evacuation centre protocols be developed or refreshed to specifically address the needs of vulnerable people.[102]

Animals in evacuation centres

12.70 Animals, both domestic pets and livestock, were often part of the evacuation process. Some submissions pointed to evacuation centres which were not able to accommodate animals.[103] Some people did not use evacuation facilities if doing so required them to leave their animals elsewhere, such as in outdoor smoke-affected areas.[104]



Figure 43: People evacuate to the beach with their animals at Malua Bay[105]

12.71 Clarence Valley Council has noted that a lesson from the last fire season is that evacuation centres 'need to cater for people and their animals, big and small'.[106] Submissions suggest that facilities that were prepared for or allowed animals, as well as those that had RSPCA or other animal welfare representatives available, were received positively by communities.[107]

12.72 In some states and territories, evacuation planning guidelines require or may provide guidance on the consideration of animals.[108] In others, local disaster management groups have their own policies about managing animals in evacuations.[109] The responsibility for management of animal welfare during evacuations – including companion animals, livestock and wildlife – often rests with separate functional areas or departments, such as primary industry or agricultural and animal services.[110] In

Victoria, the police ensure that councils have considered and provided for animals and livestock in their Municipal Emergency Management Plans.[111]

12.73 Some states and territories emphasised to us the individual responsibility of the owner for welfare and transport of animals.[112] In some states, we heard that evacuation or relief centres do not generally cater for animals other than service animals, although there may be outdoor areas available.[113] In other states, we heard that evacuation centres typically have capacity to include domestic pets in the facility or close by.[114]

12.74 The Final Report of NSW Bushfire Inquiry recommended, among other matters, that a process for animal registration at evacuation centres be developed, and that overflow sites for evacuated animals be identified.[115]

Recommendation 12.6 Evacuation planning – Evacuation centres

State and territory governments should ensure those responsible for evacuation planning periodically review these plans, and update them where appropriate, to account for the existence and standard of any evacuation centres and safer places (however described) in the community, including:

(1) the capacity of a centre to handle seasonal population variation

(2) the suitability of facilities to cater for diverse groups, including vulnerable people, and those evacuating with animals, and

(3) the existence of communications facilities and alternate power sources.

Planning for evacuations across boundaries

12.75 Natural disasters do not respect state or territory boundaries and so cooperation and coordination is vital in planning cross border evacuations. Planning for evacuations can be more complicated where communities live near the border of states and territories. The challenge is ensuring that planning considers evacuations routes and facilities across both sides of the border.[116] In some cases, while one state is experiencing a natural disaster, it will be an adjacent state that will need to provide the evacuation centre support.

12.76 Public submissions suggested that communities in border areas were frustrated by their evacuation experiences in the 2019-2020 bushfire season.

12.77 Snowy Monaro Regional Council, situated on the NSW-Victorian border, told us of the contrast in their experiences with an evacuation centre in the two states. The Victorian evacuation centre had boxes of supplies provided, including linen, air mattresses and other provisions. However, when establishing centres in NSW, there were few supplies found at the centre and they had to approach local charities seeking donations of these items. Mr Peter Bascomb, Snowy Monaro Regional Council, stated that their role in NSW went well beyond simply providing the facility for the evacuation centre, extending to operating, obtaining bedding and supplies as well as providing staff at the facilities.[117]

12.78 Some states have suggested to us that their evacuation plans already account for border areas.[118] We heard that, in some cases, these evacuations plans are prepared in close consultation with state and territory counterparts. Evidence from the states and territories suggests that their cross-border evacuation planning tends to focus on border areas that have larger populations.[119] Some local governments accepted that they should strengthen relationships with adjoining local governments across the border ahead of a disaster.[120]

12.79 Usefully, some states and territories regularly undertake cross-border exercising of evacuation planning. Exercising is critical for understanding whether evacuation plans will work in a range of different emergencies and improving those arrangements. For example, we heard of a recent exercise undertaken by Queensland and NSW that was developed for the bushfires but was adjusted to account for COVID-19. This exercise included identifying evacuation centres on both sides of the border.[122] Together with the knowledge and experience gained from managing the closure of borders during the COVID-19 pandemic, cross-border commissioners, such as the Cross Border Commissioners in Victoria and NSW, may have a useful role to play in future evacuation planning in border areas.[123]

> Asking whether a proposed policy, process or practice makes sense in the way in which it is applied at the border and within border communities. This approach could be incorporated into formal guidelines to be applied by government agencies and departments when formulating regulations, policies or processes.[121]

12.80 It is also important that community members obtain a clearer understanding of evacuation information, including where to go and what support is available on either side of the border. The Victorian IGEM's Inquiry into the 2019-2020 Victorian fire season identified that a lack of clarity in the information provided for cross-border evacuations meant that some community members were confused, and the information did not provide them with sufficient guidance as to where they should go, or what supports were available to help them to evacuate.[124]

12.81 The Final Report of the NSW Bushfire Inquiry recommended that cross-border arrangements be reflected in evacuation centre management guidelines. We were told that the recommendation will be addressed as part of a full-scale review of the Evacuation Management Guidelines.[125]

12.82 **Local government evacuation planning should be appropriately resourced and supported by states and territories given their responsibility for responding to natural disasters. Local governments may find proper planning for cross-border evacuations challenging in the absence of state and territory assistance.**

12.83 **States and territories should facilitate and exercise close cross-border cooperation when considering evacuation needs.**

Recommendation 12.7 Evacuation planning – Planning for evacuations across boundaries

State and territory governments should ensure those responsible for evacuation planning periodically review those plans, and update where appropriate, to provide for coordination between states and territories in cross-border areas and to provide cross-border access to evacuation centres.

Evacuation messaging and education

12.84 Evacuation messaging to the community should be clear and delivered in a timely manner.

> [The] Fires Near Me App suggested we evacuate the following morning - if we had done this, we may have lost our lives - as the fire came through our home in Upper Brogo the night before we were told to evacuate. A phone call from local RFS advised us to leave earlier.[126]

12.85 Where this does not occur, it can limit the community's understanding of plans to evacuate, and have the potential to create dangerous situations during an emergency.[127]

12.86 In the states and territories, general information about evacuations and evacuation centres is made publicly available, often in disaster management plans or guidelines.[128] However, specific or operational information about the intended location of evacuation centres may not be published until they are established for use in an emergency. This is because the location of the centre being opened will typically depend on the nature of the emergency, and to avoid the community relying on particular centres being open for every emergency.[129] Once established, information on locations of evacuation centres is often communicated through various means, including government and emergency services websites and apps, radio, social media, and at community meetings.[130] Some of these communication means may not be available during and immediately after a disaster. Further discussion of emergency information and warnings systems in Australia can be found in Chapter 13: Emergency information and warnings.

12.87 **Consideration should be given in evacuation planning to the likelihood that communications networks may be unavailable, and take into account communications blackspots.**

Chapter 13 Emergency information and warnings

Summary 285

The importance of emergency information and warnings 286

Roles in emergency information and warnings 287

Understanding your fire danger risk 289

The current Fire Danger Rating System 289

Progressing the Australian Fire Danger Rating System 291

The Bushfire Warning System 295

Problems with the Bushfire Warning System 296

The development of the Australian Warning System 296

The long road to consensus 297

Watch and Act 297

Sources of emergency information and warnings 299

The Emergency Alert System 299

Bushfire warning mobile applications 301

Is a national all-hazard app the solution? 304

The importance of having a radio 306

The Australian Broadcasting Corporation 307

Community radio stations 308

Media engagement with emergency management agencies 308

Summary

13.1 Provision of emergency warnings and related information is an integral part of state and territory emergency management arrangements. Warnings assist the public to make informed actions to safeguard life, property and the environment. The public must have confidence in the accuracy and reliability of the source of emergency information. Any warning issued must be timely, tailored and relevant to the public.

13.2 The current Fire Danger Rating System is scientifically outdated. The visual display, which is a common sight on many of our roads, is not nationally consistent and, we heard, is not easily understood by the public. These challenges have been the driving factors in pursuing the Australian Fire Danger Rating System (AFDRS) over some six years. The development of the scientific system to underpin the AFDRS is complex, has taken considerable time and will require field testing. To best inform and empower the community, the visual display, and the corresponding action individuals are recommended to take during emergencies, should be nationally consistent.

13.3 The Bushfire Warning System, the three level bushfire alert system used to warn the public about the threat posed by a fire and to inform the public about actions that should be taken, is not nationally consistent. The middle alert level 'Watch and Act' causes significant confusion. Progress to develop and implement a replacement warning system – the Australian Warning System (AWS) – since it was first proposed in 2004, has been glacial. In finalising the system, the symbols, colours and terminology of the AWS must be consistent across Australia, along with public education.

13.4 The Emergency Alert System is being reviewed to ensure that it uses the best technology, and accounts for people with disabilities and from culturally and linguistically diverse communities.

13.5 Specific information provided in mobile phone applications ('apps') differs according to jurisdiction. During the 2019-2020 bushfire season, this caused problems for cross-border locations and for tourists who had to rely on more than one app. There is room for improvement to the functionality and utility of the apps. This could include exploring the feasibility of a national all-hazard app.

13.6 Broadcast media, such as the ABC and community radio, provide information to isolated and rural communities when they are unable to receive landline or mobile phone communication, use the internet or watch television. We are encouraged by steps taken by some states to improve the delivery of critical information to broadcast media so that it can, in turn, be provided to the public in a timely manner.

The importance of emergency information and warnings

13.7 During natural disasters the public has an urgent and vital need for emergency information and warnings to ensure they are able to make safe decisions. They need to know what is likely to happen (or has happened), what to do and what to expect. They also need to know what the relevant government and emergency services agencies are doing to address the risk and assist the public.[1]

13.8 'Emergency information' includes emergency alerts and other information that is disseminated to affected communities before, and during, a natural disaster. This information helps individuals understand what they can expect from a natural disaster, where they can seek help, and how they should act.[2] A 'warning' or an 'alert' is a piece of information that relates to a specific natural disaster that is happening or is about to happen, and is currently having, or is likely to have, an impact on the safety of a community.[3] It provides information as to what steps the public should take to ensure their safety.

13.9 The overall aim of emergency information and warnings is to safeguard life, property and the environment.[4]

13.10 Natural disasters are highly stressful situations that can impact how an individual would normally understand and respond to information.[6] Individuals will often not have the capability or the time to process large amounts of information and decide how to act. The content of emergency information and warnings therefore needs to be considered carefully.

> These are events that leave individuals feeling overwhelmed and paralysed by the seemingly impossible alternatives and choices that have to be made.[5]

13.11 The content of the emergency information and warnings must balance the need to provide as much relevant detail as possible, yet be a clear and succinct message so that it can be quickly and easily understood. The information must be instructive and accurate if individuals are expected to respond. Relevant information includes the type and location of the risk, the expected timing of the risk, who will be affected, how they will be affected and what they can or should do to respond.[7]

13.12 The public requires tailored emergency information and warnings at different times when preparing for, and responding to, natural disasters, and for different purposes. Government and emergency services agencies have developed a variety of systems and tools that have specific functions in informing and empowering the public, for example:

- general preparedness and pre-season messaging to educate the public about the risks they may face and how to be best prepared for natural disasters
- natural disaster risk information, such as the Fire Danger Rating System, and
- frameworks that set out the levels of warnings about incidents that are posing a threat and advice on what people should do, such as the Bushfire Warning System and the Australian Tsunami Warning System.

13.13 To be able to reach the public in a timely manner, the government and emergency services agencies rely on a range of distribution methods, such as roadside signs, the Emergency Alert System, apps and broadcast media.[8]

13.14 We heard that recipients of emergency information and/or warnings often try to confirm the contents of the message before they take action to protect themselves.[9] To ensure that individuals feel empowered to act, emergency information and warnings must come from a trusted source, such as government and emergency service agencies, and be accurate. The public may question the reliability of government and emergency services agencies' information when it is inconsistent across jurisdictions. In time-sensitive, highly stressful situations, any inconsistency will mean that individuals lose valuable time in verifying and reconciling conflicting information.

13.15 The need for national consistency in emergency information and warnings is discussed throughout this chapter.

13.16 The need for emergency information and warnings to be timely, accurate and tailored has been considered in several concurrent inquiries, previous inquiries and reports.[10] The repeated consideration of this important issue reflects the need for governments at all levels to evaluate continuously and consider if current systems and processes reflect best practice and available technology. If that is not the case, then the systems and processes need to be changed and, changed, as a matter of some urgency.

13.17 **There is considerable room for improvement in the existing emergency information and warning systems across Australia.**

Roles in emergency information and warnings

13.18 State and territory governments have primary responsibility for emergency management, and this extends to the provision of emergency information and warning systems within their jurisdictions.[11] State-based emergency management legislation underpins the warning arrangements for each state and territory and, in some jurisdictions, legislation places an obligation on government authorities to warn communities.[12]

13.19 Within the states and territories, various emergency services agencies are responsible for distributing emergency warnings according to the nature of the warning and agency's responsibilities.[13] These agencies are also responsible for providing education to the public about the risks they might face and how to prepare for, respond to, and recover from natural disasters. Emergency response agencies are on the ground, have training in emergency management and understand local conditions. They are generally best placed to decide whether to issue an emergency warning, to whom a warning is issued, which warning technologies to adopt, and when to issue the warning.

13.20 State and territory governments and their agencies are, in some cases, supported in this role by local governments, which share emergency information from state and territory authorities. Some local governments keep a local Facebook page, website

and/or Twitter account to help the community find locally relevant emergency information.

13.21 The Australian Government recognises that it is more efficient for it to provide some information. For example, the Bureau of Meteorology (BoM) provides weather information to state and territory governments, and to relevant emergency services agencies.[14] It is more efficient for the Australian government to provide certain information, such as weather predictions and hazard warnings. Australia's Emergency Warning Arrangements are reflected in the below Figure.

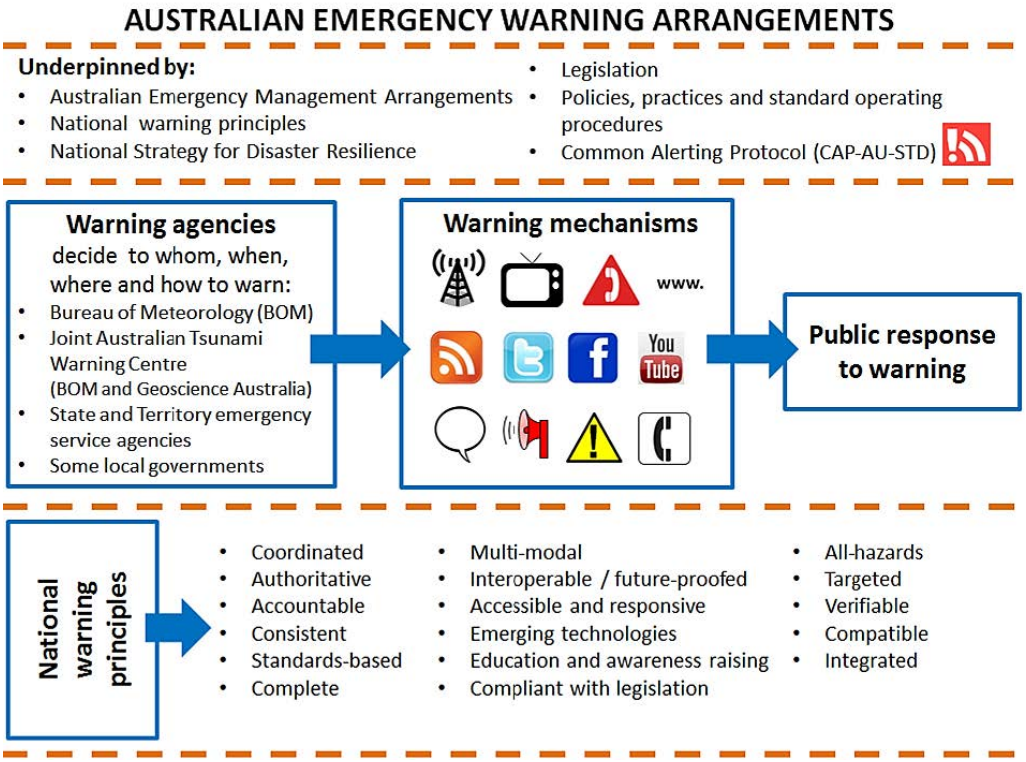


Figure 44: Australian Emergency Warnings Arrangements[15]

13.22 BoM, as an Australian Government entity, has the responsibility for weather forecasting and its dissemination to both the public and to state and territory emergency services. BoM relies on domestic weather observation equipment and also information provided by global partners. BoM disseminates information about weather events that are likely to endanger people or property, such as severe thunderstorms, fire weather, coastal hazards, high winds, floods and tropical cyclones (in collaboration with Geoscience Australia, it also issues tsunami warnings and provides the Australian Tsunami Warning System).[16] BoM provides this information to state and territory governments, local government authorities, and fire and emergency services.[17] State and territory emergency services then use this information to inform their emergency information and warnings distributed to the public.

13.23 In addition to providing the weather information that underlies emergency information and warnings, the Australian government supports emergency management resources such as the Emergency Alert System (discussed in more detail below). It further provides principles, guidance and information to states and

territories on how to improve their abilities to distribute emergency information and warnings and, by developing resource material, to help ensure that information and warnings convey the right information, such as the Australia's Warning Principles,[18] AIDR 'Warning Message Construction: Choosing your words' (2018).[19]

13.24 As with all elements of natural disaster arrangements, responsibility is a shared between different levels of government. This shared responsibility also extends to individuals. While government has an obligation to provide the emergency information and warnings and educate the public, individuals need to learn about the different emergency information and warnings, so that they can take appropriate steps to ensure their safety.

13.25 Emergency situations can change extremely quickly. There will be situations where there is no time for any emergency information or warning. Individuals must monitor emergency situations closely, be prepared to implement emergency response plans (such as flood or fire plans), and be ready to change their plans to suit changing local conditions, irrespective of whether any emergency information or warning has been provided.

Understanding your fire danger risk

13.26 Fire danger ratings provide a simplified measure of fire danger to assist in the management of bushfires. Theoretically, fire danger refers to the risks posed by bushfires; covering the likelihood of a fire igniting, rate of spread and difficulty of control of a fire once started, and the value of the assets that could be impacted. However, in practice, most fire danger ratings in use around the world focus on fire behaviour and are typically designed to provide a measure of the difficulty of suppressing or controlling a fire.

The current Fire Danger Rating System

13.27 Most people know of the current Fire Danger Rating System (FDRS) from the roadside fire danger rating signs, like that shown in the image below.



Figure 45: FDRS in NSW showing a severe rating[20]

13.28 The current FDRS performs a number of important functions, including: conveying fire danger information to the community, determining the level of preparedness for fire service agencies in fire districts, informing decisions on fire bans and the imposition of other similar restrictions (eg closure of national parks and state forests), and issuing activity-specific warnings (eg harvest safety alerts). The information is also used by researchers to evaluate the effectiveness of various fire management activities such as fuel management and suppression techniques.

13.29 Australia's current FDRS is made up of three main components:

- A set of two fire danger indices, known as the Forest Fire Danger Index (FFDI) and Grass Fire Danger Index (GFDI), which provide a numerical estimate of fire danger for a forest or grassland area based on the temperature, wind speed, relative humidity and fuel loads.
- A rating classification system that groups the FFDI and GFDI index values into six rating classes (low-moderate, high, very high, severe, extreme, catastrophic/code red).
- A visual display scheme, consisting of signboards with a semi-circle that shows the rating classes in different colours and an arrow that is orientated (remotely) to the fire danger rating each day during the fire danger period.

13.30 BoM produces daily maximum FFDI and GFDI maps, which are published on its website. It produces fire danger ratings and fire danger rating maps in consultation with the relevant fire and emergency service agency.[21] The ratings are generally

published on the websites of state fire services and then displayed on the roadside fire danger rating signs.

13.31 The current FFDI and GFDI are based on two fire behaviour models from the 1950s and 1960s and do not fully reflect the variability of landscapes across Australia.[22] The FFDI and GFDI also do not accurately capture the influence of fuels on fire behaviour; primarily because of the way in which fuel loads are estimated for the purposes of calculating both indices.[23] These limitations have been the driving factor in pursuing the Australian Fire Danger Rating System.

Progressing the Australian Fire Danger Rating System

13.32 In 2014, Australian governments agreed to, as a national priority, the development of a new nationally consistent fire danger rating system, known as the Australian Fire Danger Rating System (AFDRS).[24] A national Program Board with jurisdictional and national representation was established in late 2016, under the auspices of the Australia-New Zealand Emergency Management Committee, to oversee the staged development of AFDRS.[25] Australasian Fire and Emergency Service Authorities Council (AFAC) has been leading the development and implementation of the new system. The AFDRS is intended to be implemented in 2022-2023. A timeline of the development of the AFDRS is provided at Appendix 17: Timeline for Australian Fire Danger Rating System.

13.33 We heard that several aspects of the AFDRS program are in train:

- the finalisation of the science behind the AFDRS (the Prototype)
- agreement on the visual display of the AFDRS and the rating classifications, and
- the development of an education campaign to support the new AFDRS.

Improving the science to understand fire risk

13.34 It is widely acknowledged that there are limitations with the FDRS's reliance on the FFDI and GFDI. Most notably, research has shown that fires behave differently in different vegetation types because of the continuity and structure of the fuels. Australia has a wide range of vegetation types with different structural characteristics that influence fire behaviour. The FDRS is unable to capture this because it currently uses only two vegetation types, forests (FFDI) and grasslands (GFDI). In addition to this, the FFDI and GFDI are currently calculated with limited reference to the structure and mass of fuels in the landscape, and to the extent that fuel structure and mass is considered, there are differences in approach between the states and territories.

13.35 New research has greatly improved the ability to predict fire behaviour and the potential threat to the community accurately. For example, new fire behaviour models are now available to estimate the intensity and rate of spread of fires more accurately in a range of vegetation types.[26]

13.36 A prototype for the scientific systems that feed into the AFDRS was released in 2019 and it is intended to be tested during the 2021-2022 bushfire season.[27] The Prototype seeks to cover:

- potential fire behaviour, particularly rate of spread
- difficulty of control
- fire (or fuel) hazard and fuel availability, and
- consequences of fire including impact(s), the potential threat to people and their welfare (safety), and the vulnerability, or exposure and susceptibility, to losses.[28]

13.37 The AFDRS Prototype utilises eight broad fuel (or vegetation) types (grasslands, buttongrass, savanna, spinifex, mallee heath, shrubland, forest and pine). These were selected on the basis of the availability of suitable fire behaviour models. The prototype further subdivides the eight fuel types into 22 mid-scale vegetation groups, with each assigned a standard or modified fire behaviour model, and several hundred fine scale vegetation groups.

13.38 If adopted, the prototype would represent a considerable advance on the existing science underpinning the current FDRS. Most notably, it would move the system from its reliance on two fire behaviour models to utilising eight standard models that would be modified as necessary to capture relevant variations in fuels. Unlike the existing system, all of the 'new' fire behaviour models directly capture the impact of relevant fuel variables on fire behaviour. To support this, the prototype has identified complementary information systems to ensure that relevant fuel data are available at an appropriate scale (initially 1.5km x 1.5km grids).

13.39 The finalisation of the prototype is important so that it can provide greater accuracy to support government and emergency services decisions.[29] We acknowledge that developing the prototype for the AFDRS is complex; that it needs to be field tested; and that agency personnel need to be upskilled to use the new system effectively. While the AFDRS program has been ongoing for several years, we appreciate that this is largely due to the time taken to develop the prototype.

13.40 The implementation of the AFDRS is urgently needed. We encourage state and territory governments, with the assistance of the Australian Government, to ensure that the science underpinning the AFDRS can be finalised and tested as a priority, resourced appropriately, and implemented consistently.

Visual display of the AFDRS and rating classifications

13.41 There are variations in the visual display of the current FDRS across state and territory fire authorities (see Figure 46). For example, in Victoria, 'Catastrophic' is 'Code Red', and in Tasmania 'Catastrophic' is represented by black, not red. Some states show the fire danger index values for each rating and others do not. There is also no consistency in the recommended action for each risk rating across state and territory fire authorities. Appendix 16: Fire Danger Rating System provides an overview of the recommended action for each risk rating across state and territory fire authorities.

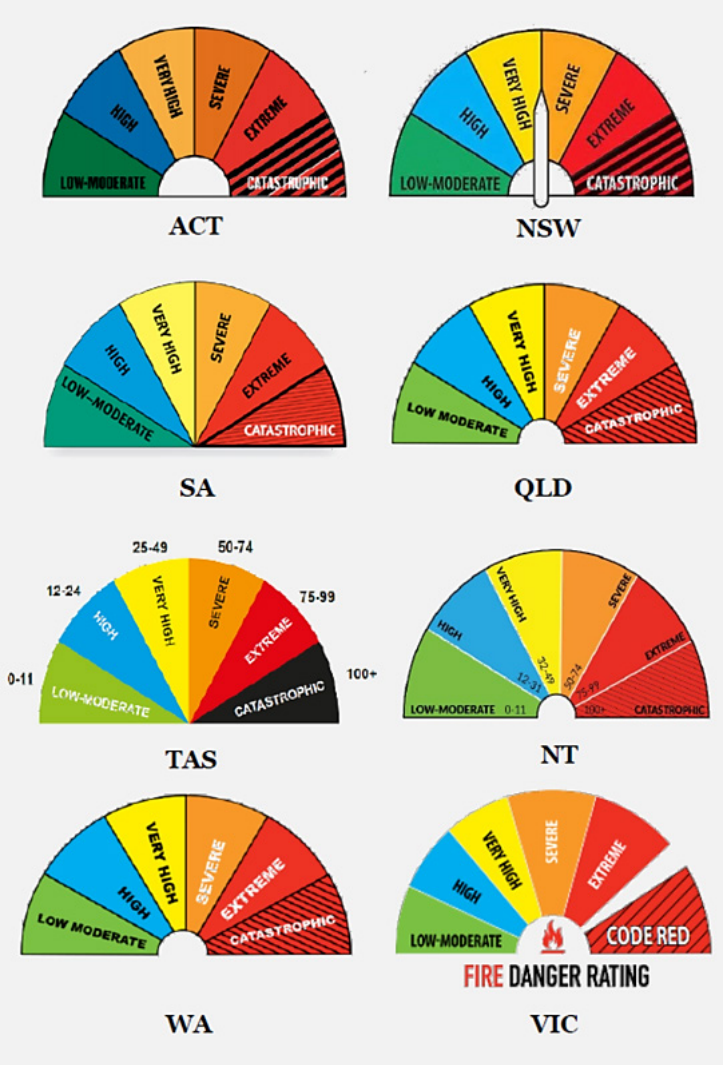


Figure 46: Fire Danger Rating System in each jurisdiction[30]

13.42 The AFDRS program was created to ensure consistency for fire danger ratings and to ensure that standardised and consistent advice can be provided to communities across Australia.[31]

13.43 As people only have a few seconds to look at the display as they drive past the signs, it is important that the terminology, colours and descriptions are easy to understand. Consistency in the terminology will help in ensuring that cross border communities and tourists are able to respond to the risk information. While we appreciate the complexity associated with finalising the prototype for the AFDRS, the development and finalisation of a nationally consistent visual display and rating classification should not be delayed further.

13.44 **State and territory governments should ensure that the visual display for the AFDRS and the recommended action for individuals are nationally consistent.**

The need for education

13.45 We heard that the current purpose and function of the FDRS is not easily understood by the community and may not be ensuring the desired response and actions within the community. In particular, we heard that:

- The system is not well known and those who do know about it talk about 'the sign on the road' rather than naming it—'[m]any waved their arms in a semicircle or like the needle or simply referenced "the arrow"'.[32]
- Individuals struggle with identifying what action they should take in response to each rating, particularly in the middle of the system (Very High to Extreme).[34]

> They need to explain more clearly what each level means. I thought it just meant we had to be careful.[33]

- Despite official advice to leave early when there is a Catastrophic/Code Red risk rating, many people wait until they see fire before leaving and others remain committed to defending properties against fires, despite advice that properties are not defendable under these conditions.[35]
- On Catastrophic/Code Red days, where the risk level covers large parts of a state or territory (including neighbouring areas) and the advice is to 'leave early'. **When this warning applies to a large area it is not clear how the public could practically implement this advice and where they should leave to.**

13.46 Extensive community consultation has been undertaken since 2018 to investigate what a new, nationally consistent, visual display could look like that would best support community understanding of fire risk and encourage people to take appropriate action.[36] The AFDRS intends to improve community safety by increasing community awareness of risk exposure to bushfire. It is expected to provide simple, easy to understand and clear messages to facilitate community action in response to the risk rating.[37]

13.47 Education will need to focus on the new rating classifications, the potential danger attached to each rating, and what steps individuals and communities should take in response to each rating. Any education campaign and information should be provided in a range of accessible digital and non-digital formats.

Recommendation 13.1 Development and implementation of the Australian Fire Danger Rating System

State and territory governments should expedite the development and implementation of the Australian Fire Danger Rating System. It should ensure that there is national consistency in the visual display of the AFDRS and action to be taken in response to each rating.

Recommendation 13.2 Education on the Australian Fire Danger Rating System

State and territory governments should deliver education to ensure that the public understands the new Australian Fire Danger Rating System ratings, the potential danger attached to each rating, and the action that should be taken in response to each rating.

The Bushfire Warning System

13.48 The Bushfire Warning System is a national, three level bushfire alert system: 'Advice'; 'Watch and Act'; and 'Emergency Warning'. The alert system is an important framework used by emergency services agencies to indicate to the public the level of threat from a fire and the recommended action that should be taken. The higher the warning level, the greater the risk to life and property.

13.49 As with other emergency information and warnings, some fires can start and spread so quickly that there is no time for a warning, or warning levels increase so quickly that several messages are received at once. The Bushfire Warning System is only a guide to help individuals make the right decisions for their safety. Individuals need to monitor their situation closely and be prepared to put their Bushfire Survival Plans into action with little or no warning.

13.50 Despite the three levels of alerts being agreed nationally in 2009, when the framework was implemented, states and territories chose to use different symbols, colours and corresponding recommended action for each alert level.

Table 7: Overview of Bushfire Warning System colour and symbols.[38]

Jurisdiction	Advice	Watch and Act	Emergency Warning
QLD			
NSW			
ACT			
VIC			
SA			
WA			
NT			
TAS			

Problems with the Bushfire Warning System

13.51 During the 2019-2020 bushfire season, the public faced three key issues related to the Bushfire Warning System.

13.52 First, the middle-level warning, 'Watch and Act', is simultaneously generic, passive and active – does it mean 'wait and see' or 'act now'? Do we watch? Do we act? Do we leave? Do we stay? Do we defend? We recognise that some people understand 'Watch and Act', however, we also heard of considerable confusion associated with the phrase.[40] 'Watch and Act' does not provide a clear and succinct message that can be quickly and easily understood, especially in times of stress.

> Watch and Act by itself was confusing to people…Does that mean we stay, and how do we act if we're staying? Shouldn't we be going if we're acting?[39]

13.53 Secondly, the inconsistent implementation of the alerts throughout Australia caused specific problems for communities at cross-border locations and for tourists. There were contradictory alerts from different emergency services agencies – fires categorised in one state at 'Watch and Act' level were categorised as 'Emergency Warning' in another.[42] We also heard that the recommended action for the alert level differed between jurisdictions (Appendix 18: Overview of Bushfire Warning System provides an overview of the current Bushfire Warning System highlighting the different recommended action under each alert level across states and territories).

> The area of greatest concern to local government [in Queensland], and specific to the 2019-2020 Bushfires surround the confusing nature of the national Bush Fire Warning System.[41]

13.54 Confidence in the emergency information being provided requires consistency in the content of the messages being issued by the different authorities. In time-sensitive, high-stress situations, an individual should not have to struggle to understand the differences in the information and, where there is inconsistency, decide which information and advice to follow.

13.55 Finally, we heard that individuals received 'Watch and Act' and 'Emergency Warning' recommending immediate departure, simultaneously.[43] In some cases, individuals received no warnings until they were told to 'leave now' or even 'too late to leave'. Any education campaign should remind the public that warnings might not be issued in a particular order and that, in some situations, bushfires can start and spread extremely quickly which means that there may be situations where there is no time for any warning to be issued.

The development of the Australian Warning System

13.56 The challenges that many people experienced in understanding and implementing the Bushfire Warning System, during the 2019-2020 bushfire season, are not new.

The need for a nationally consistent warning system was recognised as early as 2004.[44] Since then, state and territory governments have been slowly progressing the development of the Australian Warning System (AWS).

13.57 The AWS will build on existing warning frameworks and will apply to bushfire, flood, severe storm, cyclone and extreme heat (and potentially other hazards).[45] The proposed warning system includes:

- three levels of warnings with associated 'Call to Action' statements
- a consistent set of hazard icons for each level, adopting a consistent shape and colour scheme, with icons increasing in size as the warning escalates, and
- supported by consistent hazard warning frameworks that map hazard impacts to warning levels.[46]

The long road to consensus

13.58 In 2014, the peak intergovernmental body of emergency management ministers and leaders, ANZEMC, endorsed the National Review of Warnings and Information recommendation that Australia pursue greater national consistency in warnings.[47] In 2015, the National Working Group for Public Information and Warnings was formed under AFAC.[48] It is not clear what work was occurring in and outside AFAC prior to October 2017, when CCOSC committed to a consistent national warnings framework across all states and all hazards based on a three-level warning system.[49]

13.59 In February 2018, the AFAC Warnings Group established a project plan, Towards a National Warnings Framework, to '[e]stablish a sound evidence base to move towards a national three-level warning framework for all hazards'.[50] The project plan to develop the AWS was then endorsed by CCOSC in May 2018.[51]

13.60 Since 2018, extensive community research has been commissioned by CCOSC (at the national and state and territory levels) to determine how the community understands, perceives and takes action in response to warnings.[52] (Appendix 19: Timeline – Australian Warning System details the timeline for the development of the AWS).[53]

13.61 The process for pursuing national consistency has taken far too long. It has further been plagued by differences of opinion regarding the merits of 'Watch and Act'.

13.62 If community research suggests that there is no preference for one phrase over another, the solution is not more community research. It may be that an education campaign after adoption is advisable.

Watch and Act

13.63 A considerable focus of the CCOSC commissioned community research has been to understand, from the public's perspective, the preferred name for the middle warning level – 'Watch and Act' – that would be less confusing and encourage the public to take action.[54]

13.64 A key finding of the community research commissioned by CCOSC was that:

> *more than two thirds of participants stated confusion is centred on what actions should be taken at Watch and Act…[w]hile this is the point that participants believe action needs to be taken, considerable confusion exists as to whether or not the expectation is to simply monitor information (watch) or take action to prepare (act) as these are fundamentally different instructions.*[55]

13.65 Despite the community research presented to CCOSC in October 2019, showing a strong case for using the term 'action' in the middle level (for example Take Action Now, Take Action, or Act Now), at its meeting in April 2020, CCOSC recommended to endorse 'Watch and Act'.[56] The minutes noted (emphasis added):

> *The idea of a nationally consistent three level warning framework has community support. However, there has been a change of view by Victoria particularly in relation to 'Watch and Act'. Because of the unsuccessful previous attempt (in 2009) to have Victoria consistent with all other jurisdictions, CCOSC favoured a consensus view and DG EMA committed to fund a fourth round of research on the middle level warning name.* [57]

13.66 The fourth round of community research surveyed 5,500 individuals and only considered two phrases, 'Watch and Act' and 'Act Now'. It found that, overall, two-thirds preferred 'Watch and Act'.[58] Despite long standing concerns from the community and emergency services agencies with the phrase 'Watch and Act', CCOSC endorsed retaining it as the middle level warning name for the AWS.[59] This decision does not resolve the underlying confusion with the phrase 'Watch and Act'. CCOSC also 'endorsed the need for a national warnings community education program' and tasked AFAC to 'establish a proposal to progress' this program.[60]

13.67 The 'Watch and Act' process highlights that CCOSC's consensus model might not be the most suitable vehicle for making such decisions, especially where there have been differences in phrases adopted in different jurisdictions. As discussed in Chapter 3: National coordination arrangements, CCOSC's decision-making process involves state and territory representatives making decisions in the interest of their jurisdiction rather than in the national interest.

13.68 Critical issues such as this may be better determined by being elevated to an appropriate inter-governmental mechanism that is accountable to the Australian people.

13.69 State and territory governments must finalise and implement the AWS as a matter of priority. To best serve its purpose as an effective warning, and to meet the needs of the public, the system should be implemented consistently across Australia.

Prioritising education

13.70 We are concerned that the decision by CCOSC to retain and endorse, 'Watch and Act' will not solve the issues faced by the public during the 2019-2020 bushfire season, and that confusion will remain.

13.71 **State and territory governments should ensure that a national education plan is carefully developed to ensure that the public understands the new system, symbols, terminology and recommended action. The education program also needs**

to target people with disabilities, the Indigenous community and culturally and linguistically diverse Australians.

Recommendation 13.3 The Australian Warning System

State and territory governments should urgently deliver and implement the all-hazard Australian Warning System.

Recommendation 13.4 An education campaign on the Australian Warning System

State and territory governments should ensure that the implementation of the Australian Warning System is accompanied by a carefully developed national education campaign that considers the needs of all Australians.

Sources of emergency information and warnings

13.72 Australia's emergency warning system is based on a multi-modal approach.[61] This means emergency information and warnings are provided through a variety of means (or modes), for example, websites, social media (such as, Facebook and Twitter), media outlets (such as, the Australian Broadcasting Corporation (ABC) and community radio), mobile phone applications (apps), targeted messages, and door knocks.[62] The use of a variety of means helps ensure the message has the highest impact and quickly reaches the widest possible audience.

13.73 We heard that during the 2019-2020 bushfire season, key emergency information and warnings were provided to the public through the Emergency Alert System and mobile applications. We also heard that when the internet, mobile phones, and other technologies were not available, the ABC and community radio were important sources of emergency information and warnings.[63] But we also heard that, due to topography, not all residents of border communities will have reliable access to radio stations located in their state. Such cross-border anomalies can become acute in the context of directing residents to particular radio stations for state specific emergency information.[64]

13.74 Emergency warnings systems are fundamental to governments' ability to deliver messages quickly, to alert the public to emerging and imminent threats.[65]

The Emergency Alert System

13.75 The Emergency Alert System is one way in which state and territory governments and emergency service agencies provide emergency information to the public. The system sends out voice messages to landlines and text messages to mobile phones, about likely or actual emergencies, within a defined geographic area.[66]

13.76 Emergency Alert messages are an important consideration for individuals in deciding what steps they need to take when facing a natural disaster. The system has been relied upon to reach large parts of the population:

During the 2019-2020 bushfire season (specifically from 1 November 2019 to 16 January 2020), the Emergency Alert system was used by NSW, QLD, Victoria, SA, Tasmania and WA and there was a total of 492,938 fixed line messages and 4,194,576 SMS messages delivered to affected areas.[67]

13.77 While the Emergency Alert System has been relied upon heavily during a range of disasters in Australia, we heard evidence there are limitations with the system in that it is unable to reach everyone facing an emerging or imminent threat.

13.78 For emergency alerts being delivered to landline telephones, warnings have failed to be delivered in the past if:

- the telephone was engaged
- an individual did not answer the call
- there was a power outage and the individual was using a cordless telephone
- the telephone was outside the warning area but at a location still at risk, or
- the telephone was not registered to the correct service address.[68]

13.79 For text messages, reasons for failed delivery have included:

- the inbox was full
- the mobile telephone was switched off or was not in a mobile telephone coverage area
- the last known location of the mobile handset was not within the warning area at the time of the emergency but was still at risk
- individuals had not updated their address
- individuals travelled into a warning area after a message was issued, and
- individuals were in a mobile telephone blackspot.[69]

13.80 We also heard that the Emergency Alert System can lead to confusion in cross-border areas. For example, as many residents living in NSW are connected to Queensland telephone exchanges, we heard that it is possible that NSW residents may receive emergency alerts if activated from within Queensland, although the alerts might not have been activated in NSW.[70]

13.81 We heard that the Emergency Alert System technology is considered to be outdated.[71] The Department of Home Affairs, through Emergency Management Australia, has commissioned a review of new and emerging telephony-based public warning technologies.[72] The review is intended to identify and trial technologies to improve the communication of warnings across Australia, including to people with disability and people from culturally and linguistically diverse communities.[73]

13.82 The review is tasked with identifying options for future emergency warnings systems beyond 2023-2024.[74] A draft report was expected to be completed by 31 March 2020 for consideration by the Australia-New Zealand Emergency Management Committee.[75] We heard that the work has been delayed due to COVID-19.

13.83 The Emergency Alert System is an important mode for delivering emergency information and warnings to the community quickly and to a specific area where there may be an emerging or imminent threat. Events during the 2019-2020 bushfire season, and during other emergencies, have shown the limitations of the current technology and demonstrated that there is a need for an alert system that can better account for people with disability and people from culturally and linguistically diverse communities.

13.84 To ensure that state and territory governments are able to provide timely, relevant and effective messages to the public during emerging and imminent threats, the review and upgrade of the Emergency Alert System needs to be a priority. All governments need to continue working together to ensure that the system is suitably funded and uses the best available technology to improve the communication of warnings across Australia, including to people with disability and people from culturally and linguistically diverse communities.

13.85 **National community education will be required to ensure that the public understands that they may receive an Emergency Alert and the action they need to take in response.**

Bushfire warning mobile applications

13.86 Social media has changed how information is communicated to the public. Mobile applications (apps) have been an innovative social media tool to provide information to the public during bushfires.[76]

13.87 State and territory governments, and the relevant agencies (Emergency Services in WA and Victoria and Fire Services in NSW and SA), operate bushfire warning apps (and/or internet pages).[77] The apps bring together emergency information from a range of sources including incident and warning information, and forecast, historical and observational data.[78]

13.88 As a result of apps being run at the state and territory level, the specific information provided in the apps differs between states and territories. Generally, the apps provide the public with a platform to visualise the location of fires on a map, set 'watch zones' so they can be alerted if there is danger in their area, be provided with updated information that may be important to safety, and any recommended action that should be taken.

How effective were the apps during the 2019-2020 bushfire season?

13.89 During the 2019-2020 bushfire season, the public relied heavily on apps such as *Fires Near Me (NSW)*, *Alert SA*, *VicEmergency* and *EmergencyWA*. We heard that the apps were, generally, appreciated by the public and assisted individuals in making decisions in response to a new fire or an increase in a fire alert.[79] The apps were a useful source of information that could be easily visualised by the public and used when planning how to avoid bushfire areas.[80]

13.90 While many found the apps useful, others observed limitations with the apps and we heard that, at times, they did not meet user expectations. There appears to be room for improvement in the information provided in the apps.

13.91 First, we heard of the different types of information that state and territory governments include in the bushfire warning apps. For instance, in NSW, the alert attaches to the fire itself; whereas in Victoria the alert attaches to the action that needs to be taken by a particular community as a result of a particular hazard.[81] Some apps show road closures, burnt areas and have push notification functions that allow users to be notified of an emergency in their area.[82] *VicEmergency* provides for all hazards, not just bushfires, and extends coverage 50 kilometres into SA and NSW.[83]

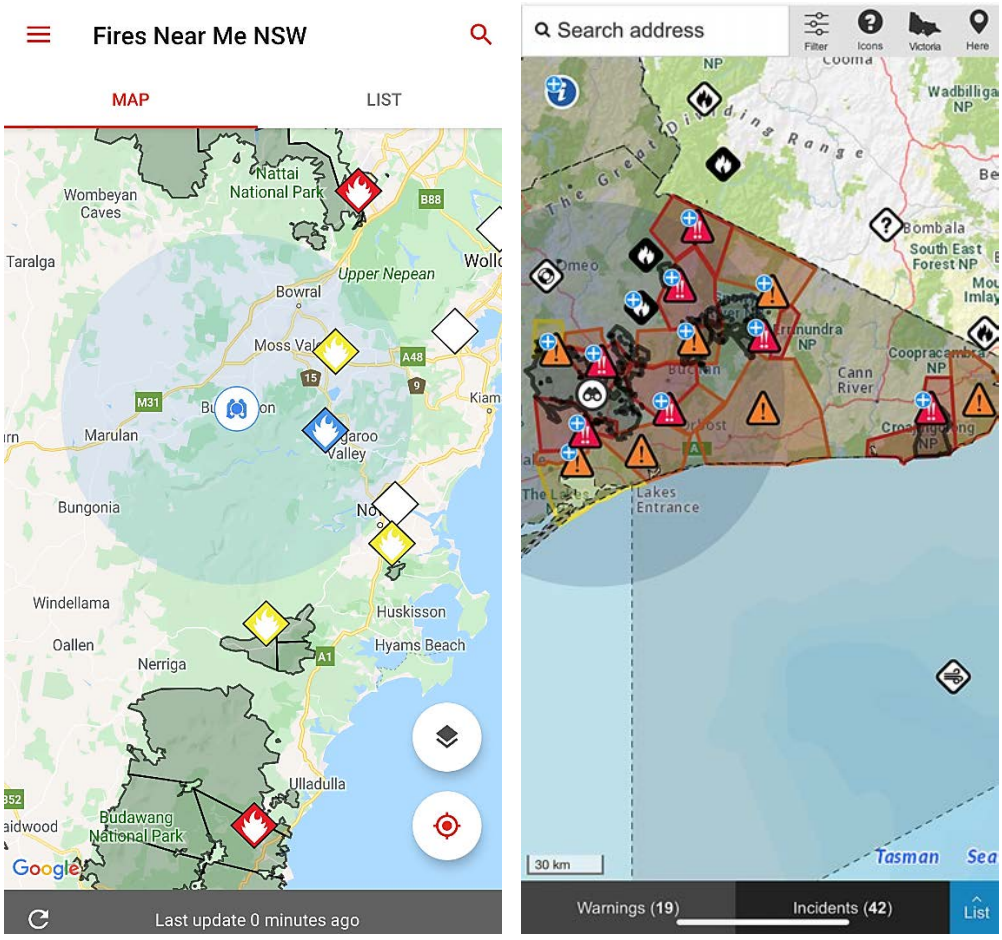


Figure 47: A comparison of the 'Fires Near Me (NSW)' app (left)[84] and 'VicEmergency' app (right)[85]

13.92 Secondly, the information provided in the apps was, in some situations, too general and not sufficiently accurate. The apps were considered useful for a general understanding about the progress of the fire, however, they did not provide detailed information, such as the direction in which the fire was moving, wind speed, and the estimated time in which a fire may reach a specific location.[86] Users expected that the information would be provided in real time. However, the time taken to publish information on the apps varied, depending on the data source and there were delays in updating the information.[87] The ability to provide up-to-date information was further impacted by damage to essential infrastructure, such as power lines and telecommunication towers. This meant that the data in the user's app might not have been updated for a significant period.

13.93 Thirdly, while the levels of warning under the Bushfire Warning System are the same between States (eg 'Advice', 'Watch and Act' and 'Emergency Warning'), states and territories use different colours and symbols on their apps (See Table 7 for an overview of the different symbols and colours used across Australia). This was challenging, particularly for tourists and those at state borders:

> *So while the actual words are similar, if not identical, people looking at it just quickly and relying on the colour codes would be potentially misled by what is actually happening.*[88]

13.94 For example, in NSW, the background to the 'Advice' warning is blue and in Victoria it is yellow. In NSW, the 'Watch and Act' background is yellow, and it is orange in Victoria. Similarly, the symbols that are used on the two apps are different. The 'Fires Near Me (NSW)' app uses a diamond shape to reflect where there is a 'Watch and Act' warning, whereas the Victorian app uses a combination of diamonds and triangles.

13.95 Fourthly, despite some of the public expecting that a 'map-based app' would provide them with all the emergency information they needed in an area, an app could not be relied upon as a single source of emergency information. We heard that individuals on the NSW and Victoria border had to download and monitor several apps. Apps being run at the state and territory level resulted in fires on maps appearing to stop at the border.[90] This presented challenges for the public, as they could not visualise on one app where the threat of fire was coming from or see in one place how they could safely evacuate from an area.[91]

> Either, build a wall that stops fires from going over State/Territory borders, or have one national app.[89]

13.96 Finally, the public needs to understand that apps cannot be relied on as a single source of emergency information. While they are useful tools for the public, they are not intended to be a stand-alone source of emergency information and warnings:

> *…because fires change so quickly. We also say to people that by the time maps are updated, things can change, and that's why we say listen to local radio, make sure you don't have one source of information.*[92]

Developing consistency across state and territory bushfire warnings apps

13.97 Map-based, bushfire emergency apps are an effective and efficient way to provide information to the public – they distribute information quickly, target a specific location, and can be provided to a wide range of people. The apps can enable people to make appropriate decisions, based on their situation. Importantly, the apps are liked by the public as a tool for receiving emergency information.

13.98 We heard that the current lack of consistency in the information, methods for assigning warnings, symbols and colours caused problems. Consistency in apps is important, as in times of high stress, and when quick decision making is needed; individuals do not have the time or ability to go between different apps and reconcile the, often inconsistent, information being provided.[93]

13.99 To equip the public with the tools they need to make informed decisions during emergencies, the challenges and limitations of the apps, experienced by the public during the 2019-2020 bushfire season, need to be addressed. We acknowledge that state and territory governments, in their own concurrent inquiries into the 2019-2020 bushfire season, and in evidence before us, recognise that there is a need for greater consistency in the information provided.[94] We welcome the steps that state and territory governments (and emergency service agencies) are taking to improve the functionality and utility of the apps. We urge them to give priority to achieving this consistency.

Is a national all-hazard app the solution?

13.100 We have considered the potential development of a national all-hazard warning app to address the limitations of the bushfire warning apps during the 2019-2020 bushfire season. The development and implementation of an all-hazard app could complement the development and implementation of the AWS.

13.101 The Australian government has previously developed such an app, however, we heard that it is no longer in use.[95] Similarly, while NSWRFS operates a national app called 'Fires Near Me Australia' (FNMA App), we understand that this has been largely superseded by the development of jurisdiction specific bushfire emergency apps, which provide broader functionality (for example, the FNMA App does not provide push notification or Watch Zone functionalities).[96]

13.102 We heard that the development of a national all-hazard app is possible and that data can be fed into such a system from the state and territory governments and from other sources.[97] We heard, however, that data from state and territory governments lacks consistency and this presents a challenge to developing a national warning app.[98] Availability of nationally consistent data is a key enabler for the development of a national app by the Australian government, or a commercial provider. In the meantime, while the development of a national app is technically feasible, governments have differing views on the utility and viability of a national app.[99]

13.103 NSW suggested that it would be a challenge to obtain state and territory governments' agreement on the development of a national app and that it is not exploring the expansion of the 'Fires Near Me (NSW)' to an all-hazard app.[100] NSW questioned whether a national app is necessary or appropriate if it resulted in inflexible standards that stifle innovation, or adopted a 'lowest common denominator approach'.[101] This concern may reflect a preoccupation with jurisdictional approaches over the benefits of consistency for the communities relying on the advice.

13.104 Victoria submitted that consideration of a national app needs to balance what people on the ground need to be able to make decisions against the necessity of individuals having a national view of natural disasters. For instance, following the 2019-2020 bushfire season, Victoria recognised that cross-border communities may be better served by tailored local information, rather than by a broader national picture, and is taking steps to explore this.[102]

13.105 The ACT, which currently relies on the *Fires Near Me (NSW)* app, recognised the benefits of adopting a national approach to the design, development and delivery of

an initiative which potentially could positively influence the affordability for smaller jurisdictions.[103]

13.106 As discussed earlier in this chapter, the development of an all-hazard AWS has been a long and challenging process for governments. We are mindful that integrating the development of an all-hazard warning app alongside this project may further delay the AWS.

13.107 Ultimately, we recognise that a national app may be useful in providing a national picture of natural disaster risks and warnings to the public. Until there is consistency in underlying data that would feed into the app, and uniformity around the country in warning terminology and symbols, it is not clear, on the evidence available to us, that the public would best be served by governments prioritising the development of a national all-hazard app over these other important initiatives.

13.108 **National consistency may be better achieved by Australian, state and territory governments working together to develop national standards of information that should be included in emergency warnings apps and ensuring consistency in the data platforms used to enable, for instance, the private sector to aggregate the information into a consolidated national app.**

13.109 **To improve the functionality and utility of the apps, the Australian government should facilitate state and territory governments working together to develop national standards of information that should be included in bushfire warnings apps. These standards could then also be applied to other hazard-specific warning mobile applications, and could include:**

- **consistent terminology and symbols**
- **consistent approach to assigning warnings to the bushfire (or other hazard)**
- **extending coverage of each jurisdiction's app to no less than 50kms into the neighbouring state or territory**
- **the provision of push notifications so a user can be notified when updated emergency information is available**
- **information on when the data for the app were last updated, and/or the regularity with which data are updated**
- **information on road closures, fire front, fire direction, and fire spread prediction, and**
- **link to websites with additional information directed at supporting the community during an emergency.**

13.110 Some jurisdictions are exploring the possibility of a national all-hazard app.[104] We welcome this and support the Australian, state and territory governments' consideration of whether the development of a national all-hazard warning app would provide the public with better emergency information and warnings.

Recommendation 13.5 The development of national standards for mobile applications

The Australian Government should facilitate state and territory governments working together to develop minimum national standards of information to be included in bushfire warnings apps.

Recommendation 13.6 Exploring the development of a national, all-hazard warning app

Australian, state and territory governments should continue to explore the feasibility of a national, all-hazard emergency warning app.

The importance of having a radio

13.111 Government and emergency service agencies rely heavily on essential infrastructure, such as power lines and telecommunication towers, to distribute emergency information and warnings to the public. During the 2019-2020 bushfire season, some essential infrastructure was severely affected by fire and did not operate reliably, if at all. As a result, communities did not have constant access to landline or mobile phone communications, the internet or television.[105] We heard that in these situations, the public relied on ABC and community radio as the source of emergency warnings information.

13.112 Radio provides an important 'lifeline' to rural and regional communities that have no other means of obtaining emergency warnings information.[106] While radio services are an important source of emergency information, where access to mobile phone networks, television and the internet are not available, radio transmission towers are also vulnerable to damage caused by bushfires (see Figure 48). Having a battery powered AM radio improves redundancy by reducing the reliance on electricity supplies.

13.113 Although radio transmissions are sometimes more reliable than other media for receiving emergency warnings advice, no single communications medium is impervious to the impact of natural disasters.

13.114 **Individuals should ensure that they have a range of ways to receive emergency warnings information, and should not rely on any single source or means. Individuals should closely monitor their surroundings and make decisions to ensure their safety.**

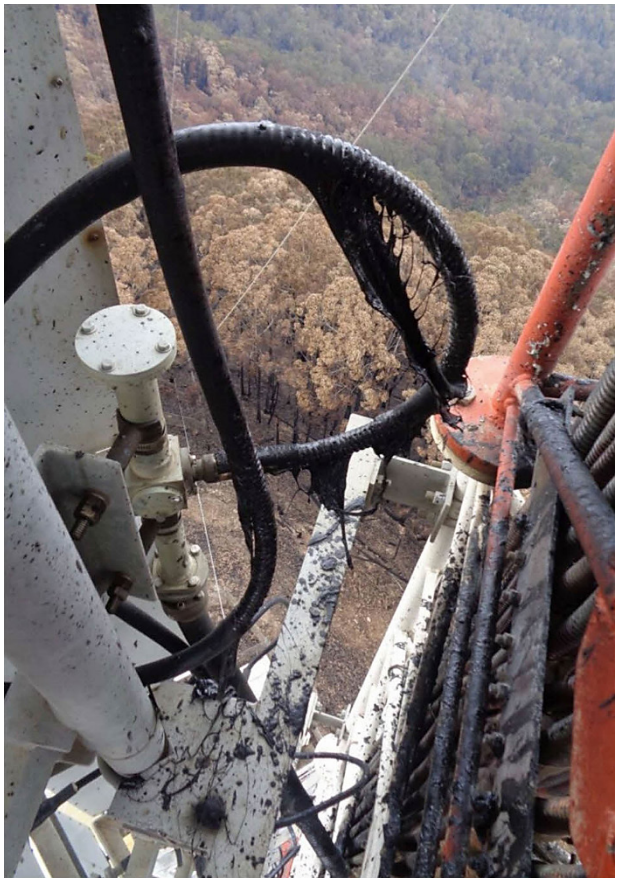


Figure 48: An ABC broadcast tower impacted by the Mount Wandera bushfire in NSW[107]

The Australian Broadcasting Corporation

13.115 The ABC is Australia's publicly funded national broadcaster. Although neither the *Australian Broadcasting Corporation Act 1983* (Cth) nor the ABC Charter prescribe a role for the ABC in emergency broadcasting, the ABC does broadcast emergency warnings.[108] The ABC told us that it has developed its role during emergencies:

> *…as part of its general responsibility to provide Australians with high quality services that keep them informed. This means that, although not specifically required or funded to provide such services, they remain central to ABC operations and have the highest priority among its activities.*[109]

13.116 The ABC has significant coverage through its radio transmission network that affords it a unique position to deliver emergency warnings information. The ABC told us that its AM radio network is accessible to over 99% of the Australian population.[110] The ABC also operates an extensive range of FM radio and digital television services.

13.117 During the 2019-2020 bushfires, the ABC experienced a significant surge in the public's use of its services across a range of platforms.[111] Between 29 December 2019 and 4 January 2020, the ABC South East audio streaming service experienced a 1,800% increase in usage and the ABC Emergency Facebook page received the equivalent of 12 months' usage during the period December 2019 to January 2020.[112]

The ABC provided emergency warnings information in relation to over 950 natural hazard events over the course of the bushfire season.[113]

> *When the power went off, towers must have been damaged in the area and communication with phones (dropped) out…most of our information then was coming from the ABC and radios.*[114]

> *The loss of communications…is a major blow to any…community. And it was total in our case…we were only connected to the outside world by listening to ABC when they were conducting their emergency broadcasts, which they did exceptionally well…*[115]

Community radio stations

13.118 Community radio stations also offer an important source of information during emergencies, particularly for Australians living in remote communities. Each week, approximately six million Australians listen to over 450 community radio stations. For many Australians, community radio is the only source of news and information available in their region.[116]

13.119 Community radio stations are also an important source of information for Indigenous and culturally and linguistically diverse Australians. There are 89 regions across Australia where Indigenous Australian community radio stations are the only broadcast services available in the region. During the 2019-2020 bushfires, over 80 community radio stations broadcast emergency warnings advice to fire affected remote Indigenous communities.[117]

Media engagement with emergency management agencies

13.120 The ABC, and other broadcasters, work with emergency management partners before, during and after emergencies to coordinate the communication of emergency information and warnings to the community.[118] The level of engagement varies across jurisdictions and includes:

- state-based emergency service training and accreditation for media personnel
- formal and informal arrangements for engaging with, and managing relationships between, local media organisations and emergency agencies
- ABC representation on emergency management committees and within operation centres, and
- agreements to access senior emergency officials during emergency incidents.[119]

13.121 The ABC submitted that embedding ABC managers within state and territory emergency management committees and operation centres facilitates the communication of timely, effective and appropriate information and warnings to the public to assist communities and individuals (including, understanding inconsistencies in emergency information terminology, symbols and explanations between states and territories). The ABC emphasised that the role of their embedded managers would be to assist with warnings and not be a journalist's function.[120]

13.122 While ABC officers have, on some occasions, been embedded in WA, NT, NSW and the ACT, we heard no consistent practice of embedding ABC managers in committees and operations centres across all jurisdictions.

13.123 Victoria and Tasmania have questioned whether formally embedding ABC managers would improve the rapid delivery of critical emergency information.[121] Concerns were expressed around resourcing, access to confidential and operational information, the potential need for a formal arrangement requiring the ABC to share the information received with other emergency broadcasters, and that it would limit the necessary flexibility in managing the varied operational arrangements in each state and territory.[122] The Australian government indicated that such an opportunity should not distinguish between public and commercial broadcasters.[123]

13.124 We also heard, however, broad support for exploring ways in which state and territory governments' could better engage with emergency broadcasters to improve the timely delivery of emergency warnings information to the public.[124] We recognise the important role that broadcast media plays in emergency information and warnings.

13.125 **State and territory governments should explore how to improve engagement between emergency managers and media representatives before, during and after natural disasters.**

13.126 **All state and territory governments (and relevant emergency service agencies, as appropriate) should provide timely warnings and public information to appropriate broadcast media to maximise the potential for critical information to reach the public.**

Chapter 14 Air quality

Summary 311

Natural disasters and poor air quality 312

Air quality information 314

- Air quality monitoring 315
- Air quality information systems 316
- Near real-time reporting 319

Health advice related to air quality 319

Public health interventions 323

Expansion of air quality monitoring networks 325

Air quality forecasting 326

Knowledge gaps 327

Summary

14.1 Development of information systems to improve air quality monitoring and reporting are a good example of coordinated efforts to support improved national natural disaster arrangements and resilience.

14.2 Natural disasters, such as storms and bushfires, can have a significant impact on air quality. Poor air quality has a range of health impacts – respiratory, mental health and cardiovascular – and can result in death. Clear and consistent information and health advice can help people manage the risks associated with poor air quality, supporting greater resilience to adverse conditions and health outcomes.

14.3 However, the presentation of air quality information is not consistent across Australia. In some areas of Australia, air quality is reported on 24 hour averages, which is of limited utility when, during a major incident, the air quality can change rapidly. Variations in reporting and the health advice to the community took on national significance when up to 80% of the population was affected by poor air quality during the 2019-2020 bushfires.

14.4 Governments, medical groups and researchers have recognised the need for improvements, particularly in the provision of consistent air quality information and associated public health advice, but inconsistency remains. Greater national consistency is required to enable individuals and communities to make informed decisions in relation to their health, wellbeing and resilience. Further, expanding air quality networks and adopting air quality forecasting would enhance community awareness and assist individuals and communities to take preventative steps to limit the negative health impacts of poor air quality.

Natural disasters and poor air quality

14.5 Some natural disasters, including storms and bushfires, can have a significant impact on air quality and impacts can be wide-ranging and potentially long-term. We heard that bushfire smoke, in particular, is a major public health concern. It contains a mixture of toxic pollutants, such as ozone, carbon monoxide, hydrocarbons and free radicals. Depending on the specific compounds, these pollutants can be respiratory irritants, reduce the capacity of red blood cells to transport oxygen, or be carcinogenic.[1]

14.6 Bushfire smoke, like other forms of air pollution, also contains very small particulate matter. Particulate matter is a complex mixture of solid and liquid particles that are classified by size ($PM_{2.5}$ and PM_{10}[2]).[3] $PM_{2.5}$ is small enough to penetrate into the lungs and enter the bloodstream and PM_{10} can enter the lungs through the nose and throat. The human body responds to $PM_{2.5}$ and PM_{10} in a similar way to an injury or virus – immune and stress responses and can lead to inflammation of tissues and organs. These physiological responses can result in chronic and acute respiratory and cardiovascular impacts, such as heart attack or stroke.[4] Exposure to particulate matter is also linked to increased mortality rates.[5]

14.7 Poor air quality can also add pressure to the health system through increased admissions to hospital, ambulance call outs, presentations to general practitioners and sales of medications.[7]

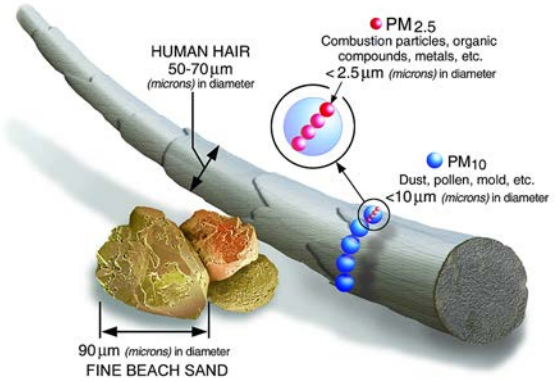


Figure 49: Size comparison of $PM_{2.5}$ and PM_{10}[6]

14.8 We are also aware of a growing body of evidence on the impacts of $PM_{2.5}$ exposure and broader health outcomes, such as negative impacts on blood glucose control, mental health, neurological function and developmental conditions in unborn children and infants.[8]

14.9 While most healthy adults and children will recover quickly from occasional acute smoke exposures, certain groups are particularly susceptible to smoke-related health impacts. These include the elderly, young children, pregnant women and people with pre-existing conditions (such as asthma, chronic obstructive pulmonary disease, high blood pressure, coronary heart disease, congestive heart failure, angina and diabetes).[9]

14.10 Research on particulate matter exposure has found that, in general, if particulate matter concentration levels double, then it could be expected that adverse health outcomes would also double.[10]

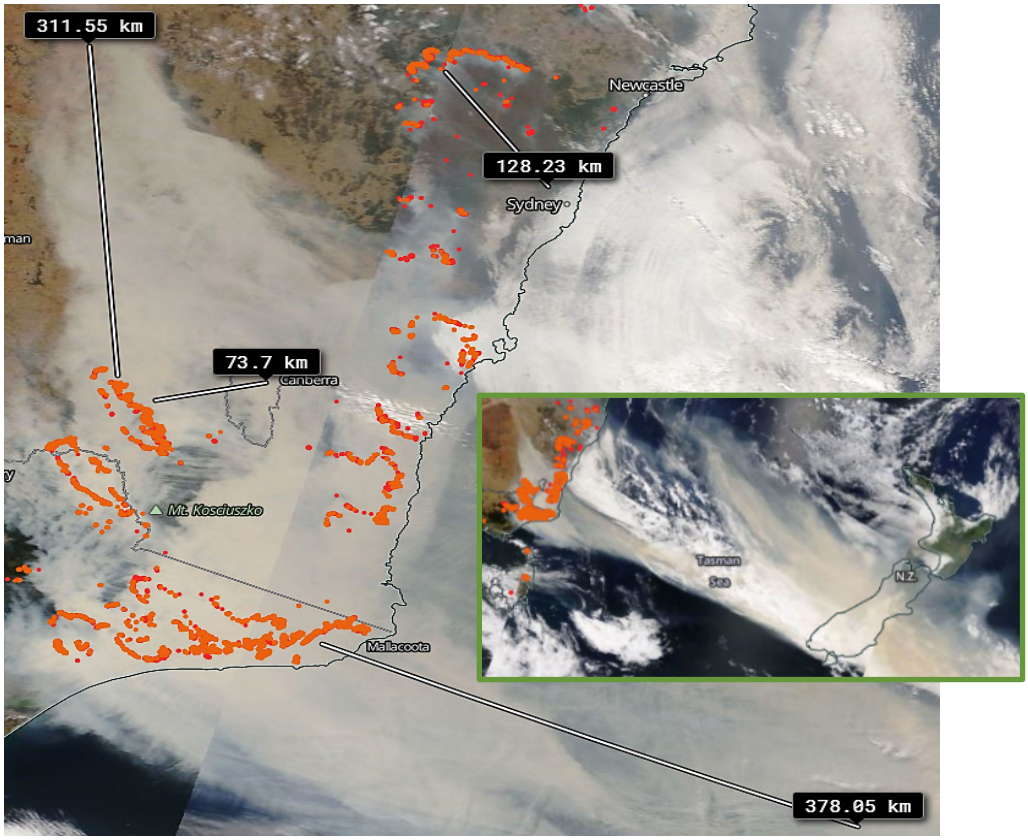


Figure 50: Satellite images of southeast Australia during the 2019-2020 bushfires.[11] The light grey is the dispersal of bushfire smoke and the red and orange areas are detected fire and thermal anomalies.

14.11 Smoke from the 2019-2020 bushfires, travelled hundreds of kilometres from its source, and blanketed large parts of Australia – see Figure 50. We heard that it adversely affected approximately 80% of the population.[12] The air quality in some areas was very poor for several weeks. We heard that peer-reviewed research indicated that smoke, from 19 weeks of continuous fire activity, may have contributed up to 429 premature deaths, 3,320 hospital admissions for cardiovascular and respiratory conditions and 1,523 presentations to emergency departments for asthma. That research also suggested that the health costs of smoke exposure from the 2019-2020 bushfires resulted in $1.95 billion in health costs, associated with premature loss of life and admissions to hospitals.[13]

14.12 Smoke exposure during the 2019-2020 bushfires had a particular impact on individuals with asthma. Asthma Australia's Bushfire Survey found that people with asthma were: more likely to report having respiratory symptoms (94%); four times more likely to attend an emergency department or be hospitalised; and seven times more likely to report requiring medication during the 2019-2020 bushfires.[14]

14.13 The impacts of poor air quality on people with asthma is not limited to bushfire smoke, and includes, for example, thunderstorms.[15] A coronial inquest found that in 2016, a thunderstorm resulted in 10 deaths[16], and the Victorian Chief Health Officer reported a 672% increase in respiratory-related emergency department presentations, a 681% increase in asthma-related admissions and 73% increase in

ambulance callouts.[17] This was likely caused by airborne allergens spread by the thunderstorm.[18]

14.14 **Poor air quality has adverse health impacts. Information on local air quality, and associated health advice, would assist communities to take preventative actions and minimise impacts.**

Air quality information

14.15 A number of organisations and individuals have called for improved air quality information. There is strong support for nationally consistent, expanded and 'real-time' air quality monitoring, supported by easy to understand and targeted public health advice.[19]

14.16 Since February 2020, and following a recommendation of the Council of Australian Governments' Health Council, Australian, state and territory governments have been working together towards national consistency in air quality information.[20]

14.17 State and territory governments are primarily responsible for monitoring and communicating air quality in Australia.[21] The *National Environment Protection (Ambient Air Quality) Measure* (NEPM AAQ) sets nationally consistent standards against which state and territory governments are required to monitor air quality. The NEPM AAQ was established under the *National Environment Protection Council Act 1994* (Cth) (NEPC Act) and corresponding legislation in each jurisdiction. The NEPM AAQ sets out maximum concentration standards for six pollutants: carbon monoxide, nitrogen dioxide, ozone, sulphur dioxide, lead, and particles (PM_{10} and $PM_{2.5}$) – see Table 8.

Table 8: Current NEPM AAQ – Standards for pollutants[22]

Pollutant	Averaging period	Maximum concentration standard
Carbon monoxide (CO)	8 hours (rolling average based on 1 hour averages)	9.0 ppm (part per million)
Nitrogen dioxide (NO_2)	1 hour (clock hour average)	0.12 ppm
	1 year (calendar year average)	0.03 ppm
Photochemical oxidants (as ozone O_3)	1 hour (clock hour average)	0.10 ppm
	4 hours (rolling average based on 1 hour averages)	0.08 ppm
Sulphur dioxide (SO_2)	1 hour (clock hour average)	0.20 ppm
	1 day (calendar day average)	0.08 ppm
	1 year (calendar year average)	0.02 ppm
Lead (Pb)	1 year (calendar year average)	0.50 µg/m³(micrograms per cubic metre)
PM_{10}	1 day (calendar day average)	50 µg/m³
	1 year (calendar year average)	25 µg/m³
$PM_{2.5}$	1 day (calendar day average)	25 µg/m³ (Goal: 20 µg/m³ by 2025)
	1 year (calendar year average)	8 µg/m³ (Goal: 7 µg/m³ by 2025)

Air quality monitoring

14.18 State and territory governments have placed air quality monitoring stations across their jurisdictions, in line with requirements of the NEPM AAQ.[23] State and territory governments also have portable monitors which can be deployed to monitor an air quality incident, such as a bushfire.[24] Some state and territory governments have also established additional networks to complement the monitoring stations required by the NEPM AAQ.[25] For example, the Victorian Government has co-designed an air quality monitoring network with the community in the Latrobe Valley in Victoria.[26]

14.19 An air quality monitoring station consists of a number of instruments that measure pollutant levels in the air and, usually, meteorological conditions. Each type of pollutant requires a different type of instrument to measure it.

14.20 The private sector and industry are also involved in air quality monitoring. For example, a private air quality monitoring network operates in the Latrobe Valley, partially funded by the Australian Government [27] – this network is separate to the Victorian Government's co-designed network. A number of industry-funded monitoring stations also operate in communities with major industries, such as coalmining and lead smelters.[28]

14.21 Not all pollutants are measured at each air quality monitoring station across Australia. State and territory governments determine the mix of pollutants measured at each site, based on local circumstances.[29] For example, the ACT does not measure sulphur dioxide as there is no significant source of that pollutant in the territory.[30] Since 2004, most state and territory governments do not monitor lead following the phasing out of leaded petrol.[31] However, monitors in Townsville and Mount Isa in Queensland,[32] and Port Pirie in SA, continue to measure ambient lead levels, due to particular local industries.[33]

14.22 The Tasmanian Government has advised us that, due to limited resources, it only publicly reports $PM_{2.5}$ and PM_{10}. It advises that screening studies conducted some years ago indicated that other pollutants under the NEPM AAQ are at very low levels in Tasmania.[34]

14.23 In general, state and territory governments use the standards in the NEPM AAQ to trigger the provision of air quality information, air quality alerts and public health advice. However, the NEPM AAQ is not routinely reviewed – the last review, *National Environment Protection (Ambient Air Quality) Measure Review*, was completed in 2011.[35] The NEPC Act, the legislative basis for the NEPM AAQ and similar measures, must be reviewed every five years. However, there is no similar legislative requirement for the measures of the NEPC Act, such as the NEPM AAQ, to be regularly reviewed.

14.24 The 2011 review made a number recommendations to change the NEPM AAQ, including in relation to its pollutant standards. In 2016, stricter reporting standards for $PM_{2.5}$ and PM_{10} were introduced, following the 2011 review and taking into account the most recent scientific advice.[36] The Australian Government told us that standards for particulate matter were reviewed in 2015 and standards for other key pollutants are actively being reviewed now.[37] The 2011 review also made recommendations to update the standards for sulphur dioxide, ozone and nitrogen

dioxide. Work is currently underway to update the standards for these pollutants (public consultation on the proposed variations closed on 7 August 2019).[38] The Australian Government has advised us that the standards in the NEPM AAQ are proposed to be next reviewed in 2025.[39]

14.25 Regular and fixed review periods, such as every five to 10 years, within the NEPM AAQ could provide the community with confidence that it takes into account the latest scientific evidence and health research on the impacts of pollutants. Any changes arising from reviews of the NEPM AAQ should be implemented in timely manner.

Air quality information systems

14.26 State and territory governments provide air quality information through a variety of means – see Appendix 21: Air quality monitoring and health advice. However, there are differences between jurisdictions in the metrics used (Air Quality Indices (AQIs)) or concentration levels and categorisation (the risk ratings which apply to different air quality levels), including the colour schemes used.

14.27 AQIs are a consolidated numerical measure that use a combination of colour coded bands and numerical values. An AQI value provides information on the extent to which the air quality falls within, or exceeds, the established national standard in the NEPM AAQ. If an AQI value is 100, then the measured air quality for a particular pollutant has reached the maximum concentration standard in the NEPM AAQ (in Table 8). An AQI does not provide information on how much of a particular pollutant is in the air.

14.28 Victoria and Tasmania do not use AQIs, and instead report the concentration levels for particular pollutants – a precise measurement of the amount of a pollutant that is in the air.

14.29 Regardless of the metric used, air quality information is reported by state and territory governments using different risk ratings. There is variability in the categories used to describe overall air quality ratings (very good, good, fair/moderate, poor, very poor, hazardous/extreme/severe), the colour coded bands used for each rating, what constitutes each rating and how the values are presented. There are also differences in the averaging periods that are reported.

14.30 In some jurisdictions, a concentration level of 50 $\mu g/m^3$ for $PM_{2.5}$ is rated as the worst air quality category, while in other jurisdictions this rating is triggered at 177 $\mu g/m^3$ – see Figure 51. Differences in averaging periods can also result in different ratings being reported for a single location at a particular point in time.[40]

14.31 In some jurisdictions, AQIs are reported for each pollutant while others only provide a composite. AQIs also assess other factors, such as visibility, which are not directly relevant to health outcomes. Consequently, the Centre for Air pollution, energy and health Research has argued for the removal of AQIs, to be replaced with categories based on pollutant concentration levels.[41] This would be similar to the current practice in Victoria[42] and Tasmania.[43]

14.32 We have not received sufficient evidence to recommend that AQIs be replaced. However, self-evidently significant discrepancies in what is said to amount to poor air quality reduces the clarity and effectiveness of air quality advice.[44] It is not surprising that the variability in AQIs and how it links to health advice has resulted in confusion in the community.[45]

Response / Air Quality Category	ACT (24HR) Based on AQI	ACT (24HR) *	NSW (24HR) Based on AQI	NT (24HR) Based on AQI	QLD (24HR) Based on AQI
Low / Very Good - Fair	0 - 8.2	0 - 8.9	0 - 8.2	0 - 8.2	0 - 8.2
	8.3 - 16.4		8.3 - 16.4	8.3 - 16.4	8.3 - 16.4
	16.5 - 25	9 - 25.9	16.5 - 25	16.5 - 25	16.5 - 25
Medium / Moderate - Poor	25.1 - 37.4	26 - 39.9	25.1 - 37.4	25.1 - 37.4	25.1 - 37.4
High / Very Poor	37.5 - 50	40 - 106.9	37.5 - 50	37.5 - 50	37.5+
		107 - 177.9			
Very High / Extreme / Hazardous	50+	>177.9	50+	50+	
		>250			

Response / Air Quality Category	SA (24HR) Based on AQI	TAS (1HR)	VIC (24HR)	VIC (1HR)	WA (24HR) Based on AQI
Low / Very Good - Fair	0 - 8.2	0 - 9	<9	<27	0 - 8.2
	8.3 - 16.4				8.3 - 16.4
	16.5 - 25	10 - 24	9 - 25	27 - 62	16.5 - 25
Medium / Moderate - Poor	25.1 - 37.4	25 - 99	>25 - 40	62 - 97	25.1 - 37.4
High / Very Poor	37.5+	100+	>40 - 177	97 - 370	37.5 - 50
Very High / Extreme / Hazardous			>177	370+	50+
			>250		

Figure 51: Comparison of air quality action categories for $PM_{2.5}$ as at February 2020 – adapted from table produced by Environment Protection Authority (EPA) Victoria.[46]

14.33 Inconsistent information, particularly from private websites and blogs, can erode the community's trust in air quality information.[47] During the 2019-2020 bushfires, some commercial and not-for-profit websites provided air quality information on bushfire-affected areas based on the United States' AQI.[48] This can create confusion as the AQIs used in the United States differ to AQIs used in Australia (for example, an AQI for $PM_{2.5}$ of 100 in Australia represents a lower concentration of $PM_{2.5}$ than an AQI of 100 in the United States).[49]

14.34 **Air quality information, including the use of AQIs, could be improved by providing more detailed and accessible information to the public, such as through the use of national apps, websites and traditional messaging communication modes.**

14.35 **There is an urgent need for national consistency in the categorisation of air quality. This includes consistency in the information provided, the labels and colour coded bands used, what constitutes each rating and how the values are presented.**

Box 14.1 Air quality information in NSW, SA and Victoria

New South Wales[50]

0 – 33 Very Good	34 – 66 Good	67 – 99 Fair	100 – 149 Poor	150 – 199 Very Poor	200+ Hazardous

New South Wales uses an AQI - the AQI value is calculated for each pollutant, and the maximum AQI value is reported online. Disaggregated AQIs and concentration levels are also available online for each monitored pollutant.

- **Air quality forecasts** – provided online, and to subscribers as SMS alerts or emails. When air quality is forecast to be above AQI 100, health alerts are auto-generated and delivered to subscribers. General health advice is provided with forecasts, based on the projected category.
- **Air quality alerts** – automated air quality alerts, via SMS or emails. An alert is issued when an AQI above 100 is measured at any site for the entire region (limited to one per day per region).
- **Data delivery services** – public access to hourly air quality and meteorological data is available via the NSW air quality Application Programming Interface and the data-download facility.
- **Public health communications** – during a natural disaster there is typically increased public communications, including media conferences by senior officials, media releases and social media.

South Australia[51]

0 – 33 Very Good	34 – 66 Good	67 – 99 Fair	100 – 149 Poor	150+ Very Poor

South Australia uses an AQI - the AQI value is calculated for each included pollutant, and the maximum AQI value is reported online. Concentration levels are also available online for each monitored pollutant.

- **Validated monitoring data -** includes both pollutant and meteorological data that has been through a verification process to remove any errors. This data is published on the South Australian Government Open Data Portal.
- **Public health communications** – public health messaging related to reduced air quality is provided through media releases, media interviews, press conferences, and social media posts as needed.
- **Alerts** - during natural disasters alerts or further information is provided through the South Australia Environmental Protection website, social media and local media platforms (print, radio and TV).

Victoria[52]

Variable Good	Variable Moderate	Variable Poor	Variable Very Poor	Variable Hazardous

Victoria does not use an AQI - it evaluates each pollutant on a non-linear scale. Concentration values are compared to the air quality categories, and the highest air quality category is reported online. There are five defined categories with descriptors.

- **AirWatch** – a website which provides an interactive map, graphs and a table showing air quality information measured at stations around Victoria with location data updated each hour. AirWatch includes general health and air quality forecasts.
- **Air quality alerts** – alerts are delivered through a variety of modes, including media releases, social media, online, AirWatch notices, and the Vic. Emergency App. Alerts are issued when air quality has been monitored as: **Poor** for 6 hours or more; **Very Poor** for 4 hours or more; and **Hazardous** for one hour or more.
- **Air quality report** – developed during a natural disaster for the Incident Controller and other emergency services personnel.
- **Public health communications** – during a natural disaster there is increased public communications, including media conferences by senior officials, media releases and social media. Public health advice is also available on the Health Channel, and the VicEmergency Hotline (1800 226 226) and website.
- **Data delivery services** – access to air quality data is available via EPA Victoria's air quality Application Programming Interface.

Near real-time reporting

14.36 During the 2019-2020 bushfires, there was demand within the community for 'real-time' air quality information. However, at the time, many state and territory governments based air quality information for $PM_{2.5}$ and PM_{10}, both major components of bushfire smoke, on levels averaged over 24 hours, consistent with the NEPM AAQ (Table 8). Victoria and Tasmania had adopted shorter averaging periods for $PM_{2.5}$ and PM_{10} prior to the 2019-2020 bushfires.[53]

14.37 Air quality conditions can change rapidly, particularly during an air quality incident, such as bushfires or storms. This means that reporting 24 hour averages often does not provide an accurate representation of air quality at a particular point in time.[54]

14.38 The ability to access near real-time information is important for the public and is crucial for high-risk individuals. Vulnerable individuals can experience deterioration in their health as the result of modest changes in air quality – and well before a 24 hour standard is exceeded. Early notification of worsening air quality enables the community to take preventative action, such as seeking cleaner air spaces, sealing an indoor environment, or taking preventative medication.[55]

14.39 It seems that the term 'real-time' air quality monitoring can, however, be misleading. Excessively short averaging periods can result in large fluctuations in measured air quality data. This can result in low-quality data which are not representative of the overall conditions in a local area[56] – for example, there may be a single short lived 'spike' in reported air quality.

14.40 There is a broad consensus across governments and researchers on the need for shorter averaging periods for measured pollutants[57] – experts generally agree that one hour averaging periods are an appropriate standard.[58] Shorter averaging periods allow for near to real-time air quality information and will help people to take meaningful steps to reduce their exposure to poor air quality.[59]

14.41 Some state and territory governments already use one hour averaging periods.[60] Queensland adopted one hour averaging periods for $PM_{2.5}$ and PM_{10} in advance of the 2020-2021 bushfire season.[61] NSW and the ACT transitioned to one hour averaging periods for particulate matters as a result of the 2019-2020 bushfires.[62]

14.42 The Environmental Health Standing Committee of the Australian Health Protection Principal Committee (AHPPC) has agreed that reporting should be based on one hour averages of $PM_{2.5}$ concentrations. If endorsed by the AHPPC, this framework will be implemented by environment protection agencies across Australia.[63]

14.43 **Shorter averaging periods in the reporting of air quality information would better reflect the health risks associated with poor air quality.**

Health advice related to air quality

14.44 State and territory governments use a variety of means for the provision of health advice relating to air quality. Advice may be provided through social media, websites, media releases, information provided by key personnel and alerts. The frequency and

triggers for the provision of health advice differ between jurisdictions – see Appendix 21: Air quality monitoring and health advice.

14.45 The content of general health advice varies between jurisdictions. Some provide more detailed information while others provide simplified messaging.[64] Table 9 provides a sample of such advice provided by NSW and Victoria – see Appendix 21: Air quality monitoring and health advice. State and territory governments also provide more tailored health advice and information for vulnerable groups – but this also varies in its specificity.[65]

14.46 Differences in the health advice provided to communities can cause confusion, particularly in cross-border areas. This undermines the utility of health advice and poses risks to vulnerable members of the community. Nationally consistent advice on the health impacts of air pollution, including smoke from bushfires, can assist in better managing its risks while providing useful information and advice to the general population and vulnerable people on how to protect their health.[66]

14.47 State and territory governments typically publish general advice, aimed at mitigating risks associated with poor air quality, but take a more proactive role during an air quality incident, such as bushfire. For example, Queensland is guided by the *Information for Public Health: Public health messaging for landscape fire smoke* during a bushfire, which guides public health messaging and actions, taking into account $PM_{2.5}$ concentration levels and the duration of exposure.[67] The ACT uses seven ratings, separate and different to its AQI, to provide public health advice related to risks during smoky conditions, specifically in relation to $PM_{2.5}$.[68]

Table 9**:** Sample of air quality health advice provided by NSW and Victoria

New South Wales		Victoria	
AQI	**Health advice**	**Category**	**Health advice**
Very poor 150-200	Sensitive groups should avoid strenuous outdoor activities Other adults should reduce or reschedule strenuous outdoor activities	**Very Poor**	• The air is probably very dusty or smoky. Everyone could be experiencing symptoms like coughing or shortness of breath. • Listen to your local emergency radio station or visit Emergency Vic. for advice. • Avoid being outside in the smoke or dust. Reduce prolonged or heavy physical activity. • If you are sensitive to air pollution, follow your treatment plan. Avoid physical activity outdoors. • Close your windows and doors to keep smoke and dust out of your home. • If you think the air in your home is uncomfortable, consider going to an air-conditioned building like a library or shopping centre for a break if it's safe to do so. • If you are worried about your symptoms, see your doctor or call Nurse On Call on 1300 606 024. • Seek urgent medical help if anyone has trouble breathing or tightness in the chest. Call 000 for an ambulance.

14.48 Protective health advice on air quality needs to strike a balance between the level of detail provided and ensuring that the information is easily understood by the community. Advice needs to be clear, consistent, evidence-based, outline activities that should be avoided, and complemented with targeted advice and plans for vulnerable groups.[69] Public health advice should also be accessible and provided through a variety of means to ensure the broadest possible exposure and access.[70]

14.49 **There is value in nationally consistent, evidence-based and easily understood health advice in relation to air quality**.

14.50 We heard of the need for greater education on air quality so that the community is better able to manage the risks associated with it.[71] Any education would need to be informed by a greater understanding of the impacts of poor air quality on human health. Increased community education on air quality could foster a greater understanding of air quality and its impacts.

14.51 **Improved community education would help enhance the community's understanding of air quality and allow individuals to manage periods of poor air quality.**

14.52 The provision of timely health advice during an air quality incident is dependent on the availability of air quality information. There is variability in the systems and processes used by environmental agencies to provide air quality information to health departments. For example, Queensland has developed an automated system which provides regular air quality reports to health departments (and other disaster management agencies).[72] We heard of instances of real-time air quality information not being provided to health departments.[73] This could limit its utility in developing specific health advice during an air quality incident.

14.53 **The availability of near real-time and, ideally, automated provision of, air quality information from environmental agencies to health departments is important in the provision of timely health advice during an air quality incident.**



Figure 52: Bushfire smoke over Parliament House in Canberra[74]

Box 14.2 Hazard reduction activities and health advice

Smoke generated from hazard reduction activities can have significant health impacts, particularly for vulnerable groups. Research suggests the cumulative impact of moderate exposure to particulate matter, such as multiple days of minor smoke exposure from a hazard reduction burn, could be equally as damaging as severe short-term exposure.[75]

Decision makers must balance conducting hazard reduction activities with community health impact. The level of involvement of state and territory health authorities in hazard reduction activities varies. State and territory health authorities are not routinely involved in the decision-making process as to the timing of hazard reduction activities.[76] Health authorities may be involved in the development of hazard reduction protocols and frameworks, or involved in working groups. For example, NSW Health is on the NSW Hazard Reduction Burn Smoke Steering Committee.[77] Some state and territory governments have specialised frameworks to support decision-making for smoke and other emissions, such as Victoria's *Smoke Framework.*[78]

Proactively managing and minimising the impacts of smoke from all-hazard reduction activities can yield substantial public health benefits.[79] Community concerns regarding these impacts can, understandably, prompt criticism of hazard reduction activities.[80] Ideally, hazard reduction planning would take into account the health risks associated with generated smoke, although this must also be balanced with risks associated with high fuel loads. Local communities should be notified in advance when a burn is scheduled and be supported by comprehensive air quality monitoring for the duration of hazard reduction activity.[81]



Figure 53: A NSW ranger carries out a controlled hazard reduction burn[82]

Public health interventions

14.54 We heard concerns about the level of guidance and support provided to communities to minimise the impacts of poor air quality. A common response to poor air quality is the use of facemasks. However, we heard that advice relating to their use can be confusing, inconsistent, and often the evidentiary basis for its use is relatively poor.[83] Paper or cloth facemasks are ineffective at filtering small particles. P2 and N95 facemasks are only effective at filtering small particles (not toxic gases) and only if properly fitted. These facemasks are impractical for use by children and are ineffective if a tight facial seal is not achieved (for example, due to facial hair).

14.55 We heard that the use of portable air cleaners or air purifiers similarly has insufficient guidance.[84] Air purifiers are only effective at reducing indoor air pollution levels when they are: fitted with high-efficiency particulate air (HEPA) filters; used in a well-sealed area; and used in a room size that is consistent with the manufacturer's recommendations. Air purifiers can have a significant upfront cost.[85]

14.56 Recommended interventions may also be impractical and provide a false sense of security. Public health advice often focuses on shelter in place at times of poor air quality. Sheltering in place may, however, provide poor protection, particularly in older buildings. Older buildings are often inadequately sealed and may not offer any protection from outdoor air pollution.[86]

14.57 Australian, state and territory governments supported, or supported in principle, the development of close to real time, nationally consistent public messaging on air quality.[87] The ACT also suggested development of a national guidance similar to the United States Environmental Protection Agency's Wildfire Smoke Guide for Public Health Officials[88] (see Box 14.3).[89]

14.58 **There is a need for greater guidance to the community on health interventions that help mitigate the impacts of poor air quality. Additional guidance and planning could help communities better prepare for poor air quality and develop effective and practical interventions. This will assist to mitigate the impact of poor air quality, particularly for vulnerable groups.**

Recommendation 14.1 Nationally consistent air quality information, health advice and interventions

Australian, state and territory governments should:

(1) develop close to real-time, nationally consistent air quality information, including consistent categorisation and public health advice

(2) greater community education and guidance, and

(3) targeted health advice to vulnerable groups.

Box 14.3 Preparing and planning for smoke – 'Smoke Plans'

'Smoke Plans' have been suggested as one approach to mitigate the impacts of air quality incidents. These plans would be developed by individuals and key institutions and would identify the impacts of air pollution and strategies to mitigate the effects of exposure. Smoke Plans have been successful in the United States and the Victorian Government is exploring their use.[90]

Planning processes could help with the development of specific strategies before an air quality incident. For example, it could assist with the identification and preparation of clean air locations for those needing to seek shelter - such as libraries, shopping malls, community centres, or schools that have tightly sealed windows and appropriate heating, air-conditioning and ventilation systems fitted with high-efficiency particulate air (HEPA) filters. It could also support the use of interventions to reduce the impact of smoke inside buildings for longer events.[91]

The United States Environmental Protection Agency has published the *Wildfire Smoke Guide for Public Health Officials*. This guide is intended to provide public health officials with information they need to be prepared for smoke events and to communicate health risks and take measures to protect the community. The guide is accessible to the public to help them mitigate the risks associated with smoke.



Figure 54: US Wildfire Smoke Guide for Public Health Officials and factsheets

The guide provides a consolidated resource which outlines the impact of smoke and specific strategies to reduce exposure covering a range of circumstances. The guide includes a series of factsheets to prepare for the smoke impacts before the start of the 'fire season'; how to protect children, pets and livestock from smoke; and effective options to filter the air at home to reduce indoor air pollution. The guide also provides information on identifying and preparing clean air shelters for use by the public and protecting workers in offices and other indoor spaces.

Expansion of air quality monitoring networks

14.59 We heard that many areas, particularly rural and remote areas, did not have access to relevant and timely air quality information during the 2019-2020 bushfires.[92]

> *...there were limited real-time air quality monitoring stations around some of the other bushfire affected areas such as Rockhampton in Central Queensland. To compensate, Queensland Health relied on visual observations from regional Public Health units and location of bushfires as advised by [Queensland Fire and Emergency Services] to estimate air quality.*[93]

14.60 During the 2019-2020 bushfires, NSW deployed portable air quality monitoring instruments to bushfire-affected areas in Cooma, Lismore, Grafton, Merimbula, Coffs Harbour and Port Macquarie.[94] Victoria also deployed monitors to 15 locations across the state.[95]

14.61 The main barriers to the expansion of the air quality monitoring network include:[96] high establishment costs (which can range from $120,000 and $250,000 per site); ongoing operational costs (which can range from $20,000 to $60,000 per site per annum); the need for highly skilled staff; and the need to identify suitable locations to install a monitor.

14.62 In addition, establishing fixed air quality monitoring stations in every town in Australia would be inefficient and have limited utility. In many areas there would not be significant sources of air pollution unless there was an air quality incident, such as a bushfire. Most state and territory governments assess the health risks and emission and pollutant sources when determining the location of fixed, temporary and mobile air quality monitoring stations.[97]

14.63 **More expansive air quality monitoring networks, based on an assessment of risk and utility, would provide communities with more accurate and relevant air quality information**.

14.64 While air quality monitoring stations in every town in Australia would be cost-prohibitive, there is increasing recognition of the value of low-cost and medium-cost sensors.[98] A number of state and territory governments are trialling and evaluating these sensors to assess their suitability to complement existing air quality monitoring networks.[99]

14.65 However, low-cost and medium-cost sensors are not a 'silver bullet'. There are a number of limitations with these monitors, including in relation to their functionality, reliability and quality, especially under extreme environmental conditions.[100] There is also an absence of nationally agreed verification, correction and calibration standards for low-cost and medium-cost sensors. [101] As a consequence, caution is required when comparing air quality data from these sensors to data from broader air quality networks. The quality of data can vary significantly across different low-cost and medium-cost sensors, which can undermine the veracity of air quality information.[102]

14.66 We heard of the need for an agreed national system to certify and verify different types of sensors, which would support use of the data in air quality information.[103] State and territory governments have taken steps to establish such a system. The

Clean Air Society of Australia and New Zealand, with the support of state and territory governments, has developed an independent testing and evaluation scheme. This scheme is intended to provide technical guidance on how low-cost sensor manufacturers can verify their equipment against reference monitoring equipment.[104]

14.67 **The use of low-cost sensors to complement air quality monitoring networks should be supported by nationally agreed standards and processes to verify low-cost monitors and integrate the data provided by those monitors within broader air quality networks.**

Air quality forecasting

14.68 The significant impacts of smoke from the 2019-2020 bushfires highlighted the need for a national air hazard forecasting capability,[105] as recommended by the CSIRO in its *Report on Climate and Disaster Resilience*.[106]

14.69 A number of tools have been developed to support forecasting capabilities. For example, the Victorian and NSW governments funded the creation of a smoke plume forecasting capability - Air Quality Forecasting System (AQFx). The AQFx was designed by CSIRO and is managed and delivered by the Bureau of Meteorology, which provides the required meteorological information (such as weather reports and forecasts).[107]

14.70 The AQFx was used during the 2019-2020 bushfires to generate smoke forecasts in Victoria and NSW. These forecasts were used to help manage hazards to health, aviation and Australian Defence Force operations. The AQFx was also used to develop forecasts which were communicated to the community through air quality alerts.[108]

14.71 As an emerging tool, further validation and improvements are required for AQFx, including its usability in forecasting prolonged smoke events, flexibility in incorporating rapidly changing input data on fire behaviour and integration with other output data (for example, population density).[109] The Victorian Government and the University of Melbourne have suggested that the AQFx be transitioned to an operational system within the Bureau of Meteorology.[110] The Bureau of Meteorology (BoM) and CSIRO expressed support for the transition of AQFx to an operational system within the BoM, supported by CSIRO and the jurisdictions.[111]

14.72 The AQFx system is one of many tools that is available or being developed to support air quality forecasting. There is in-principle support across governments and researchers for the development of a national air quality forecasting capability, not necessarily limited to the AQFx system, to be provided as an ongoing service through the BoM.[112] Any approach to national air quality forecasting should be consistent, integrated and accessible.

Recommendation 14.2 National Air Quality Forecasting Capability

Australian, state and territory governments should develop national air quality forecasting capabilities, which include broad coverage of population centres and apply to smoke and other airborne pollutants, such as dust and pollen, to predict plume behaviour.

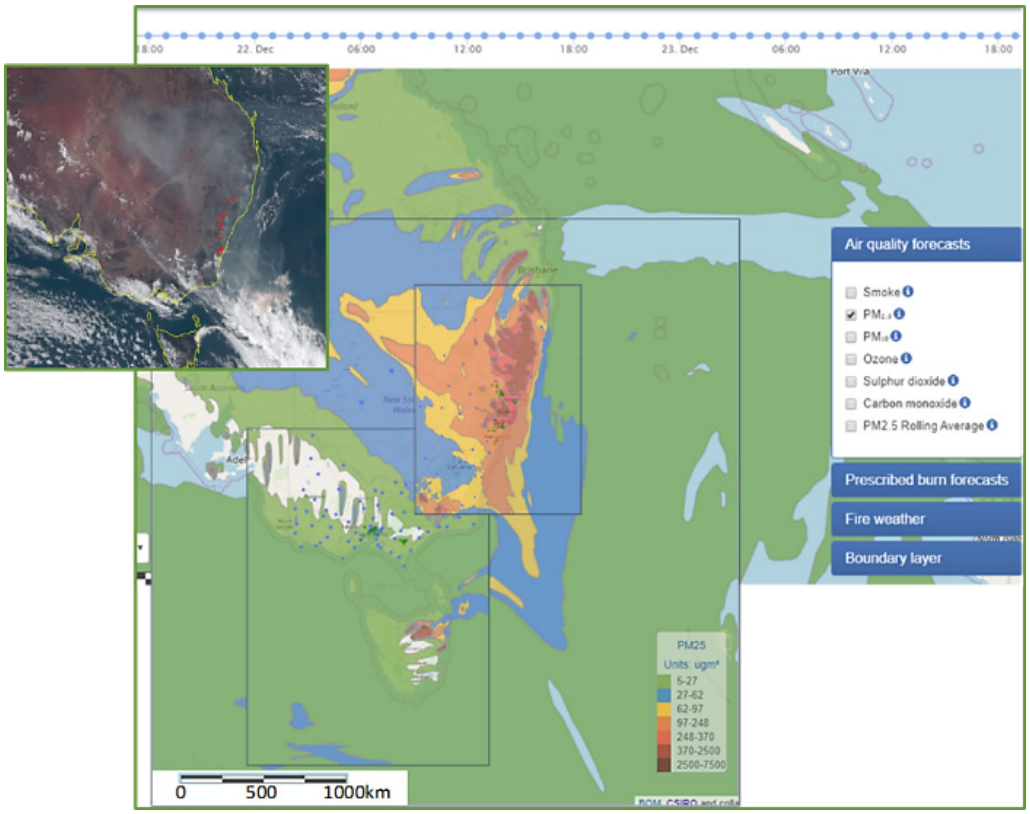


Figure 55: Visible satellite image (left); AQFx $PM_{2.5}$ forecast (right)[113]

Knowledge gaps

14.73 The total impact of poor air quality on human health is not presently known. This is particularly the case in relation to: the underlying biological mechanisms involved in respiratory impacts; the longitudinal and long-term health impacts of repeated, time-limited and prolonged exposure to smoke at different concentrations; the time taken to recover between smoke events; and the impacts on vulnerable groups.[114]

14.74 Public health advice related to air quality would benefit from a greater understanding of the effectiveness of strategies designed to minimise the impact of poor air quality. This includes: a better understanding of the efficacy of air shelters, filters, and facemasks; and developing an evidentiary basis for public health advice relating to sheltering in place - taking into consideration the impracticalities of sheltering in place over prolonged periods and limitations of older buildings to prevent pollutants getting inside.[115]

Box 14.4 NSW Air Quality Forecasting

Air quality forecasting is a complex science. Accurate forecasts require compilation of substantial data on forecast weather, current and background air pollution levels and pollutant emissions from multiple industries, activities and regions.[116] To support this, NSW has developed an Air Quality Forecasting Framework,[117] which is the basis of its air quality forecasting system. The framework uses a range of inputs and systems, including emissions and plume trajectory modelling.[118]

The NSW Government currently provides daily air quality forecasts for the Sydney Metropolitan Region and is in the process of extending forecasts to other regions. These forecasts are provided online and delivered via SMS and emails to subscribers at 4:00pm (for the next day).[119]

During extreme events, updated forecasts may be issued at other times. When air quality is forecast to be 'poor' or worse (AQI above 100), health alerts are auto-generated and delivered to subscribers.[120]

These forecasts help people who are sensitive to air pollution to manage their exposure and inform responses to pollution incidents.[121]

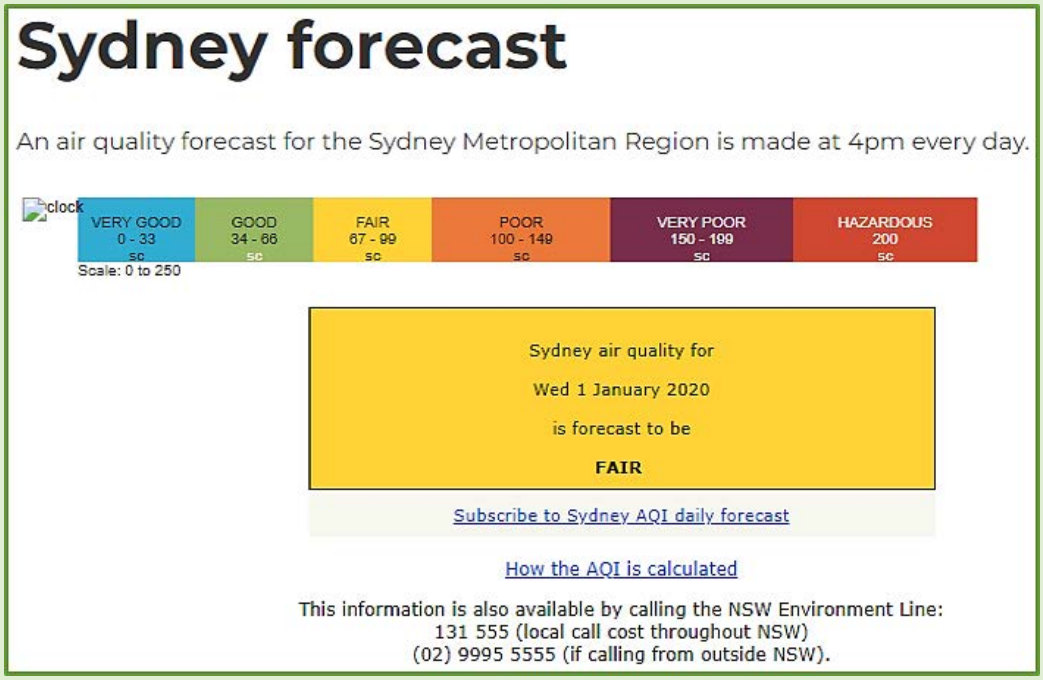


Figure 56: Air quality forecast for the Sydney Metropolitan Region on 1 January 2020[122]

14.75 During the 2019-2020 bushfires, the Australian Government announced that approximately $3 million from the Medical Research Future Fund will be provided for research into the physiological impacts of prolonged bushfire smoke exposure.[123] Four projects have been funded focusing on:[124]

- identifying and treating the physiological impacts of bushfire smoke
- the respiratory impacts of bushfire smoke on vulnerable groups
- the physiological impacts of bushfire smoke on emergency responders and outdoor workers, and
- the efficacy of facemasks in filtering bushfire smoke.

14.76 Research of this nature is valuable and should continue to be supported. A national research effort, involving the Australian, state and territory governments, is needed to address current knowledge gaps related to air quality. Addressing the knowledge gaps will assist in developing and implementing appropriate clinical and public health practices to mitigate the impact of poor air quality.

14.77 **There is value in Australian, state and territory governments addressing knowledge gaps relating to the impacts of poor air quality and better understanding the efficacy of current air quality related health advice and mitigation strategies.**

Chapter 15 Health

Summary 331

Health and natural disasters 332

Australia's health system during natural disasters 332

National health arrangements and capabilities 333

Australian Medical Assistance Teams 336

Jurisdictional arrangements 340

Primary healthcare and access to healthcare during disasters 340

Primary healthcare providers and Primary Health Networks 340

Access to healthcare and medications 343

Mental health and natural disasters 345

Mental health effects of natural disasters 345

Delivery of mental health services 346

Health and environmental outcomes data 350

Summary

15.1 Natural disasters can have an adverse impact on the health and wellbeing of individuals and communities. They can result in acute and chronic physical impacts, intensify mental health conditions and place pressure on the health system. The health and mental health response to natural disasters requires effective planning and those of national scale or consequence need to be supported by national coordination mechanisms.

15.2 In Australia, state and territory governments are primarily responsible for managing health emergencies, including those relating to natural disasters. Management of health emergencies is coordinated between state and territory health authorities, Local Hospital Networks and, to varying degrees, primary care providers. The Australian Government becomes involved when there is a national or international impact, or where an emergency has the potential to overwhelm or exhaust the capacity of state and territory governments. Under these arrangements, state and territory governments can request that national capabilities be activated by the Australian Government.

15.3 These principles appear to be well understood and clear. However, the experience of the 2019-2020 bushfires, floods and pandemic highlight a need to clarify the delivery of the national health emergency response and capabilities – one example being the use of Australian Medical Assistance Teams domestically. Current and forthcoming reviews of national health plans and capabilities provide an opportunity to clarify arrangements and incorporate lessons from these extreme events.

15.4 Primary healthcare is generally the main point of contact that Australians have with the health system. Primary healthcare providers and Primary Health Networks can play an important role in supporting health responses during and following natural disasters. However, to date they have not been adequately incorporated in health responses and disaster planning processes at the local, state and territory and national levels. Similarly, there is scope for the Australian, state and territory governments to pre-identify a set of measures which enable continuous access to healthcare and medications and to incorporate these into relevant disaster plans.

15.5 While a range of programs and funding are provided, there is scope to improve the coordination and delivery for mental health services. The long-lasting trauma of disaster events over the last decade underscores the need for greater planning for the delivery of long-term locally-based and appropriate mental health services.

15.6 National health research and data linkages play an important role in identifying the health risks of a natural disaster and building resilience. Existing health data could be more effectively used and linked to other data sources, such as environmental data. Standards which guide the collection, storage and exchange of relevant data will support healthcare planning, resource allocation and health systems resilience.

Health and natural disasters

15.7 Natural disasters can have an adverse impact on the health and wellbeing of individuals and communities. Natural disasters, in both the short and long-term, can increase the incidence of many health conditions.[1]

15.8 Acute impacts can range from mild, short-term symptoms, such as irritated eyes, to more severe conditions. Burns to the body, as result of bushfires, can be life threatening or lead to lasting disabilities that require long-term medical treatment. Heat can be a serious stressor, leading to dizziness, confusion, dehydration and heat stroke.[2] It is also linked to preterm births, increased deaths in the elderly population and is associated with long-term neurological effects.[3] Smoke from bushfires can also have a significant impact through respiratory and cardiovascular complications[4] – see Chapter 14: Air Quality.

15.9 Adverse health impacts are not limited to fire hazards. It has been estimated that people affected by the 2011 Brisbane floods were 5.3 times more likely to experience worse overall health and 2.3 times more likely to experience worse respiratory health outcomes, compared to the general population.[5]

15.10 Natural disasters can also exacerbate chronic conditions, such as cardiovascular disease, diabetes and chronic obstructive pulmonary disease.[6] This can be caused by increased susceptibility to injury or infection, separation from medication or treatment, inhaled toxins, or crush injuries.[7]

15.11 Exposure to natural disasters also affects short and long-term mental health and wellbeing. Although the majority of those exposed to a disaster have only mild, transitory symptoms, some people will develop a mental health disorder post-disaster.[8]

15.12 Natural disasters also have indirect health impacts. These include damage to health infrastructure, requiring patients to be evacuated; loss of access to healthcare and medications; and dislocation between patients and their care providers resulting in deterioration of chronic conditions and a failure of early diagnosis of life-threatening diseases.[9]

15.13 Many vulnerable people live in areas at increased risk of natural disasters and more limited access to health services. Vulnerable population groups may also have a higher risk of, or higher potential exposure to, negative health outcomes when facing natural disasters,[10] in particular children and young people. Natural disasters can also lead to environmental health consequences, including through contaminated food and water.[11]

Australia's health system during natural disasters

15.14 Responsibility for the health system is based on Australia's federal system of government, and incorporates both public and private structures. The Australian Government's responsibilities include Medicare and the Pharmaceutical Benefits Scheme (PBS), elements of primary care, including Primary Health Networks (PHNs). State and territory responsibilities include delivering preventive health

services, public community-based and primary health services, and funding and managing ambulance services.[12] The funding for public hospitals is complex and shared between Australian, state and territory governments. Local Hospital Networks (LHNs)[13] are responsible for a group of local hospitals, or an individual hospital, and linking to services within a local area.

15.15 In Australia, state and territory health authorities are primarily responsible for managing health emergencies. Responses to health emergencies are coordinated between state and territory health departments, LHNs and, to varying degrees, PHNs where they exist. Australian Government health authorities become involved when there is a national or international impact, or where an emergency has the potential to overwhelm or exhaust the capacity of state and territory governments. Under Australia's arrangements, state and territory governments can request that national capabilities be activated by the Australian Government.

National health arrangements and capabilities

15.16 The National Health Security Agreement (NHS Agreement) was agreed between the Australian, state and territory governments in November 2011. The NHS Agreement supports the *National Health Security Act 2007* (Cth) and establishes a framework for clear, quick and informed decision-making to support a coordinated national response to public health emergencies. A national response can be activated at the request of an affected, or potentially affected, state or territory. The Australian Government can act unilaterally only in the national interest.[14]

15.17 The National Health Emergency Response Arrangements (NatHealth Arrangements) are established under Part 3 of the NHS Agreement. They broadly outline coordination and governance principles applicable during national health emergencies.[15] National health sector plans are subordinate to the NatHealth Arrangements[16] and describe more detailed strategies for the management of specific hazards – such as the Domestic Response Plan for Mass Casualty Incidents of National Consequence (AUSTRAUMAPLAN).

15.18 Under the NHS Agreement and NatHealth Arrangements, strategic coordination of a public health emergency occurs through the Australian Health Protection Principal Committee (AHPPC). The role of the AHPPC is to develop strategic advice on how to meet national coordination needs associated with health emergencies. This could include coordinating operational health responses, developing national health protection policies, priorities, guidelines and standards, and assessing the need for coordinated national public health messaging.[17]

15.19 When a significant health event or emerging threat is identified, an emergency teleconference may be called at the discretion of the Chair of the AHPPC, the Chief Medical Officer of Australia (CMO). Professor Brendan Murphy, CMO during the early stages of the COVID-19 pandemic, told us the National Incident Room (NIR) is activated by the CMO 'when there is an emerging issue', be it a 'threat to public health or require coordination or close monitoring'.[18]

15.20 The NIR is the Australian Government Department of Health's emergency operation centre. The NIR has ongoing responsibility for monitoring health incidents and other

incidents with actual or potential significant health impacts. The NIR supports the AHPPC to coordinate national health sector responses, including through routine intelligence gathering and reporting.[19] State and territory agencies provide information and data to the NIR.[20]

15.21 The NIR has been constantly active since late 2019, and has had a 'significant expansion of capacity'.[22] This is due to a number of overlapping and consecutive health emergency responses, including: Ebola in the Democratic Republic of the Congo; poliovirus in Papua New Guinea and Indonesia; elevated measles importations into Australia (caused by a global resurgence of measles); a major measles outbreak in Samoa; the 2019-2020 bushfires and heatwave; the Whakaari/White Island volcano disaster in New Zealand; and the COVID-19 pandemic.[23]



Figure 57: NIR activated for the COVID-19 pandemic[21]

15.22 The NIR was activated for the 2019-2020 bushfires on 12 November 2019, triggering coordination and information sharing under the NatHealth Arrangements.[24] Formal coordination of a national health sector response commenced on 5 January 2020 with the first meeting of the AHPPC[25] dedicated to the 2019-2020 bushfires.

15.23 The NIR is the key Australian Government coordination facility in the event of a public health emergency, such as a pandemic. Professor Murphy told us it is directly linked to the World Health Organization, and during the acute phases of COVID-19 and in the peak of the bushfire response in December 2019/January 2020, it was run '24 hours a day' so that there was a 'single point of contact for information'.[26] Professor Murphy told us there was a 'very close partnership' between the NIR and the Australian Government's Crisis Coordination Centre (CCC).[27] The CCC is a whole-of-government coordination facility that provides a single source of knowledge for all hazards monitoring and situational awareness of current and emerging sources of risk and threat to Australia.[28] **There should be appropriate interaction and close coordination between the CCC and the NIR.**

15.24 Under the NatHealth Arrangements, the AHPPC may task, activate or deploy a number of established coordination arrangements and capabilities, including the National Health Emergency Management Subcommittee, Australian Medical Assistance Teams (AUSMATs), and the National Medical Stockpile.[29]

Box 15.1 Australian Health Protection Principal Committee

The AHPPC is the peak national health sector committee responsible for preparing and responding to public health emergencies and is a key decision making body. The AHPPC is chaired by the Australian Government Chief Medical Officer and includes the Chief Health Officers of each state and territory. AHPPC also includes representation from the Australian Defence Force, Emergency Management Australia and the National Critical Care and Trauma Response Centre.[30]

In a public health emergency, the AHPPC will develop a consensus-based approach to decision making and develop public health advice and appropriate responses, which are enacted in each jurisdiction.[31] During public health emergencies, Chief Health Officers are able to issue public health orders or directions which assist in managing the emergency (such as movement restrictions) - although the extent of these powers and broader functions varies between state and territory governments. These powers are similar to those available to combat agencies during a natural disaster.

The AHPPC is supported by five standing subcommittees – see Figure 58. The AHPPC typically advises health ministers on national health protection priorities and policy issues through the Council of Australian Governments' (COAG) Health Council and the Australian Health Ministers' Advisory Council.[32] During the COVID-19 pandemic, the AHPPC provided advice directly to heads of government, through the National Cabinet, [33] collapsing several layers of bureaucracy.

During the 2019-2020 bushfires, the AHPPC considered a range of issues related to national health responses, including health advice on the use of masks, national messaging on managing the effects of prolonged exposure to smoke, the supply of medications, and workforce pressures. The AHPPC also provided advice which led to the release of P2 masks from the National Medical Stockpile (a strategic reserve of medical equipment and medications).[34]

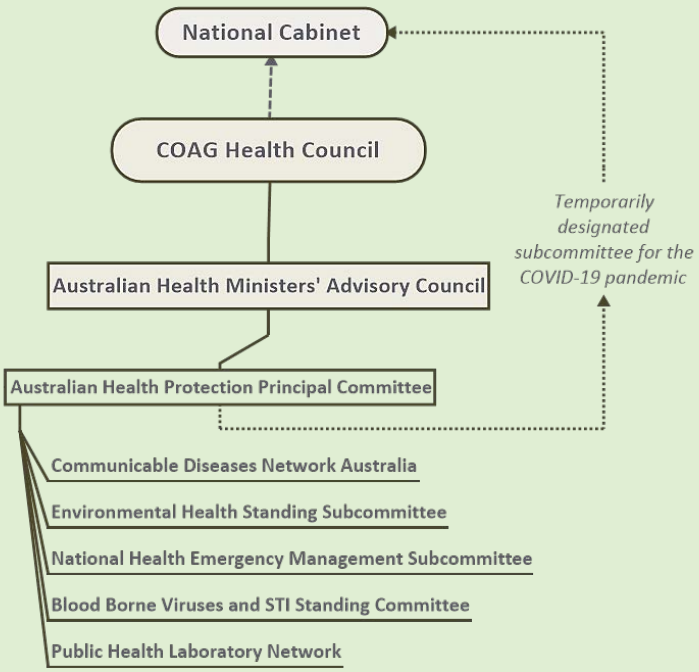


Figure 58: National committees involved in health emergencies

15.25 As noted, state and territory governments may call on the Australian Government for assistance in circumstances set out in the NatHealth Arrangements. While these arrangements worked reasonably well during the bushfires, there are opportunities for improvement. In particular, Queensland has suggested clarifying when and how national health capabilities can be used, and also in improving communication and coordination between national, jurisdictional and local structures involved in public health emergencies.[35] The Victorian Government has also suggested that further support and funding be provided for the standing committees of the AHPPC.[36]

15.26 We also heard that there may be benefit in reviewing existing national health sector plans and sub-plans, under the NatHealth Arrangements, including the AUSTRAUMAPLAN and its *Severe Burn Injury annex* (AUSBURNPLAN).[37] This would ensure current capability and capacity issues are considered at jurisdictional and national levels.[38] The Australian Government has advised that it intends to review relevant national plans, such as the AUSTRAUMAPLAN as part of its 2021 review of the Australian Government Crisis Management Framework.[39]

15.27 The NHS Agreement and NatHealth Arrangements are scheduled to be reviewed in the latter half of 2020-2021; having been delayed due to the priority placed on the COVID-19 response.[40] The Australian Government has also advised that a comprehensive review of the operation of the NIR was in the early planning and consultation phase before being paused due to recent health emergencies. Referred to as the *NIR Concept of Operations project*, the review will focus on identifying opportunities for the NIR to better support state and territory governments in responding to public health emergencies.[41]

15.28 **The principles established under the national arrangements for managing public health emergencies are reasonably clear and appear to be well understood across governments. The upcoming review of the NHS Agreement, NatHealth Arrangements and NIR provides an opportunity to clarify and improve the implementation of these arrangements.**

15.29 Natural disasters have the potential to impact the health system's capacity and ability to support communities during and following a natural disaster.[42] The health system will need, like other emergency responders, to adapt to the likely increase in the frequency and intensity of natural disasters and to the demographic changes that are altering disaster risk.

15.30 **The Australian, state and territory governments and health authorities should develop comprehensive strategies to prepare and adapt the health system to the increase in natural disaster risk.**

Australian Medical Assistance Teams

15.31 AUSMATs are World Health Organization accredited, multidisciplinary emergency medical teams that can rapidly mobilise and respond to disasters.[43] The AUSMAT capability can be used to rapidly boost regional health capabilities when logistical or access issues may preclude standard state-based arrangements.[44] AUSMAT have deployed numerous times internationally and were deployed domestically for the first time, under the NatHealth Arrangements, as part of the health response to the 2019-2020 bushfires.

15.32 The Australian Government Department of Health is responsible for maintaining the AUSMAT capability and funds the National Critical Care and Trauma Response Centre (NCCTRC), based at the Royal Darwin Hospital, through the *Project Agreement for the National Critical Care and Trauma Response Centre* with the NT Government.[45] The NCCTRC was established in 2004, in response to the 2002 Bali Bombings.[46]

15.33 Each AUSMAT is tailored, based on the medical needs of the deployment. It can include a mix of doctors, nurses, paramedics, logistical experts, and allied health staff such as environmental health staff, radiographers and pharmacists.[47] AUSMAT members are drawn from personnel based in each of state and territory governments.[48]

15.34 To support the AUSMAT capability, the NCCTRC operates a certification process for potential AUSMAT personnel[49] and provides specialised education and training.[50] There are currently 800 trained AUSMAT personnel who may be deployed in response to a public health emergency.[51]

15.35 Domestic deployments of AUSMATs are made at the direction of the AHPPC, following a request from a state or territory.[52] All state and territory governments have agreed to a rotational AUSMAT 'on call' roster in which each jurisdiction is expected to provide AUSMAT personnel when it is rostered during the year. The NT is always 'on call', as a requirement under the *Project Agreement*, to ensure that AUSMATs are capable of being deployed at short notice. If a jurisdiction cannot provide the required technical skills when requested, state and territory governments that are not 'on call' are then requested to contribute personnel.[53]



Figure 59: Ambulance on standby in Queensland, during the 2019-2020 bushfires[54]

Box 15.2 AUSMAT deployments for the 2019-2020 bushfires[55]

During the 2019-2020 bushfires, AUSMATs were deployed for the first time in a domestic setting to Victoria and NSW. The AUSMATs were co-deployed with Australian Defence Force (ADF) personnel and reported to ADF Joint Health Command as well as Victorian and NSW health authorities.

On 5 January 2020, joint ADF-AUSMAT operations commenced. Three AUSMATs were deployed to Sale, Mallacoota, Bairnsdale Regional Hospital and Wangaratta Hospital in Victoria. These teams consisted of three doctors, one intensive care paramedic, five nurses and two logisticians. The deployment to NSW consisted of two teams, which were deployed to Batemans Bay and various towns along the south coast. The teams consisted of two doctors, two paramedics, two nurses, and two logisticians.



Figure 60: AUSMAT outside a field hospital in Batemans Bay, NSW[56]

The Victorian deployment highlighted a number of challenges with the initial deployment and consultation process. The team was initially prepositioned by the Australian Government, prior to a request being submitted by the Victorian Government. At the time, Victoria had activated its Field Emergency Medical Officer program and it did not identify gaps in health or medical support. However, at the local level, health facilities had directly requested AUSMAT assistance. These local facilities were concerned that they would be overwhelmed by the threat posed by the bushfires. The AUSMAT provided assistance to those local facilities.



Figure 61: AUSMAT supporting the health response at a local hospital in Wangaratta, Victoria (left) and co-deployed AUSMAT and ADF personnel in NSW (right)[57]

15.36 Given that the 2019-2020 bushfire response was the first time that AUSMATs were deployed domestically, a number of key processes had not been practised in a domestic crisis situation. For example, while international AUSMAT deployments are well-rehearsed, the NCCTRC has suggested that further work is required to develop insurance and cost recovery arrangements for domestic deployments.[58] Domestic deployments have also proven to be more operationally complex; for example, NSW and Victoria have different operational reporting and command structures.[59]

15.37 As highlighted in Box 15.2, the experience during the 2019-2020 bushfires stressed the importance of clarifying the trigger points for the domestic deployment of AUSMAT and the associated consultation processes. In the case of Victoria, it appears that the pre-deployment of the AUSMATs, prior to a request being made, impacted on the Victorian Government's deployment of Field Emergency Management Officers.[60] However, once deployed, it appears the AUSMATs were able to provide support to the local health response.[61]

15.38 **There is merit in reviewing the existing AUSMAT processes, to ensure that there are clear procedures for the domestic deployment of AUSMAT, including in relation to requests and operational arrangements and reporting.**

15.39 We recognise the value of rapid deployment and a 'no regrets policy'[62] to the use of AUSMATs in domestic context – that is, have capabilities ready rather than waiting for local capacity to be overwhelmed or exhausted. Providing emergency managers with a better understanding of AUSMAT capabilities, such as through exercising and training, would support more effective use of those capabilities and integration in planning processes.[63]

15.40 The desirability of greater clarity around the circumstances in which the Australian Government can provide support is one reason we have recommended that the Australian Government consider legislation to support the making of a declaration of a state of national emergency – see Chapter 5: Declaration of national emergency.

15.41 **Greater awareness of AUSMAT capabilities and activation pathways in a domestic context is required.** This could be accomplished through greater training, incorporation in national emergency response exercising and inclusion in relevant emergency planning processes.

15.42 We heard from the NCCTRC that, in the event of an increasing reliance on domestic deployments, AUSMATs would benefit from growth in personnel and equipment. We also heard that there is scope for the development of standards for emergency field hospitals. Relevant standards would ensure the availability of appropriate and quality care and services when communities are displaced by a natural disaster.[64]

15.43 We heard that many nurses and medical staff occupy roles in state level emergency services and that any increase in the 'call-out' of AUSMAT may have 'unintended perverse consequences related to diminished state level emergency service staff/volunteer capacity'.[65] We agree that the use of AUSMATs should not unduly diminish the capacity of the deploying jurisdiction's health systems. This should be able to be managed in a manner similar to the interjurisdictional deployment of emergency responders and Australian Defence Force Reservists.

15.44 **The increasing use of domestic deployments of AUSMATs, to augment responses to public health emergencies, will require Australian, state and territory governments to bolster the AUSMAT capability.** This should include strategies to increase the number of trained personnel willing to be listed as AUSMAT certified, to ensure that the operational structures have the capacity to support increased deployments and to develop relevant standards. State and territory governments are supportive of reviewing AUSMAT processes and capabilities.[66]

Recommendation 15.1 Australian Medical Assistance Teams

Australian, state and territory governments should review Australian Medical Assistance Team capabilities and procedures and develop necessary training, exercising and other arrangements to build capacity for domestic deployments.

Jurisdictional arrangements

15.45 State and territory health authorities are primarily responsible for responding to health emergencies. These emergencies are managed in accordance with jurisdictional plans which are typically subordinate to, or aligned with, broader emergency management arrangements[67] – see Appendix 22: Health and mental health.

15.46 In general, under these plans, state and territory health authorities are 'combat agencies' in human health emergencies (such as infectious disease emergencies) and 'functional agencies' in providing health support in other major incidents, such as a natural disaster. The operational command structure, in response to an emergency, will reflect these roles and the context of the incident.[68]

15.47 Consistent with the broader approach to disaster management, responsibility for preparation, risk management and response is delegated to the local level – generally Local Hospital Networks (LHNs).[69] State and territory governments require the development of local level plans, which outline control and coordination arrangements and specific capabilities. Plans also usually include processes for escalating requests to jurisdictional health authorities and control centres, depending on the severity of the event.[70]

Primary healthcare and access to healthcare during disasters

Primary healthcare providers and Primary Health Networks

15.48 Primary healthcare providers are generally the main point of contact that Australians have with the health system. They are the entry level to the health system and are a broad group, including general practitioners, pharmacists, Aboriginal health workers, nurses and allied health professionals.[71] Primary care providers have valuable local knowledge and strong connections with the communities they support.[72]

15.49 Primary Health Networks (PHNs) also have an important role in Australia's health system. PHNs are independent organisations, primarily funded by the Australian Government, which support the coordination of health services and care for patients by primary healthcare providers. They work directly with primary healthcare providers, LHNs, and the broader community. PHNs also commission specific services to meet the primary healthcare needs of their region.[73]

15.50 It is well recognised that the health response to natural disasters needs a 'whole-of-community' approach to ensure that good health outcomes are achieved.[74] Joint planning and funding at a local level, including strengthening coordination between PHNs and LHNs, is a key reform priority of the *National Health Reform Agreement – Addendum 2020-25*[75] – an agreement between Australian, state and territory governments to improve health outcomes for all Australians and to ensure that our health system is sustainable.

15.51 During and after a natural disaster, primary care providers, such as general practitioners and pharmacists, play a vital role in supporting a health response. These providers are often on-the-ground as a disaster occurs, providing medical support as a trusted part of the community.[77] During the 2019-2020 bushfires, local general practitioners and pharmacists supported patients and provided continuity of care when local health infrastructure had been disrupted.[78] Primary care providers also have a role in ongoing clinical care, as they remain within the community for years after a disaster, managing its ongoing health effects.[79]

> We've gotten many stories of…people flooding in to a trusted health care professional that they know. The waiting rooms were packed with people who were in distress…[76]

15.52 There is often a significant surge in pressure on acute health services, such as hospitals, during a natural disaster.[80] Primary care providers play a role in alleviating this pressure by triaging and diagnosing patients and providing treatment, such as medical interventions and medications.[81] This helps prevent unnecessary presentations to hospital emergency departments and frees up resources for critical needs.

15.53 During the 2019-2020 bushfires, some PHNs provided direct support to local primary care providers - facilitating information sharing, coordinating primary care volunteers and assessing local healthcare needs, providing governments with situational reports on the state of primary healthcare needs in bushfire-affected areas, and assisting with distribution of medical supplies, such as P2 masks.[82]

15.54 However, primary care providers and PHNs are not systematically included in health emergency response and disaster management planning. The extent of their involvement is ad hoc and varies between local areas and jurisdictions,[84] including in related plans and

> Not only were we NOT been engaged to respond to the primary care needs of evacuees, but our involvement was questioned, despite the fact that we were attending to problems well within our scope of practice and were all well recognised local health professionals appropriately credentialed and indemnified.[83]

training and exercising processes. This results in roles and responsibilities of primary healthcare providers and PHNs not being clearly defined and can impede the delivery of services during and in the aftermath of disasters.[85] We heard that some local general practitioners were unable to assist in evacuation centres, or were even actively excluded, in part, because they were not included in formal planning processes.[86]

15.55 In addition, we heard that there are limited jurisdiction-wide and national forums and other structures in place to facilitate the inclusion of primary healthcare providers and PHNs in disaster management processes.[87] This limits the provision of advice and primary healthcare perspectives to decision makers.[88]

15.56 We heard that primary care providers are progressively being integrated within disaster management systems at the local level, primarily through stronger linkages between PHNs and LHNs.[89] For example, in response to the challenges experienced in the 2019-2020 bushfires, the Murrumbidgee Local Health District is updating its local emergency response plan to integrate the Murrumbidgee PHN and create a single recovery committee.[90]

15.57 We heard considerable support for a greater level of involvement of primary healthcare providers in disaster planning and response.[91] Some evidence suggests that PHNs should play a formal coordinating role in the disaster management context, on the basis that PHNs are said to be ideally placed to provide training, advice, and support to primary care providers, including by helping to identify and prioritise emerging issues during the recovery phase. [92]

15.58 **Primary healthcare providers and PHNs can play an important role in supporting health responses during and following natural disasters. Primary healthcare providers and PHNs should be included in disaster planning processes at the local, state and territory and national levels, as appropriate.**

15.59 We heard that one of the principal challenges of including primary care providers and PHNs is funding and resourcing.[93] Primary care providers are private businesses and may not have the financial capacity to be actively engaged in planning and preparedness activities.[94] However, we also heard that there is variability in the capacity of PHNs between jurisdictions and local areasy.[95]

15.60 PHNs are not funded by the Australian Government to undertake an emergency management role, although they have the flexibility to perform these functions.[96] Only a small proportion of PHNs have established disaster management plans. Victoria has specifically funded each of the six Victorian PHNs to maintain capacity to respond to emergency primary care requests, including participation in emergency planning.[97] The inclusion of primary healthcare providers in disaster responses is limited by the need for familiarity with emergency management arrangements[98] and varying capacities to 'surge' during a natural disaster.[99] We heard that this could be addressed through dedicated training and capacity building activities.[100] In addition, we heard of the importance of primary healthcare providers being specifically trained in emergency management structures and systems.[101] A strong understanding of emergency management command and control structures is vital for efficient tasking and use of resources, and for the safety of primary care volunteers and patients.[102]

15.61 The management of volunteer primary care practitioners is also a key element of incorporating primary healthcare in disaster responses. This includes identifying, and registering, a pool of primary care volunteers before a disaster. For example, we heard that having a register of suitably trained personnel in the Blue Mountains and Nepean areas, before the 2019-2020 bushfires, ensured that general practitioners were appropriately and effectively deployed into evacuation centres. This register was developed and maintained by the Nepean Blue Mountains PHN and provided confidence that attending practitioners had the necessary familiarity with emergency arrangements and ensured greater safety and protection for staff.[103]

15.62 The use of PHNs in disaster management processes is limited by the variability in the existing capacity of PHNs across Australia.[104] The diversity of the primary health sector and a lack of a unified voice for primary care that can appropriately represent all local areas and contexts means that there is not a single solution to integrating primary care in disaster management systems.[105]

15.63 **Australian, state and territory governments should encourage primary healthcare providers to undertake a formal role in disaster planning and response to natural disasters. This should include facilitating relevant training and education activities and arrangements to support primary healthcare providers who volunteer during natural disasters.**

Recommendation 15.2 Inclusion of primary care in disaster management

Australian, state and territory governments should develop arrangements that facilitate greater inclusion of primary healthcare providers in disaster management, including: representation on relevant disaster committees and plans and providing training, education and other supports.

Access to healthcare and medications

15.64 Natural disasters can hamper the ability of communities to access healthcare and medications. The barriers which affect the provision of healthcare vary according to the specific disaster, but can include being unable to access prescriptions, physical isolation caused by road closures and damaged health facilities (such as pharmacies), loss of power, telecommunications and potable water, and evacuations of health and care facilities.[106]

15.65 Natural disasters can also exacerbate existing health disparities in local communities, particularly in regional, remote and isolated areas.[107] It is common for these areas to have shortages in specialised equipment and supplies, vulnerable supply chains, limited patient transport and evacuation capacity, and workforce shortages.[108]

15.66 The Australian, state and territory governments introduced a number of temporary measures to address the difficulties in accessing medications during the 2019-2020 bushfires. To assist people who had lost their prescription or were unable to see a doctor,[109] the Australian Government temporarily expanded 'continuing dispensing' arrangements. Under the *National Health (Continued Dispensing – Emergency Measures) Determination 2020,*[110] pharmacists were able to give patients a one-off,

standard quantity of an eligible PBS medicine, without a prescription.[111] Normally, under continued dispensing arrangements, only eligible oral contraceptives and lipid lowering medicines can be so supplied.[112]

15.67 The changes to continued dispensing arrangements were in addition to emergency supply provisions under state and territory legislation (Appendix 22: Health and mental health) and specific emergency public health orders made by some state and territory governments. Collectively, these provisions and public health orders allowed the supply of PBS and non-PBS medications without a prescription under specific circumstances.

15.68 Further, to support access to medications during the 2019-2020 bushfires, the Therapeutic Goods Administration (TGA) gave temporary permission (*Therapeutic Goods (Restricted Representations - Salbutamol) Permission 2020)* to advertise the availability of salbutamol inhalers (asthma medication).[113] This allowed for public health campaigns to remind people to bring their inhalers with them in the event of evacuation and to advertise the continued dispensing provisions for these medicines. The temporary permission also extended to activities conducted or facilitated by evacuation centres.[114]

15.69 In addition, given the TGA's role in monitoring medicine shortages, it was able to reassure the public of the general availability of salbutamol inhalers, despite isolated and localised shortages, which helped to discourage stockpiling and over-ordering.[115]

15.70 We heard that funding through the Medicare Benefits Schedule is one of the Australian Government's 'key levers' to support access to healthcare and enable continuity of care.[116] On 10 January 2020, the Australian Government introduced a number of temporary Medicare items to enable mental health and wellbeing services to be delivered via telehealth to patients whose mental health was affected by the bushfires. In addition, from 17 January 2020, specific Medicare telehealth items were made available for psychological services, enabling bushfire-affected patients to access 10 Medicare-eligible psychological therapy sessions without a referral from a medical practitioner.[117] These were extended to people subjected to further restrictions in areas impacted by the second wave of the COVID-19 pandemic in August 2020.[118] The number of Medicare-funded psychological services was doubled from 10 to 20 through the Better Access Initiative in the October 2020 Federal Budget, in recognising that the 2019–2020 bushfires and the COVID-19 pandemic have significantly affected the mental health and wellbeing of individuals, families and communities.[119]

15.71 In response to workforce shortages, the Australian Government also developed emergency protocols for Medicare Provider Numbers. A provider number is a unique identifier issued to eligible health professionals who participate in the Medicare Program. The Medicare Provider Number enables a health professional to bill, prescribe, refer or request services that are eligible for a Medicare benefit and is tied to a specific location.[120]

15.72 The emergency protocol allowed doctors and allied health workers to practise for up to two weeks in different bushfire-affected areas using their existing Medicare Provider Number. The protocol also included an online service to provide an immediate Medicare Provider Number for work beyond two weeks, and provided

exemptions for restricted doctors (including locums) to allow relocated medical practices to offer Medicare-eligible services to communities.[121]

15.73 We heard support for these measures, which enabled access to healthcare and medications during the 2019-2020 bushfires.[122] However, medical groups suggest that these systems should be established before a natural disaster, to allow for rapid activation and to be clearly communicated to health providers and the community.[123]

15.74 **The Australian, state and territory governments should identify a set of measures which enable access to healthcare and continuous access to medications during and following any natural disaster and incorporate these into relevant plans.**

Mental health and natural disasters

Mental health effects of natural disasters

15.75 There is compelling evidence of the impacts of natural disasters on mental health. Natural disasters give rise to increased rates of stress, depression, anxiety, post-traumatic stress disorder (PTSD), alcohol and substance abuse, aggression and violence, suicide, and exacerbation of other underlying mental health problems.[124] Individuals may also experience somatic symptoms, disorders where a person has excessive or abnormal feelings or thoughts about physical conditions.[125] People can also suffer from insomnia and broken sleep.[126]

15.76 One study examining the impacts of the 2011 Brisbane floods found that those impacted by the floods were 1.9 times more likely to report psychological distress, 2.3 times more likely to report poor sleep quality, and 2.3 times more likely to have probable PTSD than the general population.[127] The 2011 Brisbane floods were also reported to be linked to increased alcohol and tobacco use.[128]

15.77 The mental health effects of natural disasters can also endure over an extended period and it may take time for symptoms to present. Following the 2009 Victorian bushfires, 21.9% of people in 'high-impact communities' were still reporting symptoms of mental health disorders five years later.[129] Over time, others reported delayed onset of mental health disorders.[130]

15.78 Geographical barriers, unsafe conditions and loss of essential services all arise after a disaster and can lead to significant delays in support, prolonging trauma and exacerbating emotional distress.[131] Long-term mental health is also linked to the practical challenges of rebuilding after a natural disaster, including experiences relating to housing, insurance and obtaining financial assistance.[132]

15.79 A number of vulnerable groups are particularly susceptible to mental health issues following natural disasters.[134] Children and young people are particularly susceptible to ongoing mental health effects – which can result in poorer educational outcomes and a loss of a sense of stability and safety.[135] The elderly are also vulnerable, particularly

> And I really worry about the kids: the kids who may have experienced the fire at its worst, the kids who, in some cases, their families have lost multiple homes and multiple properties.[133]

if they are dependent upon others for care and support.[136] We heard that there are mental health effects resulting from the exposure to bushfire smoke, particularly for those with underlying conditions, such as asthma.[137]

15.80 Natural disasters can also impact on the mental health of first responders. A range of psychological issues can arise from traumatic events, including anxiety, depression and PTSD.[138] Traumatic stress may also affect the ability to process information, perceive threats and may disrupt rational decision-making.[139]

15.81 Some studies have found that up to 39% of emergency responders have been diagnosed with a mental health condition in their life, compared to 20% of all adults in Australia.[140] These effects can also persist over an extended period – one follow-up study of the 1983 Ash Wednesday bushfires found that a core group of firefighters reported psychiatric disturbance and PTSD symptoms seven years after the event.[141] These effects could potentially extend to the loved ones of those responding to natural disasters.[142]

Delivery of mental health services

Arrangements for the delivery of mental health services

15.82 The 2019-2020 bushfires highlighted both challenges and good practice in the delivery of effective and coordinated mental health services. Mental health issues following a disaster can go unidentified and consequently untreated[143] – mental health conditions can take time to emerge[144] and affected individuals, especially during the early stages of a disaster, may initially present with physical symptoms that mask psychological symptoms.[145] Those who do receive treatment may face chronic and relapsing conditions.[146]

15.83 The psychological effect of natural disasters on communities and those responding to a disaster can be widespread and enduring. In recognition of these effects, state and territory governments facilitate the delivery of mental health services to the community and those responding to natural disasters – in-line with broader arrangements for managing the health response for a major incident.[147] Most state and territory governments have specific sub-plans (see Appendix 22: Health and mental health) with a mental health focus[148] while others rely on existing protocols.[149]

15.84 The effective integration of mental health response is an essential part of disaster planning and ensures a proactive response to the short, medium and long-term mental health effects following natural disasters.[150] We heard that there is 'often a tendency to want to respond acutely to deal with the mental health trauma of the event itself', but that 'the more pervasive problem is the long-term impacts', and particularly when there are 'cumulative natural disasters' it is important to focus on 'more than just the acute response'.[151]

15.85 At a national level, as part of the response to the 2019-2020 bushfires, the Australian Government funded the National Mental Health Commission to develop a National Natural Disaster Mental Health Framework.[152] This framework, being developed cooperatively with state and territory governments, is intended to improve mental

health and wellbeing coordination arrangements and allow governments to foster and enable participative, localised responses following natural disasters.[153]

15.86 Specific frameworks and sub-plans, if implemented, can reduce the likelihood of ad-hoc and uncoordinated mental health responses to a natural disaster (when supported by organisational processes that enable the use of institutional knowledge and incorporation of lessons from prior disasters).[154]

15.87 **All state and territory governments should develop and implement plans or policies to guide the delivery of mental health services during and after an emergency incident, such as a natural disaster.** This could build on the National Natural Disaster Mental Health Framework, once completed.

15.88 We were informed that states are considering the lessons identified during the 2019-2020 bushfire response as part of reviews of their public health emergency plans.[155] **Consideration should be given to establishing mechanisms for sharing identified lessons nationally.**[156]

Locally based services

15.89 It is important that a diversity of services, programs and delivery models be available to the community. We heard of the importance of early, appropriate and culturally informed mental health support for disaster-affected individuals.[157] Early intervention can help to prevent relatively minor mental health issues, such as sleep disturbances, from becoming chronic or severe.[158]

15.90 Local and community support can alleviate some of the stressors common in the aftermath of natural disasters. One of the strongest predictors of positive mental health outcomes is social ties. Family members are generally seen to be the main source of mental health support, and involvement in local community groups and organisations tend to be associated with more positive mental health outcomes.[159]

15.91 Mental health services should be delivered and driven locally, with a key focus being the delivery of mental health through primary and community care.[160] Similar to broader health responses, primary care providers have strong connections with local communities and are trusted by their patients[161] – although primary care providers need to have appropriate training in trauma informed care, in order to provide meaningful mental health support.[162] We heard that the introduction of alternative services and centralised solutions can undermine continuity of care.[163] In addition, we heard that the introduction of new services into communities and later withdrawal of those services, once funding expires, can leave service gaps in the community at times when people may still be recovering and needing mental health support.[164]

15.92 Additional support should be provided to disaster-affected areas by augmenting existing and well established services. This maximises community trust in, and engagement with, services and maintains long-term continuity of care.[165] In order for this to be effective, it is important to understand the range of mental health services and programs available in a local area before a disaster – this includes identifying capacity and resourcing constraints[166] and pre-planning at the local level, incorporating a broad cross-section of service providers.

15.93 Due to the scale and impacts of natural disasters, it is common for local communities to be inundated with offers of mental health support from a variety of agencies and organisations outside the local area. While an increase in these services can be positive it can also create a challenging and complex system of support for the community to navigate.[167] It can also result in a lack of clarity about the role and scope of the different organisations and understanding of how they work together and who to contact for the right level of support.[168] We heard that some state and territory governments adopted formal coordination mechanisms to ensure a clear system of mental health and wellbeing support, with clear referrals and localised partnerships.

15.94 For example, the SA Government used its Local Recovery Coordinators and established the Bushfire Recovery Mental Health Multi-agency Coordination Group to enable the coordination of resources and referral pathways.[169] Their clinical mental health support teams also conducted shared clinical team meetings with Primary Mental Health Providers (funded by Country SA PHN) to collaborate on triaging new referrals and support transition of care to higher or lower levels of support.[170] Similarly, during the 2019-2020 bushfires, the Victorian Government created a Wellbeing Coordinator within their State Control Centre. The role aimed to better coordinate wellbeing services on-the-ground during an emergency response.[171]

15.95 **Pre-planning at the local level and establishing coordination mechanisms is important for the delivery of mental health support. These mechanisms should include local providers and build local partnerships and establish referral pathways before a disaster.**

Appropriate services

15.96 The provision of mental health services also needs to be evidence-based. We heard concerns that some mental health interventions used following natural disasters, such as psychological debriefing services, have limited evidence of efficacy and in some cases may cause harm.[172]

15.97 We also heard of the value of specialist clinical mental health support teams in providing advice and support on trauma assessment and needs identification, and planning referral pathways and bridging the gaps across mental health services.[173]

15.98 However, we also heard that there were some challenges in the assessment and referral processes for clinical support. For example, we heard of instances where individuals providing support and assistance to members of the community in evacuation centres incorrectly perceived distress suffered by community members as requiring mental health service intervention. On occasions, these misunderstandings resulted in unnecessary allocation of clinical mental health support.[174] Additional training to primary care providers would support those providing services to have the resources and skills to meet the increased mental health demands following a disaster,[175] including a stronger understanding of assessment processes.

15.99 We heard of the importance of ensuring that mental health support services are culturally informed and tailored to particular groups. For example, school based disaster resilience programs can help young people manage the mental health

impacts of a disaster, particularly for high-risk students.[176] These programs are focused on social, emotional, learning and vocational support for children and teenagers and may mitigate disaster-related mental health impacts, such as poorer academic outcomes.[177]

15.100 Any recovery framework should include mental health support for emergency responders, including volunteers, as well as workforce training on the impact of trauma and recovery processes for these professions.[178] Employed emergency responders are generally able to access the same mental health services that are available to the community, including during a natural disaster, and workplace specific supports (provided by their respective emergency services organisation).[179] However, appropriate systems need to be in place to monitor their mental health and wellbeing effectively and to ensure that they get help when needed.[180] **Appropriate support for volunteers should also be considered.**

15.101 **Australian, state, and territory governments should work together to ensure that mental health responses are appropriate for addressing the impacts of natural disasters.** This should include consideration of localised support that is augmented by additional external services as necessary, provision of appropriate training to providers, ensuring appropriate and timely mental health services which are supported by appropriate assessment and referral processes. The delivery of these services should extend over a number of years.

Funding programs

15.102 In response to the 2019-2020 bushfires, Australian, state and territory governments funded specific initiatives to address impacts on mental health – see Appendix 22: Health and mental health. This investment in mental health initiatives was in addition to standing programs and was aimed at supporting affected communities and emergency services. However, there is scope for greater national coordination in these programs.

15.103 A number of state and territory governments use the Disaster Recovery Funding Arrangements to provide financial support for the deployment of clinical mental health support teams – see Chapter 22: Delivery of recovery services and financial assistance. For example, the Queensland Government has established Mental Health Disaster Recovery Teams under Category C of the Disaster Recovery Funding Arrangements. These teams comprise clinicians and peer workers who deliver a stepped care model of practice with impacted communities. This includes community engagement, training and capacity building with other frontline agencies, and provision of specialist mental health care for people impacted by the natural disaster.[181] Similarly, during the 2019-2020 bushfires, NSW used the Disaster Recovery Funding Arrangements to deploy 34 mental health clinicians across all bushfire-impacted local government areas.[182]

15.104 State and territory governments have also funded various mental health support initiatives, focused on building local capacity and community resilience. We received particularly detailed insight from Victoria. The Victorian Government is providing $23.4 million for the Community Resilience, Psychosocial and Mental Health Response. This program is intended to build capacity of local services and enable multiple entry points and seamless referral pathways to specialist support where

required. It will also fund specific training and outreach to enhance local screening and assessment capabilities and will allow local community groups to access funds and resources to support local events, projects and activities that will help to bring community members together after the 2019-2020 bushfires.[183]

15.105 **Australian, state and territory governments should establish pre-agreed recovery programs under the Disaster Recovery Funding Arrangements that focus on the delivery of mental health services.**

15.106 To support mental health needs of emergency responders, the Australian Government, as part of its Mental Health Bushfire Response Package, has allocated approximately $4.5 million to develop a national emergency services mental health literacy network and a national action plan. The mental health literacy network is intended to support emergency responders and their families, to promote early identification and intervention, and is expected to be finalised by 30 June 2021. The national action plan is intended to improve mental health outcomes for emergency service workers and is expected to be finalised by 30 June 2022.[184]

15.107 State and territory governments are also developing specific support services for the mental health and wellbeing of emergency responders. The Victorian Government has commenced the Provisional Payments Pilot, which allows eligible emergency responders to access payments for medical treatment and services for a mental injury while their compensation claim is being determined.[185]

Recommendation 15.3 Prioritising mental health during and after natural disasters

Australian, state and territory governments should refine arrangements to support localised planning and the delivery of appropriate mental health services following a natural disaster.

Health and environmental outcomes data

15.108 The effective use of data is important in improving health outcomes associated with natural disasters. Health research and data linkages play an important role in identifying the health risks of a natural disaster.[186] For example, enhancing the collection and use of environmental and health data linked with natural disasters would provide a better understanding of health impacts, enable the design of health interventions[187] and enable evaluation and comparison of events.[188] However, we heard of the limited use of primary healthcare data for research and that health data collected across the health system could be better linked.[189] Data collected by general practice are an important resource for research into the impacts of natural disasters.[190] Effective use of data is also essential for healthcare planning, resource allocation and health systems resilience.[191]

15.109 To enhance the collection and use of such information, there is a need for standards to guide the collection, storage and exchange of relevant data.[192] These datasets could be underpinned by standardised definitions, clinical coding protocols and collection methods to ensure that data are consistently and accurately recorded across acute (hospital admissions and emergency department) and primary (general practice and other primary care services) care. [193]

15.110 In addition to consistent datasets, it is important that a robust model be developed for sharing data. This model should be underpinned by national data sharing across all phases of a disaster and a strong data security framework.[194] Australian, state and territory governments broadly support the development of consistent metrics, and the sharing of health related data.[195]

15.111 We recognise that the development of consistent datasets and any data sharing framework, will be challenging and will take time. It is important for development to occur collaboratively between the Australian, state and territory governments.

Recommendation 15.4 Enhance health and mental health datasets

Australian, state and territory governments should agree to:

(1) develop consistent and compatible methods and metrics to measure health impacts related to natural disasters, including mental health, and

(2) take steps to ensure the appropriate sharing of health and mental health datasets.



Figure 62: Local doctor in Cobargo, NSW, provides primary healthcare services in a motorhome after his practice was destroyed by the 2019-2020 bushfires[196]

Chapter 16 Wildlife and heritage

Summary 353

Australia's wildlife and heritage 354

Government responsibilities for environmental protection 354

Environmental impacts from the 2019-2020 bushfires 354

Emergency response and recovery for the environment 355

Integration of non-government organisations in emergency response and recovery 357

Development of guidelines 360

Volunteer training 360

Data and information for wildlife management and species conservation 361

Gaps in data and information 362

Wildlife and species protection under national environmental law 363

Summary

16.1 Australia's extensive biodiversity includes an estimated different 620,000 species, or between 7 and 10% of all species on earth, the value of which is incalculable. However, due to a range of pressures, Australia's ecosystems are under increasing strain. Australia also has a vast number of heritage places of significant value, domestically and internationally.

16.2 The 2019-2020 bushfires have been described as an 'ecological disaster'. Fires extended across tens of millions of hectares of land, covering native forests and grasslands that serve as wildlife habitat and house ecosystems. Over 330 threatened species and 37 threatened ecological communities protected under national environmental law were in the path of the bushfires.

16.3 Many efforts were made to rescue and protect wildlife, ecosystems and heritage sites during and since the 2019-2020 bushfires. These efforts relied on expert advice, data and information sharing and fundraising efforts across individuals, communities, not-for-profit organisations, government agencies, environmental experts and the private sector.

16.4 Australian, state and territory governments share responsibility for protecting and managing Australia's environment and heritage. They each have legislative arrangements that assist them to do so. However, there is a need to better integrate environment and heritage needs into emergency planning and response. This includes working with relevant non-government organisations to establish best practice arrangements and responses relevant to emergency wildlife response and recovery. Greater consistency and collaboration is also required in the collation, storage, access and provision of data for Australian flora and fauna.

Australia's wildlife and heritage

16.5 Australia has extraordinary biodiversity, and is home to an estimated 620,000 species.[1] This represents between 7 and 10% of all species on earth.[2] The majority of Australia's species and ecological communities are unique to Australia: they occur nowhere else in the world.[3]

16.6 The value of Australia's biodiversity is incalculable, and has many tangible and intangible benefits: to the economy, wellbeing, culture and sense of identity, and scientific understanding of the world.[4]

16.7 Australia's unique and complex ecosystems are under increasing strain.[5] Changes in land-use, natural hazards, habitat loss and degradation, and feral animal and invasive plant species are contributing to increasingly poor ecological prospects, with the impact of climate change exacerbating existing pressures.[6]

16.8 Australia also has exceptional national and international natural, cultural and commemorative heritage places that contribute to Australia's national identity. For example, there are more than 100,000 known Indigenous art sites across Australia and there are likely to be even more sites as yet not revealed to or recognised beyond local community groups. The large number of commemorative places poses challenges to their protection and management, particularly in terms of resourcing.[7]

Government responsibilities for environmental protection

16.9 Australian, state and territory governments share responsibility for protecting and managing Australia's environment and heritage. State and territory governments are responsible for day-to-day land and environmental management.

16.10 The Australian Government administers Australia's national environmental law, the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). The EPBC Act relevantly empowers the Commonwealth to regulate development that could adversely affect 'matters of national environmental significance' (MNES).

Environmental impacts from the 2019-2020 bushfires

16.11 The 2019-2020 bushfires have been described as an 'ecological disaster'.[8] Fires affected tens of millions of hectares of land, covering native forests and grasslands that serve as wildlife habitat and house ecosystems. According to Professor Chris Dickman, Professor in Ecology at the University of Sydney, no bushfires on record have burnt more forest and woodland habitats within a season.[9] The affected areas include sites that are recognised and protected under the EPBC Act for their significant ecological and heritage value:[10]

- World Heritage properties: six properties were affected, including extensive burnt area across the Gondwana Rainforests of Australia in QLD and NSW (54% burnt), Greater Blue Mountains Area in NSW (82% burnt) and the Budj Bim Cultural Landscape in Victoria.

- National Heritage places**:** Multiple places were affected, with the Australian Alps National Parks and Reserves, Stirling Range National Park, and West Kimberly suffering the most significant impacts.
- Wetlands of International Importance ('Ramsar Wetlands')**:**[11] At least five wetlands were affected, with the Macquarie Marshes and Gwydir Wetlands, and Gippsland Lakes assessed as being at high-risk of long-term ecological damage.

16.12 It is too early to say with certainty what the ultimate consequences of the bushfire season will be for Australian wildlife.[12] However, wildlife and ecology experts have predicted serious, long-term, adverse effects on biodiversity.[13]

16.13 Over 330 threatened species and 37 threatened ecological communities protected under the EPBC Act were in the path of the bushfires,[14] and we heard estimates that the number of animals killed 'greatly exceeded' one billion.[15] Additionally, we heard that species and communities, not currently listed as threatened under national environmental law, may now be threatened, as the consequences of the season are better understood.[16]

16.14 We heard of significant efforts to rescue and protect wildlife, ecosystems and heritage sites during and since the 2019-2020 bushfires. These rescue and recovery efforts relied on expert advice, data and information sharing and fundraising efforts across individuals, communities, not-for-profit organisations, government agencies, environmental experts and the private sector.

Emergency response and recovery for the environment

16.15 In responding to disasters, state and territory emergency services agencies have primary responsibility for protection of people, property and the environment – they provide protection in that order. They each have legislative arrangements that assist them to do so, which are supported by various management strategies and policies, and operational plans.

16.16 In some jurisdictions, emergency services are embedded in the same portfolio as agencies responsible for environmental protection, but often they are not. We heard that while in many instances wildlife rescue or protection efforts were initiated outside emergency services, there was great value in leveraging emergency management incident management teams (IMTs) in assisting rescue operations, for example in coordinating fire suppression and requesting air support.

16.17 Some protection priorities are clearly embedded and formally recognised in emergency management, such as critical infrastructure. However, in the case of sites of environmental and heritage value, emergency services often rely on external information and relationships with other agencies to understand environmental values at risk during disasters.

16.18 States and territories had bushfire strategies and operational plans in place before the 2019-2020 bushfires with a view to preventing and responding to bushfire impacts on wildlife, ecosystems and heritage values.

Box 16.1 2019-2020 bushfire-affected species, ecological communities and heritage sites.



Figure 63: Clockwise top left: (1) Tae Rak channel and holding pond, Budj Bim Cultural Landscape in Victoria[17] which was fire affected in 2019-2020 bushfires; (2) Release of a nationally endangered Eastern Bristlebird in Victoria after it had been extracted during the fires;[18] (3) the nationally threatened Northern Corroboree Frog,[19] which was defended by aerial firefighting; (4) the Alpine Sphagnum Bogs and Associated Fens, a nationally threatened ecological community that was defended in the ACT during the fires.[20]

16.19 These strategies and plans identify high-level arrangements, such as threatened species and heritage sites, their locations, and response and recovery strategies.

16.20 **There is a need to better integrate consideration of environment and heritage assets in emergency planning and response. This requires accessible data, including on the location of environmental, heritage and cultural sites, the distribution of species and ecological communities and priorities to guide response efforts.**

16.21 In assessing environmental and heritage impacts and prioritising recovery efforts, a number of states and territories have adopted a 'rapid risk assessment' methodology. This allows them to identify immediate interventions, as well as longer-term recovery priorities. Box 16.3 profiles the ACT government's Rapid Risk Assessment approach following impacts of the 2019-2020 bushfires.

16.22 **Rapid determination of environmental priorities assists in ensuring timely implementation of strategies to recover from natural hazards.**

Integration of non-government organisations in emergency response and recovery

16.23 Wildlife organisations are integrated into state and territory emergency management arrangements to varying extents. Some wildlife organisations noted that their coordination efforts with government were initially informal, developed from outreach and offers of assistance.[21] Other wildlife organisations are embedded in formal state and territory emergency management frameworks.

16.24 For example, the South Australian Veterinary Emergency Management Incorporated (SAVEM) is a response and recovery organisation under South Australia's State Emergency Management Plan with a mission to retrieve, triage, treat, shelter and return animals of all species in an emergency. During the 2019-2020 fire season, SAVEM was activated under this plan, and deployed to the sites of the Cudlee Creek and Kangaroo Island fires.[22] SAVEM is usually able to access a fire ground within 48 hours of a bushfire passing through an area.

16.25 We heard that first responders did not always understand the arrangements relating to bushfire-affected wildlife and the non-government resources that could be made available to support the immediate and subsequent care of impacted wildlife.

16.26 Including non-government wildlife organisations within emergency management arrangements can enable these groups to work in concert with emergency management agencies, to benefit from the situational awareness of first responders, and to access the fire ground safely. Raising awareness of animal welfare, species conservation, and the capabilities of wildlife first responders can also help ensure that these groups are deployed as swiftly and safely as practicable.[23]

Box 16.2 Wollemi Pines – NSW

The Wollemi Pine is a critically endangered Jurassic Period plant species with less than 100 mature plants surviving in the wild, all located in a single remote gorge in the Wollemi National Park. It is an ecological treasure, believed to be extinct until its rediscovery in 1994. Bushfire is one of its most significant threats.

When the Blue Mountains were under threat during the 2019-2020 fire season, the Wollemi Pines were at risk of being damaged or destroyed by fire. In anticipation of this risk, large air tankers were deployed to lay fire retardant, and a rescue mission was quickly established. Wollemi National Park had previously experienced periods of high fire danger, but with this season came new challenges. Conditions were significantly hotter and drier than usual, limiting the amount of water available to fight a bushfire. It was windy, and smoke from the surrounding fires impeded visibility. Furthermore, resources were stretched by the extent and severity of fires across NSW.

A team was assembled to fight the fire comprising national park staff, firefighters and Wollemi Pine researchers. Access to the gorge was difficult: due to the ruggedness of the terrain and remoteness of the location, the site could only be reached by air. Firefighters were flown by helicopter and winched into the gorge to install and operate irrigation equipment.

By irrigating the area, the team was able to increase the moisture content in ground fuels surrounding the pines, mitigating the severity and impact of the blaze. Helicopters were also deployed to drop water onto the fires as they approached the rainforest gorge. These efforts helped protect the Wollemi Pines during the fires, minimising damage and preserving the species in the wild.



Figure 64: Pumping creek water to moisten ground fuel surrounding the Wollemi Pines[24]

Box 16.3 Rapid Risk Assessment – Orroral Valley Fire, Namadgi National Park

The ACT Government's Environment, Planning and Sustainable Development Directorate (EPSDD) work with the ACT's Emergency Services Agency provides an example of the incorporation of environmental values into emergency response, and how rapid risk assessment can support stabilisation, rehabilitation and recovery following disaster.

Emergency management IMTs in the ACT include a Values Officer during bushfire response. Although not formally included in the Australasian Inter-service Incident Management System (AIIMS) IMT structure, the Values Officer advises on cultural and ecological values, including those protected under national environmental law.[25]

Namadgi National Park is home to a number of precious cultural and ecological assets, including Indigenous rock art, Alpine bogs and fens, and a variety of threatened woodland fauna. In January and February 2020, the Orroral Valley fire burnt through 87,923 ha of the park.[26] During the fire, the Values Officer embedded in the IMT assisted sharing of information on environmental and heritage values, including emergency services protection of Indigenous values and laying of fire retardant to protect the Ginini wetlands.

In February while the Orroral Valley fire was still active,[27] the EPSDD deployed a Rapid Risk Assessment Team – which included specialists in flora, fauna, and cultural heritage – to assess impacts on the area and recommend mitigation treatments. The team identified 27 key risks to the burn area, including extreme and high risks to cultural and ecological assets. Examples of these risks included:

- fire impacts on alpine bogs, causing degradation
- post-fire predation from introduced species
- reduced water quality due to debris and erosion, impacting threatened fish species, and
- post-fire starvation of large gliders.[28]

The rapid assessments informed mitigation actions and recommendations for follow-up assessment targeted to individual risks. The team also made broader 'landscape scale' recommendations, encouraging monitoring and data collection to develop learnings. For example, the team noted that a previously unused fire retardant was used in the Gibraltar Rocks and Mount Clear areas, and encouraged land managers to monitor for any long-term impacts on these areas.[29]

Development of guidelines

16.27 The development of clear and consistent national guidance on rescue and treatment of wildlife would support a coordinated approach to recovery. For example, Wildlife Health Australia (WHA) reports that it was frequently approached by jurisdictions and response organisations seeking advice during the 2019-2020 fire season. WHA noted that there are currently no agreed national standards for rehabilitation, assessment, treatment and care for wildlife.[30] WHA worked rapidly to fill some of these gaps by, for example, developing and disseminating national food and feeding guidelines for wildlife.[31]

16.28 We note that there may be scope to enhance the ability of fire and other emergency responders to support the wildlife response by developing and disseminating guidance to them on handling wildlife, and risks around animal welfare, zoonotic disease and biosecurity.[32]

Volunteer training

16.29 We heard of the value of well trained volunteers to wildlife response. SAVEM told us that 'really good wildlife carers are gold in a response'.[33]

16.30 Training is essential to mitigate the risks of working with wildlife on the fireground. Firegrounds are inherently dangerous, and volunteers must follow protocols to keep themselves and others safe and avoid compromising other aspects of the response.[34] Training also mitigates risks to wildlife by ensuring that attempts to rescue, treat, or humanely destroy an animal meet an appropriate standard of care.

16.31 We heard that spontaneous volunteers conducted their own rescue and rehabilitation efforts,[35] at times arriving before recovery agencies were deployed.[36] Organisations reported that this complicated response operations, introducing risk and at times causing adverse outcomes.

16.32 Volunteer groups and individuals may lack training in incident management. We also heard concerns that spontaneous or untrained volunteers may have attended firegrounds during the 2019-2020 bushfires without the requisite skills or knowledge to operate safely.[37]

16.33 Some spontaneous responders lacked wildlife-specific expertise, or knowledge of best practices for treatment of wildlife in an emergency context:

> *There were a number of stories of well-intentioned individuals offering water to burnt koalas directly from bottles; an action which wildlife experts later explained could lead to drowning.*[38]

16.34 **State and territory governments should work together with relevant non-government organisations to establish best practice arrangements and responses relevant to emergency wildlife response and recovery**.

16.35 **State and territory governments should ensure that effective wildlife response and recovery capabilities are developed and integrated into emergency planning processes for natural disasters. This could include consideration of specific**

coordination capabilities, such as rapid deployment of appropriately trained personnel.

Data and information for wildlife management and species conservation

16.36 Access to high-quality, consistent and comprehensive data is essential to wildlife management and conservation efforts. These data include information on the distribution of species and ecological communities, their status, and key management needs. This information helps with their management and the prioritisation of response and recovery efforts. Data allow land managers to monitor the health and status of species and ecologies. For example, in the context of the EPBC framework, data are crucial for the purpose of communicating the needs of species and communities (and the relative urgency of these needs) to decision makers.

16.37 Currently, data and information on species and ecological communities are collected through survey and remote sensing methods by a variety of stakeholders. These include academic researchers, government land managers, industry consultants, non-government organisations, and citizen scientists. This information is supplemented by various types of repository data, including information about, and spatial modelling of, potential habitats, and information about the geographic distribution of vegetation types.[39]

16.38 In the case of bushfires, fire data are amassed through a wide range of methods – for example, observations from emergency services personnel and satellite imagery and hotspot analysis – and collected by state and territory governments, research organisations and Geoscience Australia.[40]

16.39 In response to the 2019-2020 bushfire season, the Australian Government established a Threatened Species Bushfire Recovery Expert Panel chaired by the Threatened Species Commissioner, Dr Sally Box, to assess the impacts of bushfires on natural assets, identified species and locations requiring intervention, and advise on necessary recovery actions.[41]

16.40 The work of the Expert Panel was reliant on information on species and ecological communities, and on fire extent and severity. The Panel collaborated with state and territory governments to identify an initial list of fire-affected species.[42] The Panel subsequently worked with experts to assess the vulnerability of each species based on:

- whether the species was threatened before the fire season
- how much of its geographic area intersected with the fire path, and
- whether the species has any particular vulnerabilities to bushfire.[43]

16.41 Additionally, in early 2020, to meet the broader need for a 'reliable, agreed, fit for purpose and repeatable national dataset of burnt areas',[44] the Department of Agriculture, Water and the Environment developed and released a National Indicative Aggregated Fire Extent Dataset (NIAFED).

16.42 The NIAFED aggregated data for the 2019-2020 fire season and provided a cumulative national view of the areas impacted by fires across Australia.[45] According to the Panel, this has provided 'critical' support to its work in prioritising species for urgent intervention.[46]

16.43 Examples of species impacted by the 2019-2020 bushfires, assessed using the NIAFED, together with other environmental data and information include:

- the vulnerable Slaty Red Gum (*Eucalyptus glaucina*), which is estimated to have had over 20% of its known or likely habitat burnt
- the endangered Kangaroo Island Dunnart (*Sminthopsis aitkeni*), which is estimated to have had over 80% of its known or likely habitat burnt, and
- the Kangaroo Island assassin spider (*Zephyrarchaea austini*) for which all known inhabited locations have been burnt.[47]

16.44 The Department of Agriculture, Water and the Environment noted that 'while it is the best national dataset currently available for this purpose, the limitations of the NIAFED would have affected the accuracy of the derived analyses'. They identified several known issues, including:

- low accuracy for some data inputs
- a lack of national coherency due to the variety of mapping methods, and
- a lack of information on fire severity in these areas (only outlines of burnt areas are shown).[48]

Gaps in data and information

16.45 Stakeholders – including wildlife researchers and decision-makers in government – are not always aware of where and how to access relevant information. This causes duplication, inefficiency, and siloing. No single agency has responsibility for collation and maintenance of data at a national level.

16.46 We heard that access to critical data is a pervasive challenge across the conservation and wildlife sectors. As noted in the EPBC Act Interim Report, 'multiple parties collect or purchase the same or similar information, often because they are not aware of other efforts. Similar systems and databases are built by multiple jurisdictions'. The review also noted that data are frequently inaccessible for reasons of format (eg historical data is frequently not digitised) or ownership (useful information is often considered proprietary). Where they are accessible, they are not necessarily shared between jurisdictions.[49]

16.47 Irrespective of the need for data relevant to an emergency, much remains unknown regarding Australian flora and fauna.

> *Little is known about Australia's invertebrates, non-vascular plants and fungi, with many species known from only 1-2 records. An estimated 70% of the species predicted to inhabit Australia and New Zealand are yet to be discovered and described…The current distributions, genetics and traits of vascular plants and vertebrates are still largely undocumented.*[50]

16.48 **In order to fill many important knowledge gaps on wildlife and ecosystem populations and distribution, ongoing environmental monitoring and research would be required.**

Recommendation 16.1 Environmental data

Australian, state and territory governments should ensure greater consistency and collaboration in the collation, storage, access and provision of data on the distribution and conservation status of Australian flora and fauna.

Wildlife and species protection under national environmental law

16.49 Although states and territories have primary responsibility for protecting the environment, we heard a number of expert opinions and public comments on Australia's national environmental law (the EPBC Act) in the context of threats to the environment from natural hazards. Chapter 17: Public and private land management also explores environmental protection in the context of land management and hazard reduction.

16.50 Concurrent with our inquiry, an independent review of Australia's national environmental law has been underway. It released an interim report in July 2020. As at October 2020 its final findings and recommendations are still being prepared.

16.51 We note the observation of the EPBC Act Interim Review that the number of listed threatened species and communities continues to increase.[51] We also heard that 'Australia has, in general, failed to arrest the declines in its threatened species'.[52]

16.52 We heard that the basis on which species and ecological communities are identified as being threatened is reactive. Listing of species relates to declines in numbers and distribution and probability of extinction,[53] and does not account for imminent or potential future pressures,[54] such as anticipated increasing natural hazard risks.

16.53 We understand that natural hazard risks for wildlife and ecosystems can be considered under the EPBC Act in two main ways:

- First, natural hazard occurrence or prevalence may factor into the determination that a particular species or ecological community is threatened, and by extension influence the management and protection of that species or community.[55] We heard fire is noted as a threat for a number of listed species, and factors into conservation advices and recovery plans for these species.[56] The Interim Report for the EPBC Act review notes that, although the EPBC Act provides for the preparation of recovery plans for threatened species and ecological communities, there is 'no requirement to implement a recovery plan, or report on progress or the outcomes achieved'. It notes that 'under these arrangements it is not surprising that the list of threatened species and communities has increased over time and there have been very few species that have recovered to the point that they can be removed from the list'.[57]

- Secondly, a natural hazard can be identified as a 'key threatening process'. To date, no natural hazards have been listed as such.[58] We heard that 'things are listed as, or could be listed as a key threatening process if they could cause a species or an ecological community to become endangered, or threatened, or to become more threatened or endangered'.[59] We heard that, in 2008 fire regimes was nominated as a key threatening process. No decision was made at that time to give effect to the nomination, and renewed consideration was sought in 2018.[60] In light of increasing anticipated impacts of natural hazards, we suggest this nomination be reconsidered.

Chapter 17 Public and private land management

Summary 366

Land management in Australia 367

Australia's land managers 367

Land management and natural hazards 368

Bushfires and land management 369

Bushfire hazard reduction measures 371

Effectiveness of fuel management 372

No single national fuel management strategy or technique 374

State and territory fuel management strategies 375

Fuel management on Private Land 379

Improving fuel data and information 383

Summary

17.1 Land management encompasses the ways in which farmers, foresters, Indigenous Australians, emergency services, park rangers, local governments, rural and regional landholders and others manage their land.

17.2 In the context of hazard reduction measures, land management is limited to those hazards which can be influenced by management, notably bushfire and floods. This chapter focuses on bushfire hazard reduction as an exemplar.

17.3 Bushfire hazard reduction can be carried out through fuel management activities such as prescribed burning, and mechanical thinning and slashing. These activities, if carried out prior to the arrival of an unplanned fire, have the potential to reduce the intensity and rate of spread of a bushfire.

17.4 Land managers consider a range of factors when determining the type and extent of bushfire fuel management activities to use. Due to the varying circumstances and geography in which fuel management is applied, no single fuel management strategy or technique is nationally applicable.

17.5 There is strong public interest in, and there are polarising views on, fuel management activities, particularly prescribed burning. There is clear benefit in public land managers improving the public's knowledge and understanding of the fuel management.

17.6 Understanding fuel management is of shared interest across Australia, as all jurisdictions are looking to improve how land management and hazard reduction approaches can adapt and respond to climate change.

17.7 Considerable research has been undertaken into fuel management, particularly prescribed burning and how it influences fire behaviour. However, gaps remain in the science, including in relation to the influence of fuels in extreme fires and the effectiveness and efficiency of fuel management strategies and techniques.

17.8 There is considerable variability in the level of detail provided by different fire and land management authorities and local councils on their fuel management strategies, and in the ease of accessibility of the information to the general public. Increased and more accessible community information is needed.

17.9 There is an opportunity for Australian, state and territory governments to review their legislation and processes relating to vegetation management, bushfire mitigation and hazard reduction, to ensure that there is clarity about the requirement and scope for landholders and land managers to undertake bushfire hazard reduction activities; and minimise the time that is necessary to obtain approvals.

17.10 There is widespread support for further investigation, improvement and more cost effective collection of fuel data using remote sensing and satellite technology. In addition to improving the way in which data are collected, there is also support for a continuation of effort to improve national consistency in the way fuel data are classified, recorded and shared across jurisdictions.

Land management in Australia

17.11 Australia's landscapes are vast and varied. As the sixth largest country in the world, Australia's landmass covers 7.7 million square kilometres, with almost 60,000 kilometres of coastline.[1] Forests cover 17% of our land,[2] and as the driest inhabited continent in the world, 70% of Australia is classed as arid or semi-arid.[3] Bushfires, floods, drought, cyclones, earthquakes, landslides, heatwaves and storms are experienced across the Australian landmass, and impact those who manage the land, and how they manage it.

17.12 Although climate and weather have shaped Australia's landscapes, so too have humans. Almost two-thirds of land in Australia has been modified for human use.[4] What land is used for, and how it is managed, are important factors in understanding how land management influences natural hazards and disaster resilience.

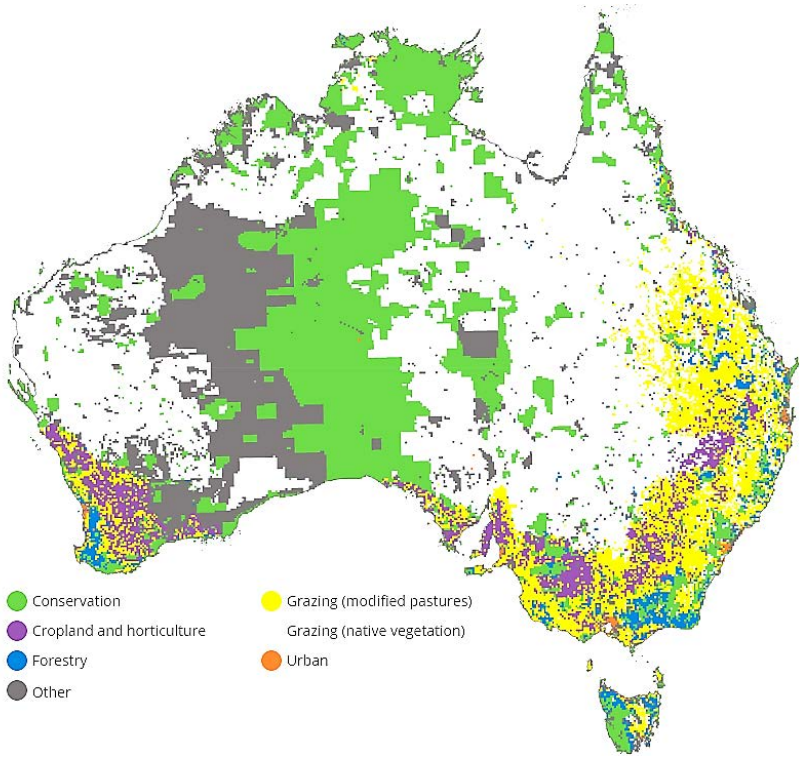


Figure 65: Land use in Australia[5]

Australia's land managers

17.13 The vast majority of Australians live in residential and urban areas where landscapes have been transformed extensively, however cities make up less than 0.2% of our land area.[6] Most land is used for agricultural purposes, with farmers managing around half of Australia's landmass.[7]

17.14 Agricultural land use, as shown in Figure 65, is predominantly grazing (native vegetation and modified pastures). Cropland, horticulture and forestry make up a much smaller proportion of agricultural activity. Some agricultural land has also been set aside for conservation/protection purposes.[8]

17.15 Farmers and local communities across rural and regional Australia are on the frontline for many disasters. As well as managing agricultural businesses and landscapes, rural and regional communities contribute extensively to disaster response and recovery efforts. During the 2019-2020 bushfires, for example, firefighting efforts relied heavily on volunteer rural and regional land managers, often using their own equipment and expert knowledge of the landscape.[9]

17.16 Indigenous Australians also manage a large proportion of Australia's land, with native title and other Indigenous land rights and interests recognised across approximately half of Australia.[10] Indigenous land and sea management includes a wide range of environmental, natural resource and cultural heritage management activities, undertaken by individuals, groups and organisations across Australia for customary, community, conservation and commercial reasons.[11] We heard of the valuable contribution of Indigenous land management in improving natural hazard resilience and risk reduction in some areas, in particular across the north of Australia. See Chapter 18: Indigenous land and fire management.

17.17 The Australian, state and territory governments are responsible for managing around a quarter of Australia's land area. This includes national parks, state forests and other types of conservation reserves across Australia.[12] Despite common misconceptions, primarily due to use of the term 'national', only six of Australia's national parks are managed by the Australian Government.[13] The remaining over 700 terrestrial national parks are state and territory responsibilities.

17.18 Local councils also have land management responsibilities for some areas of public land, including local reserves, parks and gardens and roadsides under their jurisdiction, although specific local council management arrangements vary considerably across the country.

17.19 We heard from members of the public sentiments to the effect that 'if you own or control the land, you are responsible for managing it so that it doesn't cause damage to other landholders, including your neighbours'. We heard this in relation to both private and public land.

Land management and natural hazards

17.20 Land management is the 'how' of land use. That is, the ways that farmers, foresters, Indigenous Australians, emergency services, park rangers, local governments, rural and regional landholders and others manage their land.

17.21 Land managers typically value their environment, assets and community. When natural hazards occur, many stay to protect their property, livestock and community at their own risk.

17.22 We heard of the importance of natural hazard and climate information on which land managers rely to inform their decisions, in particular:

- the Bureau of Meteorology's localised weather, climate and hazard warning information provides land managers with critical and timely intelligence, such as when to harvest and whether to move livestock

- the North Australia and Rangelands Fire Information service provides information on hot spots and fire scar histories to help Indigenous and pastoralist land managers across northern Australia prepare for and manage fires,[14] and
- the Climate Change in Australia website provides access to national climate projections and data for eight regions of Australia, and was designed in consultation with natural resource management planners to address climate change information needs.[15]

17.23 Accessible, up to date and locally relevant information is vital for land managers to manage disaster risk. This includes scalable, spatial data on varying hazards and environmental assets, as well as long term climate trends appropriate at a local level.

17.24 Although land management interacts with all natural hazards, by way of example, we explore how private and public land is managed in the context of bushfires. More specifically, we examine how fuel hazard is managed on public and private land.

Bushfires and land management

17.25 Although public commentary commonly associates land management and bushfires with hazard reduction, managing bushfire risk and resilience in the land extends further. Land managers mitigate bushfire risk and improve resilience by protecting assets such as fencing, crops, livestock, equipment, buildings, cultural sites, conservation areas and access routes. Further, we heard that some conservation reserves have fire resistant walking paths, many regional natural resource management plans have incorporated climate change projections, and expertise on ecological and cultural values has been incorporated into incident management teams.

17.26 Much of Australia's managed land is bushfire prone, although the frequency and severity of fire varies greatly across the country. The 2019-2020 bushfire season demonstrated the scale at which bushfires can impact southern parts of Australia, yet across the north of Australia, widespread bushfires are an annual occurrence, as shown in Figure 66.

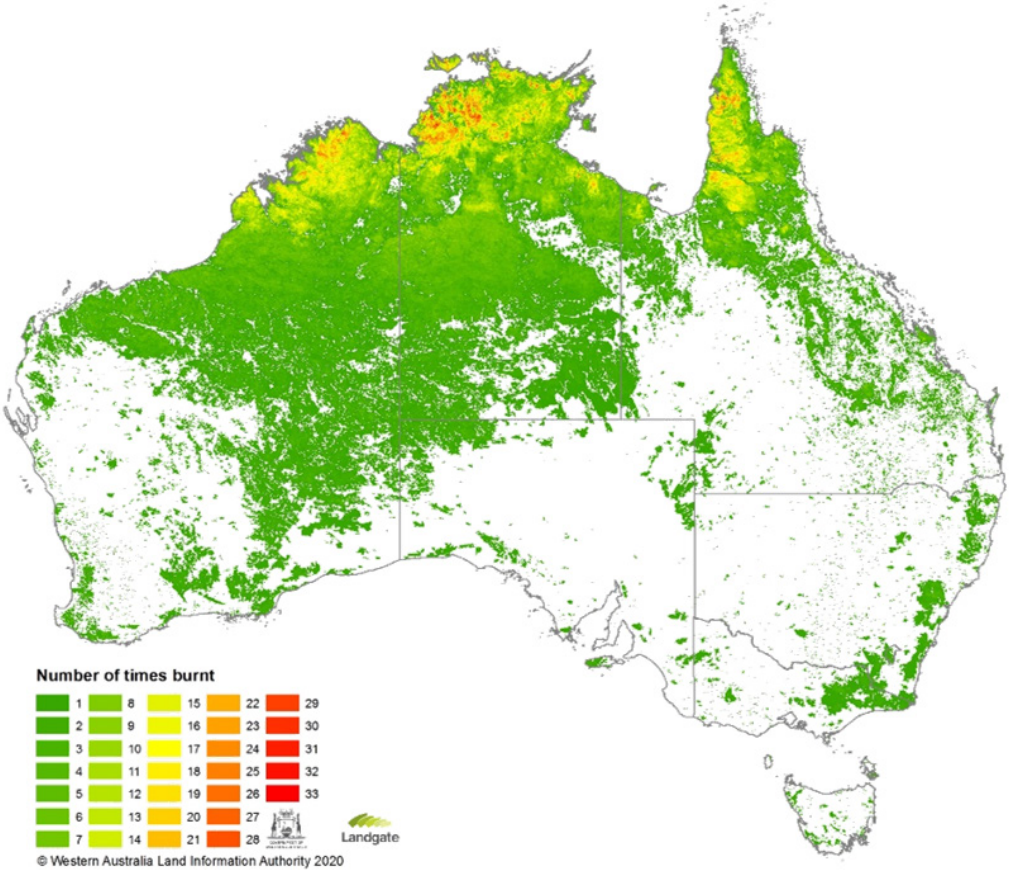


Figure 66: National fire return frequency for Australia, January 1988 to September 2020[16]

17.27 Over the past 20 years, the most damaging bushfires have predominantly occurred in Australia's forests, particularly the temperate forests in southern Australia. Australia's forests are largely managed by public and private interests, and sometimes jointly.

17.28 We refer to 'public', 'private' and 'other' forests:

- public forests - includes national parks, nature reserves, and state and territory conservation areas; as well as land where government agencies manage forests, including wood harvesting, water supply and conservation.[17]
- private forests – includes land with private ownership, crown land that is privately managed (for example, under pastoral leases for the purposes of stock grazing) and Indigenous managed land.[18]
- other – covers tenure categories where it is not clear whether they are managed by public or private interests.[19]

17.29 Figure 67 below gives an appreciation of fire extent across Australia's public and privately managed forests in the 2019-2020 bushfires.

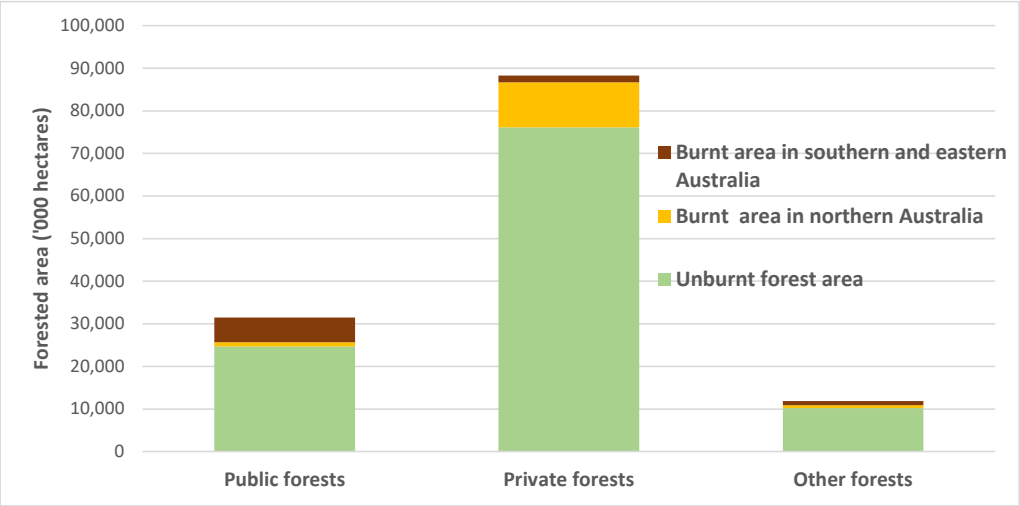


Figure 67: Native forest fire extent during the 2019-2020 summer fire season[20]

17.30 Figure 67 illustrates that native forest fire for southern and eastern Australia mainly occurred in public forests, whereas across the north of Australia, native forest fires were predominantly in privately managed forests. These figures do not include commercial plantations.

17.31 It is important to note that forest types, density and crown cover, land tenure, climate and fire regimes vary greatly between northern Australia and southern and eastern Australia. This is why the areas are separated in Figure 67.

Bushfire hazard reduction measures

17.32 Bushfire hazard reduction measures refer to the ways in which bushfire risk is reduced prior to an unplanned fire event. Hazard reduction measures are directed to efforts where land managers are able to influence future fire behaviour - mainly by fuel management. Other factors also influence fire behaviour, such as weather and terrain, but these cannot be modified easily.

17.33 Fuel management is achieved through three main processes: by reducing the total mass of fuel, altering its structure, and/or by altering its composition. These activities can reduce the intensity and rate of spread of a bushfire, as well as total 'spotting' and the distance over which embers move across the landscape ahead of a fire.[21]

17.34 Fuel management activities are generally not intended to stop or prevent bushfires on their own. They are designed to enhance and support the effectiveness of other complementary prevention, preparation and response measures; particularly fire suppression but also urban planning, building regulations and community preparedness.[22]

17.35 The most common hazard reduction techniques in Australian forests include:

- prescribed burning
- mechanical clearing such as slashing, thinning and mowing
- chemical control or spraying, through both on ground and aerial delivery, and

- grazing or browsing by animals.[23]

17.36 A range of factors inform which fuel management techniques land managers use, and when. These includes cost, practicalities, capabilities and risks. Sometimes a combination of these techniques may be most appropriate.[24]

Effectiveness of fuel management

17.37 Considerable research has been undertaken on the effectiveness of fuel management, particularly prescribed burning.[25] This research suggests that:

- Fuel load management, including prescribed burning, can materially reduce the risk to settlements when undertaken in the wildland-urban interface.
- Fuel load management in targeted areas in the broader landscape, away from the wildland-urban interface, can materially reduce the wildfire risk to settlements. The areas targeted for these purposes can include high ignition areas (eg high points in the landscape susceptible to lightning strikes), areas where the topography and forest types facilitate fire runs, ridges and other areas known to be associated with high intensity crown fires, and areas that are accessible for suppression and treatment activities.
- Fuel management can reduce bushfire-related impacts on ecological assets and areas of high conservation value.
- The amount of prescribed burning in the landscape (independent of the placement or arrangement of treatments) can materially affect the extent of bushfires. However, the evidence also suggests that the effectiveness of prescribed burning varies in different ecosystems and climates.
- The effects of fuel load management in reducing bushfire impacts and enhancing the effectiveness of suppression and other mitigation measures is relatively short-lived. Generally, fuel loads re-accumulate relatively quickly in Australian forests, meaning fuel load management activities must be done reasonably regularly to be effective in mitigating risk. Consistent with this, research suggests that prescribed burning is most effective in reducing the severity of bushfires in the first 1-4 years post-treatment. Depending on the severity of the weather and forest type, it can aid suppression for up to approximately 15 years.
- Weather has the greatest influence on bushfire behaviour and that, as fire weather conditions deteriorate, the influence of fuels declines. This means that the benefits of fuel load management activities also decline as fire weather conditions deteriorate. Research suggests that most bushfire-related impacts on lives and property in Australia have occurred in severe, extreme or catastrophic fire weather conditions.

Extreme bushfires

17.38 Fire management authorities and researchers have highlighted that the 2019-2020 bushfire season exposed gaps in the scientific understanding and ability to predict fuel behaviour under extreme weather conditions.[26]

17.39 We received evidence that emphasised the influence that fire weather has on fire behaviour and the relevance of 'extreme fires' to the effectiveness of fuel management.[27] The research on this issue differentiates between ordinary fires, which are largely a surface phenomenon, and extreme fires, where there is a coupling of the fire with the atmosphere.

17.40 In ordinary fires, there is generally a well-defined contagious fire front, with a relatively narrow band of flaming activity that delineates the unburnt fuel ahead of the fire from the burn fuel behind it. The research suggests that the behaviour of these fires, including their intensity and rate of spread, is a function of the prevailing environmental conditions, particularly weather, topography and fuels.

17.41 In extreme bushfires, the fire behaviour is no longer solely a function of the environmental conditions. These fires generate their own behaviour by interacting with the surrounding atmosphere. This results in fire behaviours that are difficult to predict.

17.42 We heard that, in extreme bushfires, fuel loads do not appear to have a material impact on fire behaviour.[29]

> The weight of research into the effects of fuel reduction on the propagation of extreme bushfires, indicates that as conditions deteriorate, fuel reduction is of diminishing effectiveness, and may have no appreciable effect under extreme conditions.[28]

17.43 In discussing the efficacy of their fuel management arrangements, state and territory agencies emphasised that the fires they were dealing with during the 2019-2020 season often occurred under severe, extreme and catastrophic conditions.[30] For example, we heard that of the six major fire incidents that occurred in SA, 'each of those occurred under catastrophic or extreme fire conditions. And… there are limitations on the success of hazard reduction preparation activities as the fire danger index increases'.[31] Any assessment of fuel management efforts needs to be considered in this context.

17.44 Nonetheless, the fact that fuels have a diminished effect on fire behaviour in severe fire weather conditions, and may have limited effect in extreme fires, does not mean that fuel management cannot be used to reduce risks. Severe weather conditions do not persist continually. Where conditions are moderate, even for short periods, there are opportunities for suppression that can be assisted by managing fuel loads. Furthermore, even in severe weather conditions, substantially reducing fuel availability in the areas surrounding assets should reduce fire intensities and consequent risk. Reducing available fuels in the landscape can also slow the initial rate of fire spread and fire intensity, which can provide opportunities for fire suppression and thereby reduce the risk of fires escalating into extreme fire events.

A need for further research

17.45 Considerable research and scientific attention has been dedicated to fuel management, particularly prescribed burning. **There is a need for continuing research to address significant gaps in the science, including in relation to the role**

of fuels in extreme fires, and the effectiveness and efficiency of fuel management strategies and techniques.[32]

17.46 Further research is relevant to all jurisdictions as they determine how to adapt their land management approaches to respond to changing climatic conditions. Research outcomes also have flow-on implications for predictive modelling capabilities, and broader planning and resourcing of hazard reduction activities.

> The role of fuel load in the development of extreme bushfires is complex… More research is required to better understand the role of fuel loads in extreme bushfire development, or to confirm that no such role exists.[33]

No single national fuel management strategy or technique

17.47 Decisions made by land managers on appropriate hazard reduction have to be tailored to local conditions and context. This includes consideration of geographic and landscape variables, and the nature of assets that are to be protected, including built, cultural and environmental assets.[34] There is no single fuel management strategy or technique that is applicable across the nation.

17.48 All forms of fuel management also come with costs and risks. These include resourcing associated with implementation (eg labour and equipment), training to maintain currency of skills and damage costs associated with fires escaping and accidents (eg, through loss of life, injury, or property loss). Indirect costs include respiratory-related health impacts associated with smoke exposure, for example when prescribed burning is undertaken in close proximity to urban settlements and potential adverse environmental and heritage impacts (for example, loss of amenity and loss of biodiversity).[35]

17.49 Other constraints also influence fuel management activities, including community awareness and understanding, growth of urban settlements and other development adjacent to land requiring management, different views (some substantial) among fire practitioners and researchers, differing regulatory settings, the shortening of seasonal windows suitable for certain fuel management activities due to climate change, and the presence of invasive species which alter fire behaviour (such as gamba grass in the NT or buffel grass in Central Australia).[36]

17.50 We heard from some agencies that staffing can also be a limitation. Smaller land management agencies highlight different scales of resourcing across the country. For example, Ms Sally Egan, Parks and Wildlife Commission of the NT, identifies that 'there are approximately 135 ranger personnel in the NT compared to 880 in the Queensland Parks and Wildlife Service'.[37]

17.51 State and territory governments emphasise that they must continually change their practices to adapt to their constraints. For example, Queensland Parks and Wildlife Service have undertaken burns before the traditionally recognised start to the prescribed burning season. This reflects a need to burn 'when conditions are suitable rather than locking into seasons'.[39] NSW Rural Fire Service outlined challenges for hazard reduction in areas like the Sydney basin, where landscape arrangements such as ridgetop developments mean that mechanical clearing tools are unable to get into some areas, necessitating the use of prescribed burning. This in turn creates issues of smoke hazard.[40]

> So it's called the Sydney basin for a reason, and that is that it's like a basin and the smoke goes in there and it gets trapped often by an inversion layer overnight and the next morning there's a heavy layer of smoke over the city.[38]

State and territory fuel management strategies

17.52 At state and territory government levels, a range of different government agencies have responsibility for fuel management. This includes national parks and wildlife agencies, which manage parts of Australia's conservation estate, state forest agencies and fire and emergency services agencies.

17.53 All states and territories have fuel management strategies that guide the application of fuel management activities on public lands and, in some jurisdictions, across all land tenures (public and private).

17.54 Fuel management activities are only one of a number of strategies employed by state and territory fire and land management agencies to mitigate risk from bushfire. Other activities include, for example, community engagement, preparedness and education programs (for example targeting ignition prevention) and construction and maintenance of fire trails.[41]

17.55 Fuel reduction undertaken by fire and land management agencies in a disaster context is intended to reduce the risk and impacts on lives, property, infrastructure and environmental and heritage values.[42] A risk-based approach drives the objectives and priorities of all jurisdictions in relation to fuel management.[43] However, there are significant differences in how these risk-based principles are applied and articulated.[44] Box 17.1 provides a snapshot of varying risk-based approaches used by different states and territories.

Community concerns about fuel management on public land

17.56 There is strong interest in, and polarising views on, fuel management activity, particularly prescribed burning to manage fuel loads.

17.57 **We heard many perspectives from public submissions that describe prescribed burning as, in effect, a panacea – a solution to bushfire risk. It is not.**

17.58 Part of the explanation for the strength of views of fuel load management, and prescribed burning in particular, may be due to a lack of community understanding about its effectiveness and the factors that influence the choice of strategy.

Box 17.1 State and territory approaches to managing fuel hazard risk

Residual risk assessments

The ACT, Tasmania and Victoria use a residual risk approach. Residual risk is the amount of risk that remains after controls are accounted for – it works to determine a level of remaining acceptable risk. In fuel management it involves calculating bushfire risk using computer modelling by simulating fires and calculating the remaining risk 'left over'. Victoria, for example, assesses risk by simulating 11,500 fires over the whole landscape and sets a percentage risk target of 70% against which to measure activities.

Area and fuel age based targets

WA, while maintaining a significant focus on the urban interface, highlights the role of a landscape-scale approach designed to create a mosaic of fuel loads across the landscape, driven by fuel age targets. In the state's south-west forests, they seek to maintain 45% of the fuel in the broader landscape that they manage at less than six years old in order to 'see a significant reduction in the extent of bushfires that occur across that landscape.'[45] This equates to a nominal 200,000 hectare target, broken across different land management zones.

NSW has a state-wide target to treat '135,000 hectares a year at a five year rolling average'.[46] Queensland has a planned burn target of greater than 5% of the total protected area and forest estate.[47] Prior to 2016, Victoria had an annual hectare target of 5% of land, but moved away from this in favour of a residual risk approach.

Historical extrapolation and qualitative assessment

NSW, SA and Queensland base their approach on historical data on ignitions and fire spread, and judgments on identification and prioritisation of fuel reduction and fire management activities. This does not involve a quantitative calculation of residual risk after mitigation activities. SA notes that its assessed risk level remains at the 'same level to acknowledge there is always going to be a level of bushfire risk to assets that have been identified as being at risk'.[48]

Zoning arrangements

States and territories also assign management zones based on risk levels and assets to be protected to assist in the implementation of their hazard reduction programs.[49] These zones define the primary purpose for fire management in a given area of land, with each zone categorised based on their management objective. They may govern, for example, how fuel is managed directly at the urban interface compared with the broader landscape.

Medium to long term outlooks

Jurisdictions emphasised the importance of medium to long term planning for fuel load management programs, noting that these programs cannot easily respond to seasonal change.[50] They acknowledge that fuel management is more than one year's worth of work – that it is 'an amalgam of each year's subsequent workload'.[51] Seasonal outlooks and indicators do, however, help to focus short term implementation and trigger other forms of preparedness and response activity.

17.59 Another potentially contributing factor to community tensions about fuel management on public lands may be misunderstandings about the strategies that have been adopted, their rationale, and the extent of implementation.

17.60 There are polarised opinions, and political and public debate, on the extent of hazard reduction occurring within Australia. One state agency expressed this tension as follows:

> *[W]e believe there is a general community intolerance of government land managers being pro-active in hazard reduction… However, following a bushfire, the government land managers are often the first to be blamed for the extent and magnitude of the fire, because we may or may not have undertaken 'enough' fuel reduction.*[52]

17.61 Information provided to us on fuel load management undertaken by public land managers demonstrated that it is captured, recorded and evaluated in different ways and to different degrees of granularity. We heard of increased fuel load management in some jurisdictions. For example, the NSW Government told us that 'in the last 7 years, National Parks and Wildlife Service has more than doubled its average annual level of hazard reduction burning'.[53]

> We believe there could be less community angst through improved community education on the value of hazard reduction and the different mechanisms to achieve this.[54]

17.62 Disclosure of clear information about fuel management strategies on public land, including the rationale, intended objectives, degree of implementation, and impact of different strategies and techniques, enables communities living in bushfire-prone areas to be fully informed about the fuel hazard aspect of the risk profile of their surrounding landscape. There was a high degree of support from state and territory governments that they should articulate and make available to the public their respective fuel management strategies, as well as the implementation and outcomes of those strategies.

17.63 Jurisdictions and local councils outlined various ways in which they are supporting and enhancing this community understanding. This includes publishing available information as to when planned burns will be undertaken, activities actually undertaken and their outcomes. For example, information about the geographical extent of fuel treatment (planned burning and other treatment methods) undertaken on public land in Victoria each financial year is publicly reported in the Forest Fire Management Victoria Fuel Management Report. The Fuel Management Reports also include information about additional cross-tenure fuel treatment undertaken, wholly or in part on private property within 1.5km of public land.[55] Queensland Parks and Wildlife Services is developing a Bushfire Risk Management Framework, which is intended to provide 'a transparent and evidence-based rationale for the management of bushfire risk on all lands that QPWS manages, in a manner that is consistent with government and community expectations, national standards and best practice'.[56]

17.64 While recognising the work underway in this area, there is considerable variability in the level of detail provided by different fire and land management authorities and local councils, and how easily accessible this information is to the general public. Increased and more accessible community education is needed to ensure that the role, and limitations, of hazard reduction activities are better understood, including its efficacy and practical constraints.[57]

17.65 **State and territory governments should take steps to improve public understanding of fuel management.**

17.66 Some state and territory agencies have highlighted that increased urban settlement and the expansion of agricultural developments in close proximity to boundaries of parks and reserves has increased the risk to life and property associated with hazard reduction activities and, by extension, that has elevated the need for higher levels of community and stakeholder engagement and awareness.[58]

Recommendation 17.1 Public availability of fuel load management strategies

Public land managers should clearly convey and make available to the public their fuel load management strategies, including the rationale behind them, as well as report annually on the implementation and outcomes of those strategies.

Compensation for damages

17.67 We heard concerns about compensation for damage incurred by property owners from fires that emerge from public land. This was raised by members of the public particularly in the context of damage to fencing occurring when fire moved from public to private land.

17.68 There are a range of legislative arrangements in place within some jurisdictions to address damages or to compensate landholders affected by unintended or unplanned fire activity associated with land that is publicly managed.[59] Jurisdictions noted that these assessments require careful consideration of circumstances and liabilities.[60] Many jurisdictions outlined the limits of their legal liabilities. For example we heard that, in the ACT, it is 'not a legal requirement to compensate landholders who experience damage from unplanned fires', however, Parks and Conservation Service will provide support for repairs of damages caused from escaped prescribed burns.[61] Others referenced insurance arrangements and consideration of issues on a case by case basis.[62]

17.69 We note that some jurisdictions have voluntary support provisions for adjoining landholders whose fences have been damaged or destroyed by bushfires. For example, the NSW Government stated that 'although not legislatively required to do so, NPWS has had a long term policy that provides support to adjoining landholders whose fences have been damaged or destroyed in bushfires'.[63] Private landholders may receive up to $5,000 per kilometre to contribute to the replacement of damaged boundary fences.[64]

Fuel management on private land

17.70 Fuel load management on private land is of considerable importance to the protection of lives, property and other assets of value.

17.71 The approach to fuel management on private land can be driven by a broad range of priorities and considerations. Indigenous Australians manage fuel as part of a broader caring for Country approach. At an individual household level, fuel management can be undertaken to enhance personal safety and protect homes and property. Businesses, including farmers and plantation owners, can undertake hazard reduction to protect their commercial interests and livelihoods. We heard, for example, from Hancock Victorian Plantations, the largest non-government land manager and manager of forest resources in Victoria, that the principal hazard reduction technique to protect their plantations is prescribed burning.[65]

Barriers to fuel management on private land

17.72 A range of barriers were outlined by land managers relating to fuel management on private land.

17.73 For example, we heard that 'there is an inconsistent understanding of risk and a variable acceptance of responsibility across various communities and between community members'.[66] We heard in public submissions that even in circumstances where land managers accept responsibility, there may be confusion as to the fuel load reduction activities they are required or permitted to undertake, and any associated penalties. This has been similarly reflected in the findings of jurisdiction-specific reviews into the 2019-2020 bushfire season.[67]

17.74 A range of environmental regulatory instruments apply within states and territories to the clearing of vegetation related to hazard reduction. These come with considerable complexities and variation in regulation and approval processes.

17.75 We recognise there are multiple objectives relevant to vegetation management. Bushfire risk management sits alongside other objectives, such as the conservation of biodiversity, heritage management and maintenance of local amenity.

17.76 To conduct vegetation clearance activities around private residential properties, homeowners must be aware of, and successfully navigate, the complexities of any applicable planning laws, standards and other regulatory instruments. They must also comply with any applicable timeframes and absorb any associated costs. They must also have an understanding of the costs and the legal ramifications of non-compliance or mistakes.[68] The ease with which individuals can navigate these complexities, and the support given to do so, also varies between jurisdictions. These challenges were demonstrated in a comparison exercises that we conducted to understand the different regulatory systems and processes.[69]

17.77 Although states and territories have primary responsibility for matters of state and local environmental significance, the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) applies to private land when an activity is likely to result in a 'significant impact' on a matter of national environmental significance.[70]

Box 17.2 An example of reducing bushfire risk through fuel management on private land[71]



Figure 68: Photograph of Willinga Park at the boundary with the National Park, showing one of the bushfire risk mitigation measures

Willinga Park is an equestrian and pastoral property west of Bawley Point, located in the Shoalhaven region of NSW. The breeding and rearing of livestock is the principal land management objective across the less developed, rural-zoned parks of the property. The property covers more than 800 hectares, with around 120 horses and 650 cattle.

A number of fuel management activities were carried out on the property. Regrowth clearing and stand thinning treatments restored an open grassy condition of forest stand structure and facilitated the resumption of grazing, which prevented shrub re-encroachment.

A report into the significance of bushfire mitigation measures carried out at Willinga Park found that on 2 December 2019, driven by strong dry westerly winds, the uncontained and out of control Currowan fire spread across the Clyde River, and across the Princes Highway, toward Willinga Park and Bawley Point.

The Currowan fire was prevented from making a high intensity and impact run into the township of Bawley Point by the presence of managed agricultural lands within the Willinga Park equestrian centre and property. Fire spread was able to be stopped when it ran into the western and southern boundaries of the Cockatoo Forest section of Willinga Park. The extent and depth of the actively maintained and grazed paddocks also absorbed spotting from the Currowan fire impact, preventing the fire from spotting over Willinga Park into dense vegetation to the east, and extending into Bawley Point.

Due to Willinga Park's blocking effect on the fire run, in conjunction with the substantial efforts of local Rural Fire Service brigades, supported by other emergency services, the local community and Willinga Park's staff, a major fire disaster in Bawley Point township was averted. In the absence of the regrowth clearance treatments and active land and grazing management implemented at Willinga Park, the Currowan fire would have continued its uncontrollable high intensity run into Bawley Point.

17.78 We heard in public submissions that land managers can have difficulty understanding when the EPBC Act applies to hazard reduction activities on their land. We also heard that the Australian Government makes information available to assist private landholders to determine whether their activities will have a 'significant impact' on a matter of national environmental significance, including guidance on government websites, guidelines to undertake self-assessment and search tools.[72]

17.79 Information that informs decisions about how private landholders manage their fuel can be highly dependent on resourcing and expertise. Individual landholders are often reliant on information, guidance and, in some cases, the practical assistance of land and fire management agencies.[73] In contrast, we also heard examples of how some substantial commercial plantation interests maintain their own well-resourced firefighting units with hazard reduction expertise, and have their own modelling capabilities, with use of simulations to target and evaluate hazard reduction efforts.[74]

17.80 We heard that there is room for both increased clarity and greater flexibility. We also heard that ambiguities around approvals and assessments sometimes caused unreasonable delays, or did not align with ideal time intervals for fuel management activities. Some public submissions expressed frustration at the tension between their shared responsibility to manage risk and the limitations on their ability to do so due to approvals required.

17.81 We also heard that criticism of delays can sometimes be attributed to a lack of community understanding of the processes. In some cases, there appears to be a need for clearer practical guidance for land managers and the broader community. There was support for governments to review their legislation and processes to ensure greater clarity and minimise times for assessment and approvals.

17.82 In considering the appropriateness of different regulatory systems to govern hazard reduction activities, some jurisdictions have highlighted the value of streamlining assessment and approval processes and improving community awareness.[75] We were told about the NSW '10/50 model' as an example of where such streamlining has occurred (see Box 17.3).[76] The South Australian Independent Review into South Australia's 2019-2020 Bushfire Season 'supports an approach to hazard reduction like the NSW Rural Fire Service 10/50 vegetation clearance framework, supported by a more comprehensive community awareness programme'.[77] We see such efforts as commendable to simplify the process for landholders.

Recommendation 17.2 Assessment and approval processes for vegetation management, bushfire mitigation and hazard reduction

Australian, state and territory governments should review the assessment and approval processes relating to vegetation management, bushfire mitigation and hazard reduction to:

(1) ensure that there is clarity about the requirements and scope for landholders and land managers to undertake bushfire hazard reduction activities, and

(2) minimise the time taken to undertake assessments and obtain approvals.

Box 17.3 NSW 10/50 Vegetation Clearing Code of Practice

In NSW, the 10/50 Vegetation Clearing Scheme was introduced to give people living near the bush an additional way of preparing their property for a bushfire. The 10/50 scheme is underpinned by the 10/50 Vegetation Clearing Code of Practice (Code).

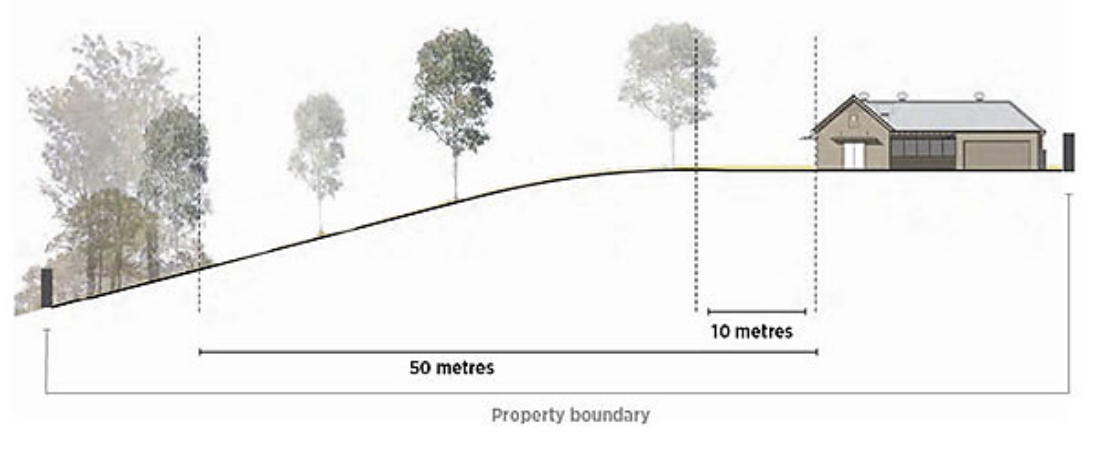


Figure 69: Figure from guidance on the 10/50 vegetation clearing rule in NSW[78]

A homeowner can use an online assessment tool available on the NSW Rural Fire Service's website to help them assess whether then 10/50 Code will allow them to clear vegetation on their property.

If eligible, the homeowner could clear trees on their property within 10 metres of their home without seeking approval, and clear underlying vegetation such as shrubs (but not trees) on their property within 50 metres of their home without seeking approval.

A number of conditions are outlined in the Code, including consideration of factors such as slope, areas that cannot be cleared such as mangroves and saltmarshes, proximity to rivers, duties of care related to the avoidance of harm to protected fauna or deliberate cruelty to animals, appropriate management of soil erosion and landslip risks.

Homeowners outside 10/50 entitlement areas are encouraged to contact their local council or land services officer to discuss their options for legally clearing vegetation.

Improving fuel data and information

17.83 Fuel data underpin the bushfire hazard reduction activities undertaken by state and territory agencies. The quality, quantity and currency of such data may directly determine the efficacy of the activities undertaken. New and emerging technologies and techniques also provide opportunities for land managers to have a better understanding of fuels and fuel management.

Fuel data collection

17.84 Jurisdictions employ a wide variety of approaches and technologies to capture and monitor information on fuel. Techniques include plot monitoring, visual assessments, use of drones, remote sensing, aerial photography and satellite technology.[79] For example, as a relatively small jurisdiction, ACT has the benefit of 750 permanent fuel plots that they measure each year to provide data on how fuel is accumulating.[80]

17.85 Remote sensing and other satellite capabilities have proven valuable for states and territories to capture nuanced fuel data and aid in fuel management planning and evaluation. Benefits include improving estimation of fuel loads, understanding the composition of fuel, and creating spatial fuel maps at an appropriate resolution.[81]

17.86 There is some variability in capability across jurisdictions. For example, the Western Australian Department of Biodiversity Conservation and Attractions advises that 'the use of technology, satellite technology and remote sensing is quite critical to our post-burn or post-mitigation activity assessment'.[82] On the other hand, Bushfires NT notes that they lack remote-sensing methods and 'tend to rely on an estimate based on the time of year of the fire which isn't always accurate'.[83] There is support for further investigation, improvement and more cost effective collection of fuel data using remote sensing and satellite technology.[84]

17.87 Researchers also told us of the benefits of spatial technology and data to be able to examine fuel, landscapes and weather systems in a holistic, accurate and dynamic way, to facilitate a more comprehensive picture of the effects of fuel treatments. [85]

17.88 **There is benefit in states and territories developing and utilising remote sensing and other technologies (for example LiDAR) to improve the capture of fuel load data.**

Fuel data understanding and use

17.89 In addition to improving the way data is collected, there is support for a continuation of effort to improve national consistency in the way fuel data are classified, recorded and shared across jurisdictions.[86] For example, the Australasian Fire and Emergency Service Authorities Council (AFAC) identifies that it 'support[s] the ongoing development of a national bushfire fuel classification to facilitate national interoperability and provide consistent data inputs into national processes such as the AFDRS and a National Bushfire Simulator such as Spark'.[87] The Victorian Government highlighted the value of 'national investment to improve the way in which fuel availability is monitored and modelled' in order to 'allow jurisdictions to make informed preparedness, readiness and response decisions'.[88]

17.90 Jurisdictions argued that any national information system should not duplicate or undermine information systems currently used by each state and territory.[89]

17.91 The Final Report of the NSW Bushfire Inquiry identified the need to:

- monitor trends in bushfire activity and impacts, including timing, cause, extent, and intensity across all land tenures and vegetation types
- track trends and identify patterns in associated weather and climate signals that contribute to severe bushfires, and
- evaluate the cost and effectiveness of risk mitigation efforts, including hazard reduction, and fire suppression activities.[90]

17.92 In 2011, work commenced to establish a nationally consistent framework for fuel classification, using existing vegetation data from a range of sources to categorise fuels into a set of nationally consistent fuel types.[91]

17.93 This work sought to 'move away from State-based vegetation descriptions classifying the vegetation based on its floristic components to a system that described how the fuel was structured (ie, how a fire would see it).' [92]

17.94 Mr Stuart Ellis, the Chief Executive Officer of AFAC, told us that state and territory fire and land management agencies considered that national alignment of their practices could:

- enhance cost efficiency in systems and data development works by supporting shared funding models and supporting system rollouts across jurisdictions
- enhance cost efficiency in research and research utilisation by supporting the sharing of project funding and allowing for the rollout of fuel and fire behaviour related findings across multiple jurisdictions
- support nationally consistent fuel inputs for fire simulators and the new Australian Fire Danger Rating System (AFDRS)
- enhance interagency and cross jurisdiction communication and information sharing
- enhance interoperability in cross border operations and interstate deployments through shared terminology around bushfire fuel characteristics and fuel types and shared bushfire fuel datasets, and
- enhance cross border operations through allowing for cross border fire simulations. [93]

17.95 Despite good intentions, implementation of the Bushfire Fuel Classification project stalled during the trial implementation period. Mr Ellis attributed the stoppage to the 'substantial effort involved [for trialling agencies] to remap their existing fuel layers and change their bespoke IT and mapping systems and procedures.' Additionally, some existing vegetation types could not be translated into the Bushfire Fuel Classification system. [94]

17.96 Focus then shifted to developing a system of mapping fuels nationally to support the development of the AFDRS. The AFDRS's fuel classification also looks at how fuel

structure influences fire behaviour. It uses existing agency data and fuel types based on the existing fire behaviour models used by the AFDRS.[95]

Recommendation 17.3 Classification, recording and sharing of fuel load data

Australian, state and territory governments should develop consistent processes for the classification, recording and sharing of fuel load data.

Chapter 18 Indigenous land and fire management

Summary 387

Indigenous land management 388

The significance of local knowledge 388

Indigenous fire management 389

Mitigating the effects of bushfires 389

Recognition and support for Indigenous land and fire management 391

Engagement and sharing of knowledge from Indigenous land and fire managers 391

Initiatives supporting Indigenous-led land and fire management 395

Supporting community resilience 396

Summary

18.1 Indigenous land management aims to protect, maintain, heal and enhance healthy and ecologically diverse ecosystems, productive landscapes and other cultural values. It is not solely directed to hazard reduction.

18.2 It is an example of how local knowledge has successfully informed land management for tens of thousands of years. Today, Indigenous land management maintains its traditional and cultural importance, while also leveraging technologies such as helicopters and satellites.

18.3 Public interest focuses mainly on Indigenous fire management practices, despite it being just one aspect of the broad and integrated approach of Indigenous land management.

18.4 There is growing recognition of the value of Indigenous land and fire management practices as a way to mitigate the effects of bushfires. This is particularly evident in the north of Australia, where it has been used to reduce the intensity and extent of bushfires. However, conditions enabling Indigenous land management in the north of Australia vary in a number of ways compared to prevailing conditions in southern parts of Australia. There may nevertheless be opportunities to reinvigorate Indigenous land management practices in parts of southern Australia.

18.5 Australian, state and territory governments are increasingly supporting Indigenous land management practices. There is a desire to generate hazard reduction and environmental benefits, while also improving the resilience of Indigenous communities.

18.6 All governments should work with Traditional Owners to explore the relationship between Indigenous land management and natural disaster resilience.

18.7 Governments and land managers should further explore the opportunities for Indigenous land and fire management in land management strategies.

Indigenous land management

18.8 Indigenous land management aims to protect, maintain, heal and enhance healthy and ecological diverse ecosystems, productive landscapes and other cultural values.

18.9 Indigenous land management, also referred to as 'caring for Country', is undertaken by Indigenous individuals, groups and organisations across Australia for a range of customary, community, conservation and commercial reasons.

18.10 Indigenous land management activities are diverse and include a range of environmental, natural resource and cultural heritage management activities, including water management, the harvesting of food and fibre and the conduct of controlled burns.[1]

18.11 Indigenous land management is not solely directed to hazard reduction.

The significance of local knowledge

18.12 Indigenous land management is an example of how local knowledge has successfully informed land management for tens of thousands of years.

18.13 It draws on a close knowledge of Australia's landscapes, developed from observation, ongoing interaction, active custodianship and adaptation to changing circumstances. It is place-based; targeting action to the specific circumstances of a place, including its environment and customs, and engaging local people in development and implementation. Techniques and outputs are therefore specific to a place or practitioner, and differ widely across Australia.[2]

18.14 Different landscapes across Australia require different regimes depending on the requirements of Country, including environmental factors such as vegetation type, climate and introduced species.[3]

18.15 Today, Indigenous land management retains its traditional and cultural importance, while adapted to changing ecosystems and leveraging various technologies.[4] We heard examples of traditional knowledge being used together with technology. For example, Warddeken Land Management in the NT explained that Indigenous rangers in West Arnhem Land use a combination of traditional knowledge and technology, such as helicopters and GPS, to help guide their burning.[5] The WA Government notes that, in the Kimberley and Western Desert areas, Indigenous communities work with state agencies to maintain traditional burning practices assisted by various technologies.[6]

Indigenous fire management



Figure 70: Indigenous fire management on public land in Queensland[7]

18.16 We heard that the use of fire has always been a means of shaping and managing the land by Indigenous Australians.[8] It has also been an aspect of Indigenous land management that has generated significant public interest during our inquiry.

18.17 Public interest focuses mainly on Indigenous fire management practices and their role in altering fuel loads, despite it being just one aspect of the broad and integrated approach of Indigenous land management.[9]

18.18 It is common for the term 'Indigenous fire management' to be used interchangeably with the term 'prescribed burning', and for the general public to consider the approach exclusively in terms of its hazard reduction outcomes or similarities in technique (eg mosaic burning). However, Indigenous fire management has cultural origins and broader objectives. It aims to achieve a wide range of social, economic and cultural outcomes beyond hazard reduction.[10] As noted by the CSIRO, 'the physical impact of Indigenous cultural burning is complemented by a cultural and symbolic significance that is passed from generation to generation'.[11]

18.19 Jurisdictions recognise and endorse the importance of distinguishing between priorities of broad-scale fuel management for hazard reduction purposes and Indigenous cultural burning practices.[12]

18.20 **Indigenous use of fire, including for hazard reduction purposes, is but one component of broader Indigenous land management.**

Mitigating the effects of bushfires

18.21 There is growing recognition of the value of Indigenous use of fire as a way to improve disaster resilience by mitigating the effects of bushfires. This is particularly evident in the north of Australia, where it has been used to reduce the intensity and extent of bushfires. Research in northern Australia demonstrates that savanna burns

conducted early in the dry season can reduce the incidence of more destructive and higher intensity fires.[13]

18.22 Although reducing bushfire risk is not necessarily the primary purpose of Indigenous land management, reduced fuel loads and improved ecosystem resilience can be important benefits of its application.[14]

18.23 In the West Arnhem Land Fire Abatement program in the NT, Indigenous rangers worked with government agencies and scientists to introduce cultural burning to a large part of Arnhem Land, resulting in a reduction in the frequency and magnitude of large bushfires.[15] In return, they now receive carbon credits, which can be sold to the Australian Government and other buyers.

18.24 A range of programs are exploring the relationship between Indigenous fire management and natural disaster resilience. For example, the NT Government established a Conservation and Land Management Fund, which provides funding to assist Indigenous rangers to improve conservation practices, including fire management, on Indigenous land and sea Country.[16]

18.25 We heard that the majority of Indigenous fire management in Australia occurs in northern Australia (NT, Queensland and WA).[17] The Australian tropical savanna covers approximately 25% of the Australian mainland and is primarily composed of sporadic eucalyptus trees and understorey grass. Rapid growth during the wet season and a prolonged dry season provides conditions conducive to extensive wildfires in the late dry season.[18] Indigenous fire management activities can assist in reducing unplanned bushfires and maintaining the biodiversity of the tropical savanna.

18.26 Fire projects in northern Australia often use aerial incendiary drops from helicopters during the early dry season to reduce fuel loads and establish a network of strategic fire breaks, hundreds of kilometres long, across the landscape.[19] These burns are complemented by on-ground burning from people in vehicles, or walkers using matches and drip torches. Using both aerial and ground burning techniques allows for more effective fire projects, mitigating the intensity and extent of late-season bushfires, while the fire breaks create barriers around sensitive vegetation and cultural sites.

18.27 In southern Australia, the vegetation and geography are different and lend themselves to different hazard reduction techniques. We also heard that fire management practices are not as prevalent in southern Australia as it is in the north.[20] However, Indigenous organisations and communities are seeking to increase the level of knowledge and contribute to land and fire management practices in southern jurisdictions.[21]

18.28 Some jurisdictions are working with Indigenous communities to address these knowledge gaps. For example, NSW National Parks and Wildlife service is partnering with Indigenous communities to undertake burns on public land. While these burns are recognised as promoting specific cultural outcomes, those that correlate with hazard reduction are being measured to contribute to a growing knowledge base.[22]

18.29 We were also told of the improved ecological resilience effects of Indigenous fire management on Australian landscapes, attributable to the benefits of local knowledge of plants, animals and landscapes informing fire management practices.[23]

Recognition and support for Indigenous land and fire management

18.30 Australian, state and territory governments are increasingly supporting Indigenous land and fire management practices. The incorporation of Indigenous land management practices benefits the resilience of Indigenous Australians, and provides opportunities for a whole of community response to bushfires.

18.31 We heard recognition of, and support for, Indigenous land and fire management in two main forms:

- engagement and sharing of knowledge from Indigenous land and fire managers, and
- the inclusion of Indigenous-led land and fire management in the state and territory response to bushfires.

Engagement and sharing of knowledge from Indigenous land and fire managers

18.32 Jurisdictions emphasised the importance of close engagement with Traditional Custodians in their fire management approaches.[24]

18.33 We heard of a number of forms of engagement and sharing of knowledge between Indigenous land and fire managers and state and territory fire and land management agencies, including:

- consultation and partnership arrangements with Indigenous Australians on land and cultural heritage management, including managing bushfire risk,[25] and
- Joint Land Management arrangements between governments and Traditional Owners to share responsibility for the management of public land.[26]

18.34 We heard from jurisdictions that this engagement is reflected and promoted in strategic documents and arrangements. For example, the ACT emphasised that engagement has been incorporated as an action in the ACT's Strategic Bushfire Management Plan.[27] Queensland's Department of Environment and Science outlines their structured partnerships with Indigenous communities and work underway to prepare Strategic Plans for Gondwana, Riversleigh and K'gari (Fraser Island) World Heritage areas. These plans will consider approaches to bushfire management.[28] Victoria's Department of Environment, Land, Water and Planning highlighted the development of bespoke partnerships with individual Traditional Owner corporations at a regional level, tailored to reflect their specific interests and capabilities and underpinned by memoranda of understanding.[29]

Box 18.1North Kimberley Fire Abatement Project, Western Australia[30]

In the North Kimberley, Dambimangari, Wilinggin, Wunambal Gaambera Uunguu and Balanggarra Indigenous Rangers and Traditional Owners are managing the land and sea Country of their respective native title areas – including through 'right-way' fire.

The four groups registered savanna burning carbon projects in 2014 and have since worked together as the North Kimberley Fire Abatement Project (NKFAP).

Fire management is carried out in line with Healthy Country Plans, using a combination of science and traditional knowledge, with the objectives of looking after Country and culture, limiting late-season wildfires, driving biodiversity conservation, protecting cultural sites and facilitating intergenerational transmission of traditional knowledge. The carbon projects were registered under the Emissions Reduction Fund (ERF) in order to generate revenue that could be reinvested to ensure the sustainability of these operations, continue providing access to Country to Traditional Owners, provide jobs skills and training opportunities, and create other economic opportunities.

Healthy Country fire operations carried out by the NKFAP partners in the early dry season have significantly reduced the average extent, intensity and frequency of late-season wildfires. Revenue from the projects has enabled a maturing of fire operations while supporting capacity building, governance and growth of the four organisations. Relatedly, the ranger groups also manage invasive plants in order to prevent the incursion and spread of high biomass weeds, such as gamba grass, that promote fire across their native title / carbon project areas.

The NKFAP projects are nationally and internationally acclaimed both for their fire management outcomes and the social, environmental and economic benefits they have brought to remote Indigenous communities – far beyond the value of carbon credits earned. Indigenous Rangers have participated in two way exchanges to share their skills and knowledge in Botswana Africa as part of the International Savanna Fire Management Initiative.

18.35 Close partnerships and two way knowledge exchanges were emphasised by jurisdictions. For example, the WA Bushfire Centre of Excellence is developing a Traditional Fire Program and integrating traditional knowledge and cultural fire practices into training programs.[31] The Queensland Government emphasises efforts to work with Indigenous communities to deepen partnerships with Queensland Parks and Wildlife Service rangers, to provide two-way learning opportunities.[32] It was noted that the last decade has seen a 'convergence of Indigenous-led grass roots initiatives, new recognition of Indigenous rights within land management governance, and a growing receptiveness to collaboration within many government agencies' in southern Australia.[33]

18.36 We also heard of instances where support networks and mechanisms have been effective in renewing connection. Firesticks Alliance Indigenous Corporation told us that they help to establish fire programs on Country by working with communities to re-invigorate and share knowledge of how fire should interact with their landscapes.[34]

18.37 We heard that successful application of practices in areas without Indigenous land ownership can often rely on informal relationships developed between individuals in the Indigenous community and individuals in the relevant agencies.[35] However, Indigenous perspectives are not always considered in planning and decision-making processes.[36]

18.38 Guidance such as the *Our Knowledge, Our Way Guidelines*, developed by more than 100 Indigenous contributors and launched in July 2020, is an example of strengthening and sharing of Indigenous knowledge in land and sea management in culturally appropriate ways.[37] State and territory agencies also have policies and guidance for staff engaging with, and involving, Indigenous Australians in fire management.[38]

18.39 Indigenous land management advocates highlighted benefits of bringing Indigenous and non-Indigenous land managers to learn together.[39] Victor Steffensen from Firesticks highlighted the value of these opportunities, where appropriate, to give 'non-Indigenous people a greater understanding of [Indigenous] culture' as well as an understanding that 'Indigenous fire management is valuable for the future, not just culturally but to look after the environment'.[40]

Box 18.2 *Our Knowledge, Our Way Guidelines*[41]

OUR KNOWLEDGE OUR WAY in caring for Country

Indigenous-led approaches to strengthening and sharing our knowledge for land and sea management

Best Practice Guidelines from Australian experiences

The Our Knowledge, Our Way Best Practice Guidelines identify ways that partners can support good knowledge practice, for example, through strong partnership agreements, support for cultural governance arrangements, and protocols.

The Guidelines were supported by the Australian Government's National Environmental Science Program, Northern Australia Environmental Resources Hub, under the project *Knowledge Brokering for Indigenous Land Management.*

The Guidelines are Indigenous-led, based on an open, transparent process established by the Project Steering Group, which called for Indigenous Peoples to submit case studies that demonstrate best practice in working with Indigenous knowledge.

The following are extracts from the *Our Knowledge, Our Way Guidelines:*

'Our Indigenous knowledge connects us to our Country and our cultures. Our knowledge is owned by us as Traditional Owners and is diverse across Australia. The vision for *Our Knowledge Our Way* in caring for Country, established by the Indigenous-majority Project Steering Group, is:

- Indigenous people are empowered to look after Country our way.
- Improved environmental conditions and multiple social, cultural and economic benefits come from effective Indigenous adaptive management of Country.'

'The Guidelines are based around 23 case studies from across Australia that show how caring for Country can be supported through:

- Strengthening Indigenous knowledge
- Strong partnerships
- Sharing and weaving knowledge
- Indigenous networks.'

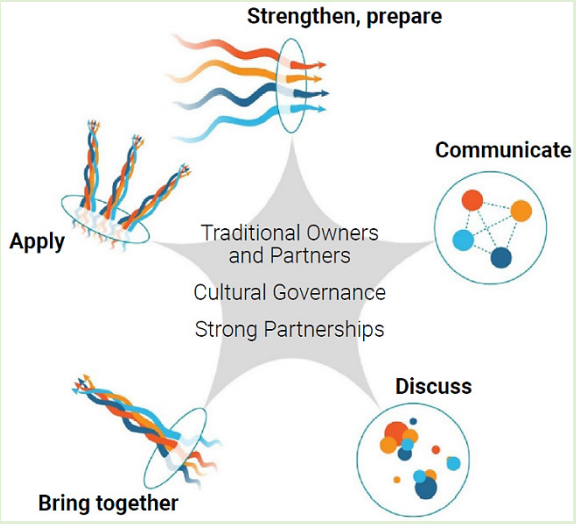


Figure 71: Key steps that can help Traditional Owners and partners in sharing and weaving knowledge[42]

Initiatives supporting Indigenous-led land and fire management

18.40 Contrary to some public perception, the Australian, state and territory governments have put in place initiatives to support Indigenous land and fire management.

18.41 We heard about ways in which jurisdictions are directly supporting Indigenous-led activities that include fire management, including*:*

- ranger programs that support Indigenous rangers to manage and protect Country[43]
- carbon abatement initiatives that allow land managers to earn carbon credits by changing management practices to reduce greenhouse gas emissions[44]
- the establishment of Indigenous Protected Areas, which are areas of land and sea managed by Indigenous groups as protected areas for biodiversity conservation and other social, cultural and economic benefits,[45] and
- development of strategies and initiatives that support Traditional Owners to apply Indigenous land management on Country.[46]

18.42 The Queensland Government works with 24 communities around the state by providing grant funding to support the employment of 100 Indigenous Land and Sea rangers.[47] We heard of the extensive ranger network in the Kimberley, where between 70 and 100 full-time rangers are employed and collectively manage an area of over 450km^2.[48] The NSW 2019-2020 Bushfire Inquiry found that NSW can 'look to and learn from' successful models of Indigenous land management that incorporate cultural burning, such as the Indigenous ranger models in the NT and Far North Queensland. It also found that this support should have 'due regard to the different landscapes, vegetation-types and settlement and land-use patterns in those parts of Australia.'[49]

18.43 We heard of other support for Indigenous-led initiatives. For example, Victorian Traditional Owner groups nominate traditional burns to the Forest Fire Management Victoria (FFMVic) and Country Fire Authority (CFA) Joint Fuel Management Program – over 30 traditional burns have been nominated by a range of different Traditional Owner groups to this program for 2019-2022.[50] The ACT has introduced an 'Aboriginal Fire Management Zone' in the ACT Strategic Bushfire Management Plan 2019, the objective of which is to identify a landscape scale area in the ACT where the priority is to allow traditional burning practices to be undertaken by local Indigenous groups.[51] Uncle Denis Rose of the Gunditj Mirring Traditional Owners Aboriginal Corporation told us of the Corporation's successful partnership arrangements with the Victorian Government and how, under the guidance of Traditional Owners, Budj Bim Rangers undertake cultural burns at Kurtonitj and Allambie, using mosaic burning to regenerate areas of vegetation.[52]

18.44 State and territory agencies have also developed various strategies to support and invigorate the application of Indigenous land management. For example, between 2017 and 2019, the Victorian Department of Environment, Land, Water and Planning supported Traditional Owners to author the Victorian *Traditional Owner Cultural Fire Strategy*, in partnership with Parks Victoria and the Country Fire Authority. The

strategy is intended to provide 'a roadmap for the Victorian Government to reduce barriers and support Traditional Owners to apply traditional fire to Country.'[53]

18.45 A range of state, territory and national policies and guidelines support engagement and collaboration with Indigenous communities in bushfire management and support for Indigenous land management.[54] The extent of the implementation of these guidelines is not always clear. We heard that a better understanding of implementation can identify opportunities to improve support and engagement, increase transparency, provide benchmarking against which progress can be tracked and elevate the status of Indigenous land management in agency planning.[55]

Supporting community resilience

18.46 Community resilience, specifically the ability of communities to withstand and recover from the impacts of natural disasters, is connected with overall community health and wellbeing.[56] Indigenous land management allows landscapes to be managed in a way that empowers and reflects the cultural practices, voices and aspirations of Indigenous Australians. Through their involvement in Indigenous land management, Indigenous communities also accrue health, social and cultural benefits.

18.47 We heard of knowledge transfer across generations, and of associated social and mental health benefits of that transfer.[57] Mr Munuggullumurr Yibarbuk, Warddeken Land Management Ltd, noted that 'we have a new generation coming up that we need to teach, we need to invigorate our knowledges'.[58] We also heard of the social and cultural value in restoring the role of Indigenous women in land management. Vanessa Cavanagh, an expert on Indigenous fire management, told us of the unique values, interests and responsibilities that Indigenous women have to maintain on Country and the benefit of specific strategies that support Indigenous women to be more involved in these processes.[59]

18.48 Indigenous land management is also providing a source of income for many Traditional Owners in northern Australia.[60] Carbon abatement programs have assisted to re-invigorate Indigenous land management, providing an operational budget, and generating positive social, economic, health and cultural outcomes for Indigenous communities.[61]

Recommendation 18.1 Indigenous land and fire management and natural disaster resilience

Australian, state, territory and local governments should engage further with Traditional Owners to explore the relationship between Indigenous land and fire management and natural disaster resilience.

Recommendation 18.2 Indigenous land and fire management and public land management

Australian, state, territory and local governments should explore further opportunities to leverage Indigenous land and fire management insights, in the development, planning and execution of public land management activities.

Box 18.3 Gunaikurnai Land and Water Aboriginal Corporation[62]

Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) represents Traditional Owners in the Gippsland region of Victoria from the Brataualung, Brayakaulung, Brabralung, Krauatungalung and Tatungalung family clans, who were recognised in a Native Title Consent Determination, made under the *Traditional Owner Settlement Act 2010* (Vic).

GLaWAC has a partnership with the Victorian Government to jointly manage ten parks and reserves in Gippsland. These environments include forests, rivers, beaches, plains and animals and are all part of 'Country' and the cultural identity of the Gunaikurnai. This formal partnership arrangement brings together the combined skills, expertise and cultural knowledge of the Gunaikurnai people and the Victorian Government in a way that respects and values the culture and traditions of the Traditional Owners.

GLaWAC believes that collaboration and knowledge sharing between Traditional Owners and government agencies is integral in generating an adaptive fire management practice. The Corporation has formal and informal protocols and agreements with land management agencies on when and how they should be consulted and involved.

GLaWAC was also involved in the emergency response in the Gippsland region through consultation with the Aboriginal Cultural Values Officer at the Department of Environment, Land, Water and Planning to check significant values for registered Aboriginal places and to provide management recommendations for these sites, and undertake cultural heritage assessments. Gunaikurnai people were also trained as firefighters by local authorities as part of knowledge exchange efforts and were deployed during the bushfires. GLaWAC notes examples of Indigenous cultural heritage sites that were protected by firefighters who had prior knowledge of the location of the sites; knowledge gained through the work over many years of cultural heritage teams and sharing this knowledge through the Aboriginal Victoria database.

GLaWAC highlighted areas for improvement, including the need to prevent future rushed actions that cause damage to Indigenous cultural heritage sites, and ensure a holistic approach to the management of natural disasters in Australia, including year-round management of Country that is properly resourced.

In terms of direct fire-related work, GLaWAC describes being at a different stage in terms of reconnection and reinvigorating land management through cultural burning compared with areas in northern Australia. They emphasise wanting to approach cultural burning in a way that is safe and constructive and does not hold up communities as being 'a protector or a non-protector of any assets'. They seek to support older community members to demonstrate leadership and share their knowledge, and younger community members to feel safe in learning and practising it. They note gaps in how they are resourced to undertake fire-related work. GLaWAC endorses the Victorian Cultural Fire Strategy, a government funded initiative led by Victorian Traditional Owner fire knowledge holders that was developed to re-invigorate cultural fire through Indigenous-led Traditional Owner practices across all kinds land tenure and Country.

Chapter 19 Land-use planning and building regulation

Summary 399

How and where we build and the impact of natural hazards 400

Land-use planning influences exposure 400

Building regulations influence vulnerability 400

Existing risk to the built environment 401

Identifying natural hazard risk 402

Communicating natural hazard risk 404

Incentivising proportionate action to reduce risk 406

Future land-use planning decisions 410

The role of data in land-use planning 410

The effectiveness of building standards 411

Summary

19.1 Land-use planning regimes and building regulations govern how and where homes, businesses and infrastructure are built. They influence the exposure and vulnerability of structures and communities to natural hazards. They can also be used to mitigate risk and improve resilience.

19.2 Land-use planning decisions and exposure to risk are inextricably linked. Existing, or 'legacy', risk needs to be identified and communicated, and proportionate action taken to reduce risk. Clear risk information supports individuals, communities, and governments to take informed action to manage those risks. Governments should work together to address legacy risk.

19.3 The likelihood of increases in the severity and frequency of natural hazards should be taken into account in land-use planning and building decisions. These decisions should be informed by the best available data on current and future risk.

19.4 The effectiveness of some standards intended to mitigate natural hazard risk is currently unclear and should be assessed to ensure that resources spent on mitigation efforts are effective and proportionate. Consideration should be given to the costs and benefits of amending the National Construction Code to add the resilience of buildings to natural hazards as an objective, in addition to the protection of life.

How and where we build and the impact of natural hazards

19.5 Australia's long history of natural hazards and their resulting disasters have highlighted the extent to which communities and assets are exposed and vulnerable. Over 3,100 houses were destroyed and more than 100 Local Government Areas were impacted by the 2019-2020 bushfires.[1] In the 2010-2011 Queensland floods, around 28,000 houses needed to be rebuilt, and many more were damaged.[2]

19.6 How towns and cities are planned and the manner in which homes and infrastructure are built have long lasting ramifications.[3] Relevant to natural hazards, these decisions influence the exposure and vulnerability of communities and assets. Good land-use planning and building decisions can mitigate risk and improve resilience.

Land-use planning influences exposure

19.7 Land-use planning is a shared responsibility of state, territory and local governments. State and territory governments have primary responsibility for land-use planning regulation, but many relevant functions and responsibilities can be, and often are, delegated to local governments. Local governments are responsible for developing and applying local planning schemes, including by making development approval decisions. The exceptions are the ACT and the NT, which have full responsibility for the land-use planning process.[4]

19.8 Broadly, land-use planning governs how land can be used and developed. As such, it affects the exposure of communities to natural hazards. 'Land-use planning' includes, but is not limited to:

- Zoning – the process by which governments classify or 'zone' what a land area can be used for. For example, a zone can determine if residential buildings can be located in a given area and to what level of density.
- Urban safety – including overlays and other development restrictions that relate to what development can occur in an area and the standards that must be met for new developments, in relation to how this influences the safety of the inhabitants of this environment.
- Development approval – the process by which a decision maker approves whether a proposed development can occur. For example, where a local council may approve a new housing subdivision.

19.9 Land-use planning decisions take into account a wide range of objectives including cost, amenity, and specific community desires.[5] We focus on the connections between land-use planning and managing natural disasters.

Building regulations influence vulnerability

19.10 Building regulations determine how built assets are designed and constructed and so affect the vulnerability of built assets to natural disasters. 'Building regulations' in this report encompasses both building standards and the instruments which govern the use of these standards.[6]

19.11 Laws regulating construction in each state and territory are based on the National Construction Code (the Code). The development and maintenance of the Code is the responsibility of the Australian Building Codes Board (ABCB), a joint initiative of all governments. The Code prescribes the minimum necessary requirements for safety and health, amenity and accessibility, and sustainability in the design, construction, performance and liveability of new buildings – and new building work in existing buildings – throughout Australia.[7]

19.12 The Code is given effect by separate legislation in each state and territory. While the Code seeks to achieve a nationally consistent building safety standard, the implementing legislation in the states and territories adopt the Code subject to various restrictions and amendments. The Code does not, therefore, operate fully consistently across jurisdictions.[8]

19.13 In setting out building requirements, the Code references numerous standards that can meet its performance-based requirements. These standards can be written by the ABCB or by non-government institutions, such as Standards Australia.[9] Some standards are specifically aimed at reducing risk from natural disasters, such as:

- Australian Standard (AS) 3959 - *Construction of buildings in bushfire-prone areas*. AS 3959 prescribes building and engineering standards to which homes should be constructed, to be safe under different levels of bushfire risk (Bushfire Attack Level, or BAL),[10] and
- the steel framed construction in bushfire areas National Association of Steel Framed Housing standard.[11]

Existing risk to the built environment

19.14 Risk from natural hazards to lives and property is influenced by past decisions such as how and where communities, businesses, infrastructure and homes were built. While the consequences may only be felt decades later, this risk is inherited by those who are responsible for the built environment today. This existing risk is often referred to as 'legacy risk'.

19.15 We heard that natural hazard risks to existing structures or communities are significant, yet apparently are not sufficiently addressed in most land-use planning regimes.[12] The Property Council of Australia told us that 'inappropriate building design and construction in the past has been widespread, leading to a built environment susceptible to damage'.[13]

19.16 Upon purchase, the buyer of a property assumes any additional natural hazard risk created during construction.[14] But buyers may be unaware of the risk they are assuming and the costs of this risk.[15] Mr Mark Crosweller AFSM, former Director-General of Emergency Management Australia, gave the example of parts of Wagga Wagga, where residents face flood risk due to institutional decisions that were not within residents' control.[16]

19.17 When risk is identified and communicated, and incentives to reduce risk exist, individual businesses and communities gain the knowledge and impetus necessary to tackle the risks for which they are responsible.

Identifying natural hazard risk

19.18 The first step to reduce natural disaster risks to existing homes and communities is to identify the extent to which they are exposed and vulnerable. The *National Disaster Risk Reduction Framework*, endorsed by Australian, state and territory governments in 2020,[17] listed the following priority:

> *Disaster risk information is freely disclosed [and] it is our collective responsibility to efficiently equip decision-makers in all sectors with the information and capabilities they need to make decisions that reduce disaster risk.*[18]

19.19 Cross Dependency Initiative (XDI), a business specialising in risk analysis, has modelled and analysed natural hazard risks. XDI estimates that over 380,000 properties are currently exposed to 'high natural hazard risk' and this may grow to 735,000 by 2100 – this is in the absence of any new houses being built, due to an increasing frequency and severity of hazards.[19] See Figure 72.

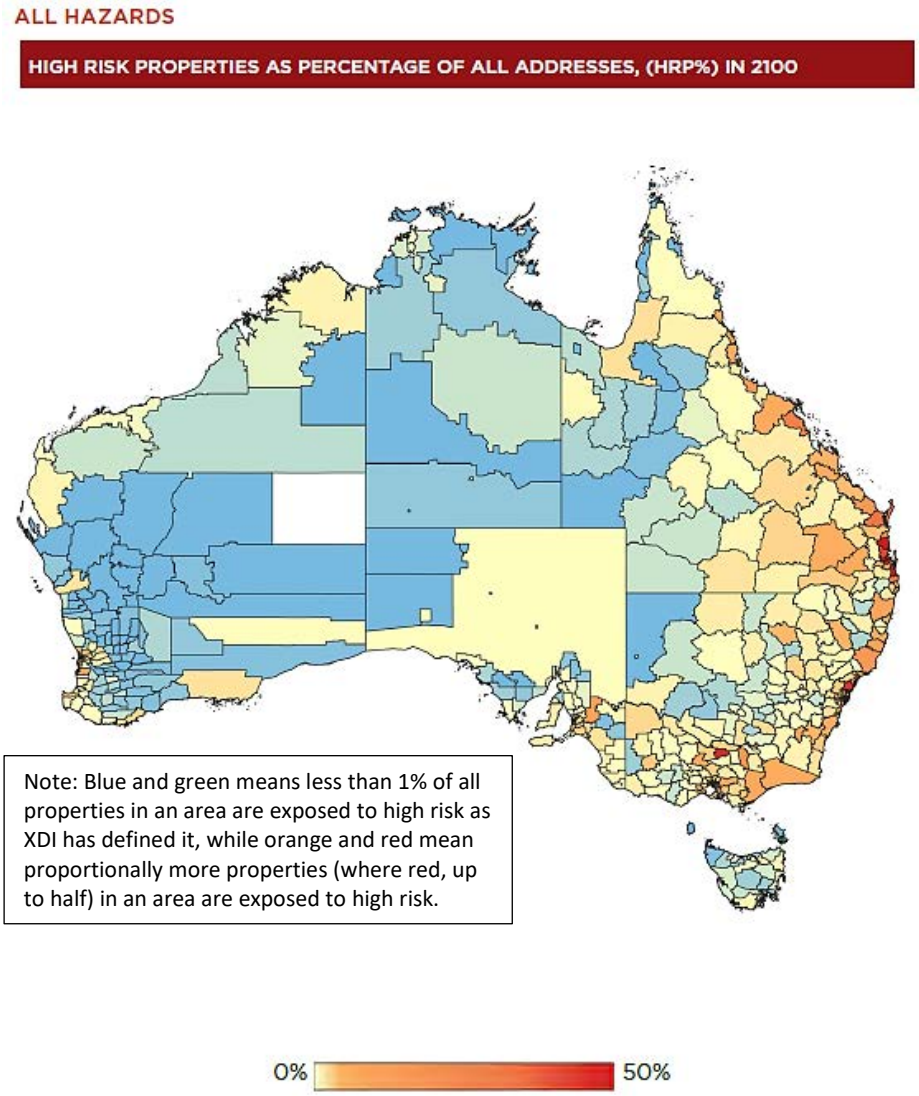


Figure 72: Predicted distribution of exposure to high natural hazard risk in 2100.[20]

19.20 The Insurance Council of Australia (ICA) noted that in the 2019-2020 fire season, 99% of buildings destroyed were within 500m of bushland, and 74% of buildings lost were constructed prior to the introduction of building standard AS 3959.[21] Related work from the Bushfire Building Council estimates that:

> *90% of buildings in bushfire prone areas in Australia have not been built to bushfire planning and construction regulations because they were built prior to regulation being applied.*[22]

Data to identify risk accurately

19.21 Estimates of exposure draw on available data on the distribution of hazards and location of communities, businesses and infrastructure.[23]

19.22 Vulnerability assessments consider the design and construction of buildings and infrastructure and the capacity and resilience of communities.[24]

19.23 Identifying and addressing legacy risk requires exposure and vulnerability data that are accurate, useful and able to be used to clearly communicate risk to households.[25] Comparability and consistency of risk data at a national level has also been raised as desirable,[26] potentially to deliver efficiencies, avoid duplication, and improve understanding.[27] Experts, business groups, and the insurance industry have told us of gaps in exposure and vulnerability data,[28] which can present a barrier to informed decision making.[29]

19.24 We heard calls from governments, government institutions, and the private sector for this information to be made publicly available, to maximise its benefits and to improve accountability.[30] The Australian Government said that:

> *The Commonwealth supports making information for hazard risk and vulnerability information as open and publicly available as possible, noting privacy, commerciality and contractual issues may need to be resolved in order to do so for much of this data. The Commonwealth considers it important end-users, including citizens and local community groups, are supported in understanding and interpreting the natural hazard information and data, and ways to manage natural disaster exposure and risks.*[31]

19.25 On the other hand, privacy and market impact considerations suggest possible adverse consequences of detailed risk exposure and vulnerability information.[32] For example, revealing the risk profile of properties could potentially affect their value, and could expose state, territory and local governments to liability.[33] Data identifying exposure and vulnerability may also be costly if too detailed or, if not detailed enough, of limited value.[34] These concerns need to be carefully weighed in determining strategies to address legacy risk, but should not preclude strategies being developed.

19.26 When individuals, businesses, and governments have access to good information on risk, they can make informed decisions to manage this risk. Strategies with measurable goals and targets are acknowledged as a way to improve accountability for actions,[35] and can also serve to promote coordination. For example, the Queensland Inspector-General Emergency Management (IGEM) has established a Standard for Disaster Management in Queensland to give the community and entities

a greater understanding of which outcomes to pursue and whether risk management is achieving these outcomes.[36] The Victorian IGEM also uses risk reduction targets to monitor progress,[37] and noted that for a shared responsibility for risk management to be most successful, 'performance targets, and appropriate outcome measures must be clear and comprehensible to communities'.[38]

19.27 States, territories and others including insurers, business groups and expert bodies expressed broad support for Australian, state and territory governments to work together to agree a national approach to addressing 'legacy risk'.[39] WA in particular said that an agreed national approach is needed to address legacy risk in relation to a number of areas.[40] Some bodies, such as the ICA and the Australian Local Governments Association expressed interest in being involved in any process to agree a national approach.[41] NSW said it would not support an approach that undermined state responsibilities in this space.[42] We agree with this sentiment.

19.28 **States and territory governments should be responsible and accountable for addressing legacy risk. The Australian Government should work with states and territories to address risk where it is efficient and effective to do so.**

Communicating natural hazard risk

19.29 In addition to information availability, the communication of clear risk information can enable purchasers, prospective occupants, and builders to make more informed decisions about where to buy and/or live, how to design and build structures and how to manage land around these structures. State and territory governments should work together, with the Australian Government as appropriate, to improve the communication of clear, comparable, and understandable risk information.

19.30 Risk information is most useful when it is communicated to people when they can use it to make important decisions. Decisions like buying a house, making a property more resilient, or taking out insurance can be points at which to consider better communicating risk. For example, in real estate sales, this could be achieved by property or rates notices issued by local governments, or in insurance policies and renewal notices. Each different form of communication need not require a new assessment of risk.

19.31 Some states already have programs in place to notify home buyers of their natural hazard risks when a home is purchased, but applicable schemes vary considerably.[43]

19.32 A rating system or a similar mechanism could be considered as a way to communicate risks.[44] We note that in October 2020, Emergency Management Australia was considering a proposal from the Bushfire Building Council for a 'star rating' aimed to achieve this.[45]

19.33 We also note that it would be desirable if communication of risk was linked to information on obligations and options for risk management. In this way, it may also assist people, businesses and governments to comply with measures intended to reduce risk. We heard that letting compliance slip can lead to increased risk and degrade over time the value of actions taken to reduce risk.[46] See Figure 73.



Figure 73: Example of a house built to be resilient to natural hazards becoming less so due to a lack of maintenance and compliance with protective measures[47]

19.34 The Queensland Government questioned whether there is a need to directly communicate risk to people when they can access government websites that already host this information.[48] The answer is simple: many people do not.[49] However, the person who goes out of their way to understand their risk and the person who does nothing face the same risk. Further, there may be differences in the extent to which different people can understand risk, even where some information may be available.

19.35 Concerns may arise in respect of privacy and market impacts of the disclosure of risk information. These may be affected by the frequency with which information is updated and where it is applied.

19.36 In addition, if nationally consistent measures to communicate risk are to be developed, nationally consistent definitions of risk will be needed.[50] Developing nationally consistent mechanisms to communicate risk may avoid future issues such as the confusion that could arise if two states have a very similar mechanism, such as a star rating, which communicate different information in each jurisdiction. It may also reduce duplication of development between jurisdictions. As such, national consistency is desirable if it is efficient and of overall benefit.

19.37 However, when risk is not mitigated, perhaps because the risk is unknown to the affected individual, the costs are borne not only by that individual but also by governments and others in the community.[51] Peak bodies, consumer groups, and risk analysis businesses have each pressed the need for improvements to the communication of natural hazard risk.[52] Natural hazard risk information communicated to households should include information, to a useful and practical level of detail, on expected exposure and vulnerability of a property within a designated 'hazard prone' area. We discussed exposure and vulnerability data in Chapter 4: Supporting better decisions.

19.38 Economic studies note that 'behavioural nudges' can be effective in influencing people to take positive actions to improve factors within their control and for which they are responsible.[53]

19.39 Previous inquires have also recommended better direct communication of risk.[54] Stakeholders broadly support a mechanism to communicate risk, with most states supporting in principle and noting they would like to be closely involved in any development process.[55] We agree that the development process should be collaborative.

Recommendation 19.1 Communication of natural hazard risk information to individuals

State and territory governments should:

(1) each have a process or mechanism in place to communicate natural hazard risk information to households (including prospective purchasers) in 'hazard prone' areas, and

(2) work together, and with the Australian Government where appropriate, to explore the development of a national mechanism to do the same.

Incentivising proportionate action to reduce risk

19.40 Mitigation actions in the built environment can occur on many scales, from big government-funded mitigation such as the construction of flood levees, to individual-level mitigation that a household or business can undertake, such as upgrading a roof to be cyclone-resilient or installing sprinkler systems to protect against ember attack. Incentives for people to take proportionate and cost-effective mitigation action to reduce risk should be encouraged.

19.41 Depending on the hazard, the appropriate scale of mitigation can vary. For example, a flood levee can be more cost-effective than requiring every house in an area being rebuilt to be raised above expected flood-levels.

19.42 In other inquires and in a number of submissions from private sector bodies, state and local governments, and emergency responders we heard a desire for greater investment in mitigation.[56] We also heard that mitigation in many cases can be a cost-effective means of managing risk.[57] The CSIRO contended:

> *A $1 investment in climate adaptation or disaster risk reduction saves between $2 and $11 in post-disaster recovery and reconstruction.*[58]

Incentives can come from the public sector, private sector, or both

19.43 We note that the ICA already works with governments to identify more extensive mitigation projects and their likely insurance savings, through programs such as the Mitigation Priorities Project and the Mitigation Valuation Service.[59] Governments and industry should continue to work together to identify effective large-scale mitigation projects. In this chapter, we focus on how individuals, supported by government and business, can be encouraged to undertake actions to mitigate risk and increase resilience to natural hazards.



Figure 74: Flooding in February 2020 in Jandowae, Queensland[60]

19.44 For some existing homes and structures, retrofitting and other individual-level mitigation options can reduce a structure's vulnerability to natural hazards, and help protect the safety of people.[61] These actions may include:

- upgrading a property and relevant features (such as water tanks, sprinkler systems, and building materials) to a higher standard of resilience
- clearing of vegetation within a certain area of a building,[62] and
- the construction of hazard-resistant shelters.

19.45 It is important that incentives and measures are practical and cost-effective. One way to achieve this is to have standards for specific mitigation actions, which have been evaluated to see if they achieve their objectives and pass a cost-benefit analysis.[63] Two examples raised are:

- AS 5414:2014: Bushfire water spray systems – this standard sets out the requirements for building a bushfire sprinkler system,[64] and
- the Performance Standard for The Design and Construction of Private Bushfire Shelters[65] – the ABCB notes that it is currently developing quantified NCC performance requirements to replace the current NCC requirements for private bushfire shelters.[66]

19.46 We heard a number of calls for better incentives to reduce the risk to existing properties.[67] However, upgrading homes to comply with higher standards can be cost-prohibitive or, in some cases, impossible.[68] This is an important consideration when incentivising action.

19.47 Legislation can provide for required mitigation. However, it can be impractical, inappropriate and costly to regulate to compel people to upgrade or retrofit buildings.

19.48 States and territories presently do not require upgrading or retrofitting of existing homes to address natural hazards.[69] NSW, Victoria and SA, in some cases, require homes to be upgraded to a higher building standard for significant building modifications. The thresholds for activation of higher standards vary by state, and can also vary by local government area.[70]

19.49 Insurers and consumer groups have called for governments to directly subsidise mitigation to encourage people to take action.[71] The Australian Competition and Consumer Commission (ACCC) noted that direct subsidies for mitigation can be relatively efficient compared to other subsidies such as subsidising insurance premiums for households.[72]

19.50 Direct subsidies for mitigation were offered in Queensland following the 2011 floods. Households in the Lockyer Valley were incentivised through a voluntary land-swap program to leave the flood plain.[73] The Household Resilience Program subsidised households to retrofit their roofs in cyclone-prone areas.[74]

19.51 **States, territories and local governments should consider if, where, and how it is appropriate for them to create incentives for natural disaster mitigation.**

The insurance industry can encourage mitigation

19.52 Insurers can encourage mitigation actions through lower insurance premiums. If insurance prices risk, lowering risk should lower premium costs.[75] This in turn should lead to a virtuous cycle of improved insurance affordability and effectiveness – which, as seen in our discussion on the role of insurance in Chapter 20: Insurance, is in the interests of governments, insurers and individuals.

19.53 Mitigation activities which are recognised by insurers can improve insurance affordability and effectiveness. A government-funded flood levee in Roma, Queensland was recognised,[76] and some insurers recognised the Household Resilience Program mitigation upgrades targeting cyclone resilience in Queensland.[77] Under this program, the roofs of almost 2,000 homes were upgraded using government grants. The ICA noted that the upgraded homes were 63% less likely to suffer a total-loss, and insurers decreased premiums for these retrofitted homes by an average of around 10%.[78]

19.54 Nonetheless, despite the recognised value of mitigation, individual-level mitigation is not uniformly encouraged by insurers. The Productivity Commission and ACCC noted that individual-level mitigation actions to reduce risk are rarely recognised in premiums, and that this is an area for improvement in insurance pricing.[79]

19.55 Some insurers contended this is due to poor information on how mitigation activities affect risk, which results in insurers being unable to reflect lowered risk through lowered premium prices.[80]

19.56 To step through the problem of recognising individual-level mitigation and our proposed recommendation to help solve it:

- It is presently difficult for insurers to recognise where individual-level mitigation will reduce risk. It is also difficult for households and businesses to know which mitigation options will be most cost-effective.
- As the cost of insurance premiums reflects risk, when risk is reduced, the cost of premiums should reduce. By developing common guidance on mitigation actions that the insurance industry has recognised as lowering risk:
  - insurers gain access to an easier way to evaluate where individual-level mitigation lowers risk, and
  - consumers can more easily understand what options are available and the financial and risk-reduction benefits of a given option.
- Through this combination, barriers to individual-level mitigation, and barriers to insurers recognising this mitigation, should decrease. As such, financial incentives to mitigate should increase, enabling a virtuous cycle that benefits both insurers and consumers. See Figure 75.

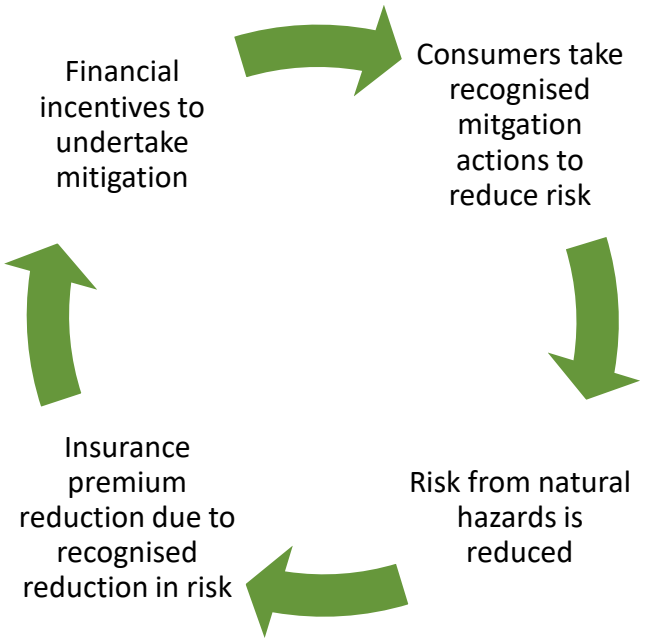


Figure 75: Cycle of insurer-recognised mitigation with financial incentives

19.57 Insurers also noted the cumulative effect of government subsidies for insurer-recognised individual-level mitigation, which can incentivise people to take action where they may not have taken action as a result of insurance-based incentives alone, and noted their concern that insurance-based incentives in isolation may not be sufficient to achieve broader community resilience.[81]

19.58 Similar mechanisms have been recommended by the ACCC and the Final Report of the NSW Bushfire Inquiry.[82]

19.59 Insurers, consumers groups, and governments universally support the development of mitigation guidance,[83] with states expressing an interest in close involvement in development and implementation.

Recommendation 19.2 Guidance for insurer-recognised retrofitting and mitigation

The insurance industry, as represented by the Insurance Council of Australia, working with state and territory governments and other relevant stakeholders, should produce and communicate to consumers clear guidance on individual-level natural hazard risk mitigation actions insurers will recognise in setting insurance premiums.

Future land-use planning decisions

The role of data in land-use planning

19.60 Good land-use planning decisions can mitigate future risks. Decisions about new developments should be based on the best information available on current and future risks. In addition, development in high-risk areas should be avoided unless risk can be clearly communicated and cost-effectively managed. Where new structures are built in high-risk areas, they should be sufficiently resilient for their expected lifespan.

19.61 While we heard that land-use planning regimes have improved recently in relation to managing natural hazard risk,[84] we also heard calls from peak bodies, insurers, local governments, and emergency response organisations, for further strengthening of land-use planning regimes.[85]

19.62 Currently, all states permit homes to be built in bushfire and flood prone areas, and the degree to which planning or building standards act to mitigate risk varies across jurisdictions.[86] Industry groups, local governments, and insurers expressed concern about development continuing to occur in high-risk areas.[87] Former Commissioner of the Queensland Fire and Emergency Services, Lee Johnson, said that land-use planning 'is an area of great weakness in the whole system of dealing with the risk of bushfire in Australia,'[88] and the ICA pointed out:

> *Although land-use planning has improved in respect to reducing disaster risk … there is still clear evidence of recent planning decisions placing communities at a known and obvious risk of disaster. For example, development in the suburb of Idalia in Townsville is only partially completed, yet it was significantly inundated by flood in February 2019.*[89]

19.63 Good data and information, including hazard mapping, are critical to the effectiveness of land-use planning regimes and building regulations. We heard that there is significant scope for this information to be improved.[90] We heard from insurers, local governments, peak bodies and experts that some natural hazard risk assessments, including hazard mapping, lack sufficient detail and are apparently not sufficiently integrated into land-use planning schemes.[91] This can lead to poorly informed land-use planning decisions that increase risks.

19.64 We note that different assets have different considerations in relation to how much risk they can acceptably be exposed to, depending on use, economic-life and other factors. The degree of acceptable risk also depends on asset class – acceptable risk will likely differ between an industrial property and a residential one.

19.65 People may choose to live or build in a high-risk area for multiple reasons, but a decision to take on risk should be an informed decision.

19.66 Since 2002, a number of major inquiries have suggested better integration of risk data into land-use planning regimes.[92] The 2004 National Inquiry on Bushfire Mitigation and Management, said that, to reduce natural hazard risk from bushfires:

> *Planning processes [should] ensure that built assets are not placed in areas of high fire risk and that structures meet standards of construction that reduce their vulnerability.*[93]

19.67 All states and territories accept the principle that consideration of risk should be a mandatory requirement in land-use planning decisions, with the exception of NSW, which did not comment but accepted a similar recommendation in the recent NSW Independent Bushfire Inquiry.[94]

19.68 Land-use planning decisions should consider natural disaster risk. However, in doing so, it is necessary to draw on the best available information. Improved capabilities in data, information, and the tools and services that rely on data and information – as discussed in Chapter 4: Supporting better decisions – should be integrated into land-use planning regimes.

Recommendation 19.3 Mandatory consideration of natural disaster risk in land-use planning decisions

State, territory and local governments should be required to consider present and future natural disaster risk when making land-use planning decisions for new developments.

The effectiveness of building standards

19.69 Building regulation can also mitigate future risk. The effectiveness of building standards relies on good data and information.

19.70 There is scope to improve the quality and availability of data and information used in these regulations. As better data becomes available, relevant standards should be reviewed in light of those data to ensure that the standard continues to be as effective as possible to mitigate that risk.

19.71 Consideration should be given to whether the present objectives of the Code, including to protect life, (and the corresponding standards used to achieve objectives in the Code) should be extended to protect property as well.

Analysing building standards to confirm their effectiveness

19.72 According to the Australian Business Roundtable for Disaster Resilience & Safer Communities, 'it is not possible to accurately assess the effectiveness of enhanced bushfire protection measures in reducing estimated annual damage costs'.[95]

19.73 While a CSIRO study noted that it is likely that AS 3959 - *Construction of buildings in bushfire-prone areas* reduces losses due to fire,[96] we also heard that data limitations make it difficult to undertake a robust cost-benefit analysis to assess whether the benefits outweigh the additional cost of building to AS 3959.[97] We also heard that aspects of fire behaviour such as ember attack and the proximity of other houses are apparently not adequately addressed in the current standards.[98]

19.74 While the evidence we heard primarily relates to AS 3959, the principles we discuss in this section can also relate to all relevant building standards. These include structural design standards for other hazards such as AS 1170.2 Wind; AS 1170.3 Snow and ice; AS 1170.4-2007 Earthquake.[99]

19.75 The period following a natural disaster provides a brief window to collect data to assess which aspects of buildings made them more or less likely to be damaged or destroyed.[100] Although some bodies such as Risk Frontiers have used existing data to reveal key issues at a high level,[101] we heard of a desire for improved impact data,[102] which we addressed in Chapter 4: Supporting better decisions. For instance, CSIRO has suggested that the creation of a national register of planning and building regulation controls that are, or have been, implemented to manage risk as it is essential to estimating vulnerability and eventual performance of built assets.[103] Currently this information is not aggregated at a state or territory level,[104] must be requested from individual local governments, and assessments are often too time and resource intensive to perform.[105] According to Mr Stingemore, Standards Australia:

> *…the better the data that we have available to us, the better our technical committees are able to set levels within a particular standard … [but] all we really have today are anecdotes and statements available to us that things either did perform well or they did not perform well.*[106]

19.76 **The effectiveness of relevant building standards to manage natural hazard risk should be reviewed using the best available data, and better data should be commissioned if current data are inadequate.**

Currency of data used in standards

19.77 The ways that data are used in applying building regulations should also be improved.

19.78 In some places the fire danger information used to calculate the Bushfire Attack Levels (BALs) for the purposes of AS 3959 is out of date and does not accurately quantify expected risk.[107] For example, in the latest 2018 version of AS 3959 BAL the Forest Fire Danger Index (FFDI) values used are from 2009 rather than more contemporary values or a future-looking FFDI for the life of a structure.[108]

19.79 In some cases a single fire danger index is applied across a broad area, regardless of differences in vegetation and topography. For example, Queensland has an FFDI of 40 for the whole state,[109] when we were told it should apparently be between 80 and 130.[110]

19.80 Additionally, there are cases where the fire danger index is very different immediately either side of state boundaries, even where vegetation and topography does not differ, such as where Queensland uses an FFDI of 40 and northern NSW uses an FFDI of 80.[111]

19.81 In March 2020, the Council of Australian Governments directed the Building Ministers Forum (BMF) intergovernmental body to consider how the Code could be updated to enhance climate and disaster resilience.[112] The ABCB has informed us that a process is currently underway with CSIRO and others to consider how to better account for future climate risks.[113]

19.82 **The data used in relevant building standards that manage natural hazard risk should be updated to reflect the best data available, and use data projections if these projections are relevant and can be given with confidence.**

The aims of the National Construction Code

19.83 The Code presently aims to protect life, but not property.[114] Mr Sullivan, Insurance Council of Australia, noted that the aims of the Code include safety, but 'it doesn't stipulate a performance outcome for protecting the property, except to the extent that property protection would save life'.[115]

19.84 This may mean that, in some cases, proportionate and cost-effective options to protect a house are overlooked because they do not also function to protect life. The ICA gives the following example:

> *Strata buildings are designed to withstand high windspeeds to ensure they don't collapse. However, window and door flashings are not designed to withstand water ingress under high windspeed. As a result, strata buildings in Australia are highly vulnerable to extensive water damage during storms.*[116]

19.85 Another example is noted by the ABCB, which in 2016 considered a study by Risk Frontiers that found that increasing the resilience of roof tiles to hailstorms was likely to have positive economic benefits.[117] However, the ABCB decided not to pursue updating the criteria for roof tile resilience, because:

> *It would be difficult to justify any increase in NCC stringency based on the ABCB's mission (the primary focus of which is not property protection) … as the risk to life safety is negligible.*[118]

19.86 To address these types of issues, the ICA recommended that the Code be updated to include protection of property as an explicit objective in addition to protection of life.[119] We agree that such an update should be considered. While protecting life should be the top priority, loss of and damage to property caused by natural disasters inflicts a heavy burden on individuals and communities.

19.87 **Where the National Construction Code can be expanded in a proven, cost-effective way to improve the ability of a structure to withstand damage and destruction of property from natural hazards, it should be.**

19.88 Underneath the Code, should an update occur, the standards that achieve this objective would also likely need to be updated to protect property from damage and destruction, as well as to protect life.

Review of the National Construction Code

19.89 Building more resilient houses comes at a cost, and changing the standards may add to this cost.[120] Increased costs can be problematic for people who rebuild following a natural disaster. A community group noted:

> *The additional cost of compliance with existing standards in high bushfire risk areas is reported to be in the range of 25-30% of the normal building cost. If these standards are tightened further, the costs will be prohibitive.*[121]

19.90 All changes to regulate resilience should be proportionate and proven to be cost-effective. We note that both Australian Standards and the Code are already subject to cost-benefit analyses.[122] AS 3959 and the Code are also subject to regular reviews.[123] We commend these initiatives, as they provide reassurance that any additional costs imposed are subject to value analysis, and the standards and code see updates regularly. As we (and Standards Australia and the ABCB) have noted, with better data and information these processes can be further improved.[124]

19.91 Previous inquires have expressed similar views.[125] In 2019, the ACCC said the ABCB should 'expressly consider measures that better protect the interiors and contents of residential buildings from damage caused by natural hazard risk'.[126]

19.92 States, territories and peak bodies supported the evaluation of the standard's effectiveness in supporting property survival in a bushfire, suggesting the ABCB conduct this work.[127] Some states also note the relevance of existing intergovernmental agreements and the BMF[128] – to this end, the BMF should also consider this recommendation in its ongoing work.

Recommendation 19.4 National Construction Code

The Australian Building Codes Board, working with other bodies as appropriate, should:

(1) assess the extent to which AS 3959:2018 Construction of buildings in bushfire-prone areas, and other relevant building standards, are effective in reducing risk from natural hazards to lives and property, and

(2) conduct an evaluation as to whether the National Construction Code should be amended to specifically include, as an objective of the code, making buildings more resilient to natural hazards.

Chapter 20 Insurance

Summary 416

The role of insurance in managing natural disasters 417

Maintaining adequate insurance coverage 418

Data, information and insurance pricing 420

Consumer understanding of insurance 421

Insurance taxes and insurance pricing 422

Previous and ongoing insurance inquiries 424

Guidance on debris clean-up 424

Summary

20.1 Having adequate insurance is an important way for households and businesses to manage financial risks from natural hazards. It is beneficial for consumers, the insurance sector and governments that insurance markets are operating effectively.

20.2 Insurance is important because individuals cannot rely on public and charitable entities to restore their positions following a natural disaster. Government funding does not take the place of insurance, and nor should this be expected. Further, governments should not disadvantage or disincentivise those who have insurance, for example through recovery targeted to the uninsured, as to do so may encourage underinsurance.

20.3 Several other prior and concurrent inquiries have identified impediments reducing the effectiveness of insurance to help manage risk from natural hazards. These include issues which can reduce insurance affordability, limit consumer understanding, and reduce insurance coverage. For insurance to function effectively as risk rises, the outcomes of these inquiries should be addressed.

20.4 Confusion over debris clean-up arrangements was a particular concern for the 2019-2020 bushfire season. We recommend that governments outline in advance the circumstances and timeframes over which they will or will not provide assistance for debris clean-up, to avoid adverse impacts on consumers and insurance markets and provide national clarity on recovery support.

20.5 As insurance prices risk, lowering risk through mitigation actions can benefit both consumers and the insurance sector. Recognition of mitigation can reduce insurance premiums and in turn provide financial incentives for mitigation. We consider in Chapter 19: Land-use planning and building regulation how insurers and consumers can better recognise which mitigation options will reduce risk and costs.

The role of insurance in managing natural disasters

20.6 General insurance refers to insurance other than life insurance, and includes several types of insurance. Most relevantly, two types of general insurance play an important role in the management of the risks associated with natural hazards:

- home, contents and vehicle insurance, and
- business insurance, including property and business interruption insurance.

20.7 General insurance plays several important roles in managing natural disaster risk:

- it allows people to manage a risk financially, including the risks posed by natural hazards, under agreed circumstances
- it can communicate risk via the cost of premiums and thereby influence behaviour, such as where people decide to live or how to build or renovate, and
- it can help households and businesses recover after a disaster.[1]

20.8 The success of these roles depends on households and businesses maintaining adequate insurance coverage. As discussed in Chapter 21: Coordinating relief and recovery, while charity and government assistance can be of great support to individuals impacted by disasters, it should not be relied on by those individuals as a substitute for insurance.

20.9 The Reserve Bank of Australia (RBA) reported that 'inflation-adjusted insurance claims for natural disasters in the current decade have been more than double those in the previous decade'.[2] Insurance claims for cyclones Debbie and Yasi, in 2017 and 2011 respectively, amounted to over $1.5 billion each, and the claims in relation to widespread flooding in Queensland in 2010-11 amounted to around $2.4 billion.[3] More recently, as at 27 August 2020, around 38,500 claims (including building, contents and commercial insurance claims) had been lodged as a result of the 2019-2020 bushfires, totalling an estimated $2.33 billion.[4]

20.10 The RBA expects that the insurance industry will be increasingly exposed to natural hazard risk as the climate changes. The RBA expects that this impact will grow over time, and may create barriers to efficiently pricing insurance, which would adversely affect the insurance industry, consumers, businesses and governments.[5] The 2020 *Severe Weather in a Changing Climate* report by Insurance Australia Group (IAG) and the National Center for Atmospheric Research (NCAR) noted that climate change is expected to 'substantially increase the frequency and intensity of weather and climate extremes'.[6]

20.11 The general insurance market is complicated. Any government intervention in the market can have positive and negative consequences that need to be carefully considered before action is taken.[7] For example, changes to the regulatory architecture to mandate a more comprehensive level of basic coverage could lead to increases in insurance premiums, and, in turn, this decreased affordability could have the unintended effect of pushing more people to cease their insurance or to underinsure.

20.12 We are also conscious that insurance in respect of natural hazard risks is only one aspect of the general insurance market, and each of the issues identified in this chapter affects not only natural hazard insurance but also insurance more broadly. A number of prior and concurrent inquiries have considered insurance in greater detail and in many cases more broadly, across the full scope of the general insurance market (see Box 20.1).

20.13 Although our Letters Patent do not explicitly mention insurance, it is an important aspect of natural hazard risk management. We have had regard to prior and concurrent inquiries including on insurance, while seeking to avoid duplication. As those inquiries also consider issues which impact upon the effectiveness and efficiency of insurance in preparing for, mitigating against and recovering from natural disasters, their outcomes merit careful consideration.

20.14 The National Disaster Risk Reduction Framework lists improving the accessibility, variety and uptake of insurance as a key goal for risk reduction.[8] Our observations and recommendations are focused on insurance as a risk management tool in relation to natural hazard risks. We have focused on four main issues affecting the ability of insurance markets to assist in the management of natural hazard risks efficiently and effectively. These are:

- increasing premiums and other factors, which are potentially leading to issues with under- and non-insurance, decreasing the overall effectiveness of insurance as a tool to manage natural hazard risks[9]
- issues in relation to data and information that are potentially impeding the ability of insurers to price risk through premiums accurately
- the complexity of insurance, which is potentially impeding the ability of households and businesses to make informed decisions, and
- taxes on insurance, which can cause market distortions and potentially reduce the extent of insurance coverage.

Maintaining adequate insurance coverage

20.15 For insurance to help people manage natural hazard risk most effectively, households and businesses need to maintain adequate insurance coverage.

20.16 In part due to increasing costs driven by rising risk and tax distortions, absence of (or insufficient) insurance has been raised as a growing concern by other inquiries, consumer groups, and the insurance industry.[10] At present around 95 per cent of homes are insured for loss or damage,[11] but we have not obtained rigorous estimates on underinsurance.

20.17 The *National Insurance Project Final Report* to the Australia-New Zealand Emergency Management Committee in 2020 estimated that gaps in coverage are significant for contents insurance (among renters) and business interruption cover.[12] It noted that up to 15 per cent of businesses do not have insurance for interruption to business caused by natural hazards.[13]

Box 20.1 Relevant insurance inquiries

The Productivity Commission inquiry into Natural Disaster Funding Arrangements. In 2015, the Productivity Commission released its report for its inquiry into natural disaster funding.[14] The inquiry examined the role of insurance, information about insurance, affordability, and understanding of insurance. It addressed the impact of insurance taxes and disclosure of risk information among other matters.

The Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry. In 2019, the Royal Commission delivered its report to Government. A number of recommendations in this report concerned insurance and generally related to improving consumer protections, including on unfair contract terms, external dispute resolution, and claims handling.[15] The Australian Government accepted the report's recommendations which are currently being implemented and given effect by the Australian government and industry.[16]

The Australian Competition and Consumer Commission (ACCC) Northern Australia Insurance Inquiry. This inquiry is considering insurance in Northern Australia – the inquiry noted that its finding and recommendations will in many cases be relevant to all of Australia[17] – including insurance pricing and affordability, consumer understanding of insurance products and of natural hazard risk, and distortions to the effectiveness of insurance markets.[18] It commenced in 2017 and has released two interim reports.[19] The ACCC is due to deliver its final report by 30 November 2020.

The Treasury Disclosure In General Insurance Review is currently investigating a number of insurance issues in response to the 2017 Senate Economics Reference Committee report on issues in general insurance in Australia, which includes consumer understanding of issues such as standard definitions and the standard cover regime.[20] We have been told that this work has been delayed due to competing priorities such as the implementation of the recommendations of the Financial Services Royal Commission.[21]

20.18 The fewer people who are covered by insurance, the less effective it is at managing risk, because the benefits of risk-pooling are reduced. Additionally, when households that are uninsured or underinsured are affected by a natural disaster they can face costs that they cannot meet, and, where this happens, costs may also accrue to governments, such as through increased claims for social security.[23]

> I don't know how people got through without insurance coverage because it would have been tragic and awful.[22]

20.19 Consumer groups have expressed concern in relation to underinsurance for sum-insured cover.[24] In some cases, sum-insured cover has been too low – either due to a choice on the part of consumers to underinsure, or an under-estimation of the costs of rebuilding and additional components such as debris clean-up that will, in turn, be taken from the sum-insured amount. In some cases, this has led to insufficient funds to rebuild a house, though the scale and the extent of sum-insured issues are unclear.[25]

20.20 Consumer groups have suggested that the creation of systems (or improvements to existing sum-insured calculators) to provide consumers with accurate and up-to-date estimates of the cost of rebuilding in a given area should be considered.[26]

Data, information and insurance pricing

20.21 Insurance puts a price on risk. Reflecting this, insurance costs rise as risks rises. Increasing natural hazard risk is likely to put upwards pressure on the cost of insurance premiums, potentially exacerbating affordability issues.[27] Affordability is an important concern because increases in the cost of insurance can lead to people choosing to decrease or abandon their insurance coverage.[28]

20.22 To price risk accurately, insurers need good information to gauge the risk profile of what is being insured.[29] Where data are less accurate, insurance pricing will be less accurate – it may over- or under-price risk. The price of insurance can also be used to signal risk to consumers,[30] so it is important that this signal is accurate.

20.23 We refer to three limitations to data and information that are available to insurers:

- gaps in data and information about existing natural hazards, exposure and vulnerability
- capabilities to create projections of future risk, such as where climate change is resulting in changes to the frequency and intensity of hazards and increases to exposure, which is increasing the difficulty of assessing risk, and
- lack of ability for insurers to recognise where risk mitigation has been undertaken, and for consumers to know which mitigation actions will be recognised.

20.24 To the first two points, insurers have a great deal of data on natural hazard risk and impacts, but the quality and consistency of data varies across Australia. Data inconsistency, which the insurance industry has raised as an issue, is in part

attributable to the range of data sources of varying consistency and quality, including data produced by state and local governments.[31] The IAG NCAR report and other submissions from industry also noted the need for more data on the impacts of climate change on natural disasters.[32]

20.25 We consider data consistency and improvements to climate and risk data and information in Chapter 4: Supporting better decisions.

20.26 To the third point, as insurance puts a price on risk, reducing risk by undertaking mitigation and resilience activities should help lower insurance costs and premiums.[33] We have seen that insurance is responsive to large-scale risk mitigation activities, such as the construction of a flood levee, but individual-level mitigation activities are often not recognised by insurers.[34] The insurance industry has called for greater investment in mitigation and this should be reflected in the pricing of premiums.[35]

20.27 We explore the issue of recognising and incentivising mitigation in greater detail and provide a recommendation to address this issue in Chapter 19: Land-use planning and building regulation.

20.28 **We would expect that improvements to data will be reflected in premiums, including reduced premiums where governments, homeowners and business take action to mitigate risk.**

Consumer understanding of insurance

20.29 Insurance products are complex, and many consumers have difficulty understanding both their risk profile and the range of inclusions and exclusions in policies.[36] Insurers and regulators should continue to work towards improving consumer understanding of insurance for natural hazards. Poor understanding of insurance can lead to poor outcomes and reduce the effectiveness of insurance as a risk management tool.

20.30 A Monash University study found evidence that most people have difficulty understanding insurance products.[37] Submissions and other inquiries suggest improvements to standard insurance definitions and the standard cover regime could improve consumer understanding.[38]

20.31 Standard definitions provide consistent scope in relation to a given insurable event, but, so far, only the definition of 'flood' has been standardised.[39] During our inquiry, we received evidence suggesting benefits in standardising the definition of 'fire' and other natural hazards.[40]

20.32 The standard cover regime provides a set level of coverage for given insurance products. However, we heard that standard cover can be altered to become non-standard (such that it may exclude 'standard' events), and that these alterations and their consequences are often unclear to consumers.[41]

20.33 Clear and reliable information on both risk and insurance products should also improve consumers' ability to make informed decisions about how to use insurance.[42] This could be done via mechanisms such as rating systems that could be communicated to consumers with insurance notices and other media.[43] The value of

communicating clear information on risk to people is discussed further in Chapter 19: Land-use planning and building regulation.

20.34 Services that assist people with information during a time of financial hardship provide valuable support during a crisis. Difficulties with making an insurance claim, or claims handling as it is called, can place a high emotional burden on people already dealing with the aftermath of a natural disaster.[44]

20.35 However, some unregulated businesses which offer to 'assist' people in the claims handling process have been reported to be 'unscrupulous' and charge high prices for very simple services that may be available for free.[45] The Australian Financial Complaints Authority raised issues with unregulated claims management as a key concern, saying:[46]

> *We find these businesses provide little help but charge fees of up to 30% of a cash settlement. Assistance with insurance claims is available free for consumers and AFCA's complaint resolution services are designed to be used by consumers without representation.*[47]

20.36 The Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry recommended that claims management service businesses be regulated as financial services, affording protections to those consumers who use them in the future.[48] This reform is being progressed by Treasury, subject to a six-month delay due to the COVID-19 pandemic.[49]

20.37 However, overall, we heard that most insurance claims arising out of the 2019-2020 bushfire season were handled by insurers proactively and in a timely manner, and that the number of complaints arising out of those claims was relatively small.[50] Notwithstanding the worthy efforts of insurers, we also heard evidence that there was an increase in the demand for free legal advice in relation to insurance claims, and that legal service providers continue to receive requests for such assistance.[51]

20.38 **The review and update of mechanisms which can improve consumer understanding and use of insurance – including standard definitions, the standard cover regime, and regulation for claims management services – should be prioritised.**

Insurance taxes and insurance pricing

20.39 Previous inquiries have found that the cost of insurance is also being increased by the cost of insurance taxes, especially those imposed by most state governments.[52]

20.40 This can detract from the ability of insurance to signal risk accurately,[53] and contribute to affordability issues raised above. Insurance taxes exist in three forms:

- levies for emergency services – currently the NSW Emergency Services Levy and the Tasmanian Insurance Fire Levy – Victoria also had a similar levy on insurance until 2013, when they moved to a property tax
- stamp duty on insurance – this duty is imposed across Australia at a rate of around 10% in each state, with the exception of the ACT which abolished insurance stamp duties in 2016,[54] and

- the Goods and Services Tax (GST).

20.41 The Insurance Council of Australia (ICA) estimates that, in NSW, insurance taxes can add more than 50 per cent to the cost of an insurance premium for a household, while in the ACT only 10 per cent is added by taxes, by the GST.[55] (See Table 10 for figures across all states and territories.)

Table 10: Impact of insurance taxes[56]

Tax	General insurance (GI) taxes (GST of 10% applies to all GI products)	Impact of levies, GST and stamp duties on final price paid by consumer[5]
NSW	**Stamp duty*:** 9% of the premium. Concessional 5% of premium payable on aviation, disability, hospital and ancillary health benefits, motor vehicle, occupational indemnity. Concessional 2.5% of premium paid on crop and livestock. **ESL:** Historically adds 21% to home and contents premiums and up to 40% to business premiums. **Note:** NSW is increasing its ESL requirements by $230 million between 2018-19 and 2021-22 to fund presumptive workers' compensation liabilities for firefighters.	The addition of ESL, GST and stamp duties is projected to add in 2020-21 **more than 50%** to the base premium for a household policy and up to 70% to a business policy.
VIC	**Stamp duty*:** 10% of previous month's gross premiums. **Note:** Victoria abolished its Fire Services Levy on insurance premiums in 2013.	The addition of GST and stamp duties adds **21%** to the base premium for a household policy.
QLD	**Stamp duty*:** 9% of the premium for most GI contracts; 5% of net premiums for workers compensation. 10c flat for CTP. **Note:** The Queensland Government increased its stamp duties on GI products by 1.5 percentage points in 2013.	The addition of GST and stamp duties adds **19.9%** to the base premium for a household policy.
WA	**Stamp duty*:** 10% of gross premiums; 10% of premiums on CTP.	The addition of GST and stamp duties adds **21%** to the base premium for a household policy.
SA	**Stamp duty*:** 11% of premium.	The addition of GST and stamp duties adds **22%** to the base premium for a household policy.
TAS	**Stamp duty*:** 10% of premium. There is also a fire levy of 2% on marine cargo insurance; 14% aviation hull insurance and 28% on certain other prescribed classes of commercial insurance. **Note:** The Tasmanian Government increased the stamp duty on GI products by 2 percentage points in 2012.	The addition of GST and stamp duties adds **21%** to the base premium for a household policy.
NT	**Stamp duty*:** 10% of premiums.	The addition of GST and stamp duties adds **21%** to the base premium for a household policy.
ACT	**Stamp duty*:** Nil. **Note:** The ACT completed the phasing out of its stamp duties on insurance products in 2016.	The addition of GST adds **10%** to the base premium for a household policy.

Source: States and territories' general insurance duty rates retrieved from NSW Treasury, *TRP18-01 Interstate Comparison of Taxes 2017-18*, page 22. April 2018. States and territories' impact of general insurance duties on price (percentage) calculated by the Insurance Council. NSW Budget papers and ministerial statements.

20.42 Consumer groups and insurers have recommended that taxes on insurance – namely emergency services levies and stamp duties – be abolished to lower insurance costs.[57] This has also been recommended by previous inquires including:

- NSW Federal Financial Relations Review draft report 2020: 'All specific taxes on insurance products, including the Emergency Services Levy in NSW, should be abolished and replaced by more efficient and broad tax bases, to improve the affordability and uptake of insurance'[58]
- ACCC's Northern Australia Insurance Inquiry interim reports 2018 and 2019: 'Abolish stamp duty on home, contents and strata insurance products'[59]

- Productivity Commission Natural Disaster Funding Inquiry report 2015: 'State and territory taxes and levies on general insurance should be phased out and replaced with less distortionary taxes'[60]
- Australia's Future Tax System 2010: 'Over time, a broad-based cash flow tax — applied on a destination basis — could be used to finance the abolition of other taxes, including payroll tax and inefficient State consumption taxes, such as insurance taxes',[61] and
- Victorian Bushfires Royal Commission report 2010: 'The State replace the Fire Services Levy with a property-based levy and introduce concessions for low-income earners'.[62]

20.43 **Due to the costs added to insurance premiums by state and territory insurance taxes, and the effect that this can have on affordability and coverage, states and territories should consider the relevant findings and recommendations of previous inquiries.**

20.44 The insurance of public assets, such as arrangements administered by state-owned insurers, are covered in Chapter 22: Delivery of recovery services and financial assistance.

Previous and ongoing insurance inquiries

20.45 **Governments should give careful consideration to the findings and recommendations of the prior and concurrent inquiries into insurance, with respect to the use and accessibility of insurance as a risk management tool for natural disasters. Such consideration and the resultant responses should occur in a timely manner.**

20.46 All governments, with the exception of NSW, which noted a need for further time for internal consultation, expressed support or support in principle for the proposition that they consider the findings of these reviews as they relate to insurance issues.[63]

Guidance on debris clean-up

20.47 One of the specific insurance issues highlighted during our inquiry related to problems experienced with debris clean-up following a disaster. Many parties, including local councils and insurers, expressed frustration over debris removal and clean-up services after the 2019-2020 bushfires. This was partly caused by sum-insured cover issues and the cost of debris clean-up (especially for contaminated debris like asbestos which can increase clean-up costs significantly) and partly by confusion as to responsibilities between insurers and the states that offered clean-up assistance.[64] In some cases, this resulted in delays to clean-up, payments, or rebuilding.[65] Suncorp noted that:

> *Despite ongoing discussions between the insurance industry and state governments, by mid-February 2020 we were still unable to provide our customers with certainty around how the government schemes would work, when RoD [Removal of Debris] works would take place at their properties, or how the financial arrangements for the scheme would affect them.*[66]

20.48 Creating guidance on debris clean-up has broad support from most governments, the insurance industry, and consumer groups.[67]

20.49 The ICA has suggested that government debris clean-up guidance be developed in consultation with the insurance industry, to ensure that this guidance is workable and fair for both insured and uninsured residents, and does not create incentives that lower insurance coverage.[68] The Consumer Action Law Centre expressed the view that any savings for insurers from government debris clean-up programs should be passed onto the policyholders impacted by the disaster.[69]

20.50 If governments choose to provide assistance in debris clean-up or in other matters, they should be careful not to create incentives that result in inequitable outcomes, or result in individuals and households reducing insurance cover and thereby shifting the costs of risk to governments.

Recommendation 20.1 Debris clean-up arrangements

Governments should create and publish standing policy guidance on whether they will or will not assist to clean-up debris, including contaminated debris, resulting from natural hazards.

Chapter 21 Coordinating relief and recovery

Summary 427

Objectives and priorities of recovery 428

Recovery process 429

Locally-led recovery 430

Recovery roles 433

Capacity to undertake locally-led recovery 436

Recovery coordination and planning 436

Recovery coordination 436

Recovery planning 437

Recovery plans need to be clear and effectively implemented 437

Standing recovery plans allow for an understanding of capabilities 439

Non-government organisations and charities 439

Planning and coordination 439

Donated goods 440

Fundraising and distribution of donated funds 442

Regulation of charities and fundraising 443

Recovery volunteerism 446

Volunteer coordination 446

Volunteer capacities 448

National recovery management 448

Governance arrangements 448

National coordination groups 449

National frameworks 450

Recovery workforce and resource sharing 451

Recovery exercises and training 452

Exercises 452

Training 453

Summary

21.1 The recovery process seeks to address the diverse needs of individuals and communities following a disaster. It often commences during the response phase and will continue for years after. Recovery is more than simply rebuilding and providing financial assistance. It is a complex and multilayered social and developmental process. When conducted well, the recovery process provides hope, a sense of future, and opportunity for healing. However, recovery can also be complex and frustrating to navigate.

21.2 The recovery process should draw governments, non-government organisations, businesses, communities and individuals together. It is well recognised that recovery works best when communities are placed at the centre of the process. As the closest level of government to communities, local governments are best placed to deliver locally-led recovery. However, there is scope for this level of government to be better supported in fulfilling its recovery responsibilities – this is a key responsibility of the state and territory governments.

21.3 Given the complexities of the recovery process, pre-planning and coordination is essential. Standing recovery plans must focus on known recovery needs, clearly identify the organisations responsible, and be supported by appropriate and pre-established arrangements. This is not solely the responsibility of Australian governments. Non-government action should likewise be planned and integrated within broader government recovery arrangements.

21.4 The 2019-2020 bushfires highlighted the willingness and capacity of individuals and businesses to volunteer their time and resources to assist disaster-affected communities. Problems, however, can occur when this embodiment of the 'Australian spirit' is not harnessed in a planned and coordinated way. There is also scope to improve community education and awareness on the most effective ways to help disaster-affected communities recover and address any systemic barriers in harnessing this support.

21.5 To enable locally-led recovery, it is essential that the impacts on communities are understood. However, it has been difficult to develop a clear national picture of the impact of the 2019-2020 bushfires across the nation. The limited availability of data and inconsistency of processes have hampered this effort. There is scope to improve the consistency, collection and sharing of impact data.

21.6 In addition, improving the sharing of recovery resources between jurisdictions, building the competencies and capabilities of Australia's recovery workforce, and enhancing recovery training and exercising will improve recovery processes for, and resilience to, future disasters.

21.7 The 2019-2020 bushfires highlighted scope to improve national recovery policy arrangements and coordination. Building a national strategic framework for recovery will allow for the national discourse on recovery to move beyond simply talking about the provision of funding, to developing concrete steps to strengthen the resilience of communities and ensure the recovery process can improve the lives of individuals affected by natural disasters.

Objectives and priorities of recovery

21.8 Recovery often commences as a disaster is unfolding, continues for years after the disaster has passed and can occur concurrently with other disasters. For many of the communities affected by the 2019-2020 bushfires, the process of recovery remains in its early stages.

21.9 A natural disaster can profoundly change a person's life. Natural disasters can destroy homes and livelihoods, which may have taken a lifetime to build. They can be source of significant financial stress and can leave an individual with long-term health impacts. Economic disruption and social issues are common and can lead to significant trauma, stress and anxiety in the aftermath of a disaster.[2]

> …everything you've done over the years is just totally ruined. [I know it] just sounds trivial but it's not…to us it's a lot.[1]

21.10 Recovery is complex and personal. It not only deals with the financial impacts of a disaster, but also multilayered social and developmental processes. The concept of recovery seeks to address the diverse needs of individuals and communities.[4] It can also provide hope, support and a sense of future – an invaluable opportunity to prepare for, and build resilience to, future disasters.

> …we're pretty lucky in Mallacoota, we're a small community and we're all friends, we all know each other, and when it comes down to it we're all going to help each other out really…You just make sure that everyone's okay.[3]

21.11 We have observed numerous instances of well planned, coordinated and effective recovery following the 2019-2020 bushfires. These instances highlight an intricate interaction of individuals; Australian, state and territory and local governments; insurers; and charities and non-government organisations.

> *The recovery centre establishment was a pivotal and positive response mechanism. The immediate cash benefits of $700 per family unit were fast and easy…Once the Defence Forces were allowed in and other larger scale response services such as Blaze Aid and Rubicon had a starting point, the bigger response started to work well. Once [I] saw the arrival of 'army boots' on my property, I felt there was a commensurate level of help now available to address the immense challenge now facing us.*[5]

21.12 When conducted well, the recovery process provides an important opportunity for healing. It allows individuals to deal with one of the most traumatic and disruptive experiences of their lives. However, the processes that people need to navigate can be complex. We observed frustration, fatigue, confusion and trauma within communities, caused by navigating recovery processes.[6] We also heard of delays in the timely provision of recovery support.

Recovery process

21.13 We have observed that successful recovery processes are predicated on a number of elements. It is important to:

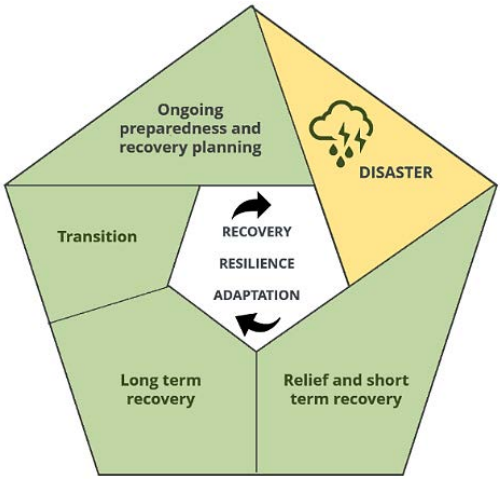
- understand the context of the community
- recognise the complex and dynamic nature of natural disasters and the communities that they have impacted
- use community-led approaches that are responsive and flexible, and that engage communities and empower them to move forward
- ensure a planned, coordinated and adaptive approach is used, based on continuing assessment of impacts and needs
- ensure effective communication with affected communities and other stakeholders, and
- recognise, support and build on community, individual and organisational capacity.

21.14 The importance of these elements is reflected in the *National Principles for Disaster Recovery* (National Principles). The National Principles guide recovery planning and delivery processes and encourage the adoption of best practice in addressing the impacts on affected communities.[7] These impacts can be categorised across four environmental 'domains': built, social, economic and natural – see Figure 76. Addressing the impacts on all four domains is essential for the successful recovery of a community.



Figure 76: Four domains of community recovery[8]

21.15 Australia's experience with natural disasters shows that recovery does not occur in a linear or staged process. The different phases of recovery can overlap, even within a single community. However, it is useful to consider recovery as a four stage cycle – see Figure 77.



Ongoing preparedness and recovery planning: the development of a whole-of-community approach to mitigate the effects and manage the consequences of an emergency or disaster. Recovery planning covers both planning as part of ongoing preparedness for events and also event specific recovery plan(s) to facilitate recovery from disasters.

Relief and short-term recovery: the period during and immediately after an event (hours to weeks), including: rapid impact assessment, early relief and emergency assistance, recovery needs assessment, and short-term planning. This phase may occur in parallel to the response to a disaster.

Long-term recovery: medium to long-term recovery efforts, ranging from several months to many years. This phase includes community engagement, rebuilding, and renewal programs and projects. Some elements of this phase will continue until well after the affected community is able to manage on its own.

Transition: the progressive handover to 'business as usual'. The transition stage identifies lessons and implements improvements to increase resilience as part of recovery processes and planning moving forward.

Figure 77: The recovery cycle, adapted from the Australian Disaster Resilience Handbook 2: Community Recovery[9]

21.16 Effective recovery requires thorough planning and coordination across all levels of government, charities, non-government organisations, insurers, volunteers, businesses, households and community groups.

Locally-led recovery

21.17 State and territory governments have primary responsibility for the recovery of communities affected by natural disasters.[10] Consistent with the principle of subsidiarity, and the National Principles, all state and territory governments have developed arrangements to facilitate a locally-led approach to recovery. A key part of these arrangements is that all states and the NT have transferred or delegated some recovery responsibilities to their local councils and shires[11] (the ACT functions as both territory and local government).

21.18 The role of local governments in recovery recognises that successful recovery must be based on local considerations and needs. As the closest level of government to communities, local governments are best placed to deliver locally-led recovery.[12]

21.19 There is broad acceptance across all levels of government and communities of the importance of locally-led recovery. The role of local governments in facilitating locally-led recovery processes will vary, depending on jurisdictional legislation and emergency arrangements. Generally, it involves local level planning and delivery of a broad range of services to communities.[13]

21.20 Local governments will generally provide relief services and recovery information to communities, remove debris and support clean-up, coordinate local relief funds for those directly affected by disasters and conduct damage assessments.[14] They also manage the replacement and repair of their own assets. Local governments coordinate recovery efforts by appointing recovery coordinators, establishing local recovery committees, and leading the development of local recovery plans – capturing the needs and aspirations of their communities.[15]



Bushfire burning through a family farm in Walwa, Towong Shire (Victoria) on 30 December 2019.

Localised flooding in Towong Shire (Victoria) on 8 March 2020.

It is common for localised flooding and landslides to occur following a bushfire. This is caused by the inability of the ground to absorb any excess rain, due in part to the loss of vegetation.



Figure 78: Bushfires and then flooding in Towong Shire, Victoria.[16]

Box 21.1 Eurobodalla Youth in Recovery Forums[17]

By February 2020, the 2019-2020 bushfires had resulted in more than 271,000 hectares (or approximately 79 per cent) of the Eurobodalla Shire Council area being directly impacted. In that same month, Eurobodalla also received heavy rain resulting in localised flooding.

The Eurobodalla Shire Council was aware that the effects of the disasters would have a significant impact on the region's young people. It considered there was a need for youth service providers and for young people to be provided with an opportunity to talk about how the fires had impacted them. This was based on discussions with people in the community and observations within evacuation centres and recovery centres.



Figure 79: Firefront in Bingie, Eurobodalla, January 2020[18]

To support the recovery for young people in Eurobodalla, the Council hosted three forums. These forums provided an opportunity for the young people of Eurobodalla to voice their concerns and brainstorm ideas. Recovery projects were subsequently co-designed, based on the needs directly identified by the young people of Eurobodalla. The forums also allowed for youth service providers in Eurobodalla to collaborate and avoid duplication of recovery programs.

The forums provided an opportunity to uncover young leaders and created opportunities to further build their skills and leadership potential. A survey conducted after the forums found that 89 per cent of young participants felt more empowered to support their communities and 44 per cent had been actively involved in community projects.

> *It was evident young people need to be consulted prior to future planning sessions, with a commitment to co-design principles in planning actions.*[19]



Figure 80: Eurobodalla youth in recovery[20]

Recovery roles

State and territory arrangements

21.21 State and territory governments have arrangements in place to provide additional resourcing and support where local government capacity is exceeded.[21] Although there are variations between jurisdictions, in general, these arrangements describe broad roles and responsibilities, relevant stakeholders, capabilities and resources available, processes for escalating requests depending on the severity of the event and governance arrangements.

21.22 State and territory governments also provide dedicated recovery programs and funding to support recovery efforts following a natural disaster – see Chapter 22: Delivery of recovery services and financial assistance.

Australian Government support

21.23 The Australian Government has an important supporting role in relation to recovery.[22] The main forms of recovery support provided by the Australian Government include:

- financial assistance to state and territory governments through the Disaster Recovery Funding Arrangements – see Chapter 22: Delivery of recovery services and financial assistance
- financial assistance to disaster-affected individuals, through the Australian Government Disaster Recovery Payment and Disaster Recovery Allowance and associated ex-gratia assistance – see Chapter 22: Delivery of recovery services and financial assistance and
- Australian Defence Force assistance, following a request from state or territory governments – see Chapter 7: Role of the Australian Defence Force.

21.24 The Australian Government also has dedicated funding pools for recovery. During the 2019-2020 bushfires, the Australian Government committed $2 billion, through the National Bushfire Recovery Fund, to support the recovery of affected communities – see Appendix 24: Recovery Supports. In addition, the Emergency Response Fund (ERF) allows the Australian Government to draw up to $150 million each financial year to fund recovery and up to $50 million each financial year for resilience and preparation activities.[23] The ERF is intended to be a last resort program, only to be drawn upon where existing programs are insufficient to meet the needs of communities.[24] The ERF has not been used to date. [25]

21.25 These dedicated funding pools support whole-of-government prioritisation of recovery measures, and facilitate Australian Government departments to think innovatively about how to support recovery without necessarily being constrained by normal funding considerations or cost-sharing arrangements.[26]

Non-government organisations and charities

21.26 Non-government organisations and charities play a vital role in supporting the recovery of disaster-affected communities. They provide support and services to

people and communities during and after a disaster. They can be both complementary to, and partners of, government in community recovery. Charities such as the Australian Red Cross, St Vincent de Paul Society and The Salvation Army, are often embedded in formal recovery arrangements and provide a range of support, including emergency relief, financial assistance and psychosocial assistance. Other organisations may focus on supporting recovery in specific areas, such as wildlife rescue (for example, the NSW Wildlife Information Rescue and Education Service and the Royal Society for the Prevention of Cruelty to Animals) and legal assistance services.

21.27 During the 2019-2020 bushfires, the non-government organisations and businesses provided valuable support directly to affected individuals, small businesses and primary producers. Charities and non-government organisations delivered a range of urgent relief services, such as psychological first aid and emergency meals.[27] Charities also provided financial assistance directly to disaster-affected individuals and communities. The Business Council of Australia also coordinated the provision of $70 million in financial and in-kind assistance from the business community.[28]



Figure 81: Australian Red Cross volunteer outside the Bairnsdale relief centre, Victoria[29]

Box 21.2 Business Council of Australia - BizRebuild[30]

In response to the 2019-2020 bushfires, the Business Council of Australia launched their Community Rebuilding Initiative, known as BizRebuild. It is a five year business-led initiative which provides practical and targeted assistance to bushfire-affected local businesses. BizRebuild work is 'focused on directing assistance to small and local businesses to restore jobs, create new ones and help rebuild economies and communities'.

Business Council of Australia members, which include companies from all around Australia, supported BizRebuild through funding donations, provision of goods and services, in-kind assistance and organised secondments of senior staff to BizRebuild. BizRebuild has worked closely with the National Bushfire Recovery Agency, providing advice to it on the issues faced by businesses in the recovery process.

BizRebuild has provided a range of services, including cash vouchers for retooling and recovery needs, in-kind assistance, including business recovery, financial, mental health and other experts, business-to-small business support and organising business forums and roundtables.

BizRebuild has also supported community-based projects, such as a 'pop-up mall' in Mogo, NSW. This initiative was developed with the Mogo Village Business Chamber and the Eurobodalla Shire Council and turned 13 donated demountable buildings into a temporary pop-up mall. The pop-up mall provided temporary premises for local businesses and new accommodation for the Mogo Local Aboriginal Land Council – all of which were destroyed during the 2019-2020 bushfires.

Based on its experience, BizRebuild has shared a number of lessons, including: the significant effect of indirect impacts of natural disasters on businesses; the importance of re-establishing cash-flow as soon as possible; the need for a personal approach and in-kind assistance; and the importance of a community-led approach.



Figure 82: Pop-up mall in Mogo, NSW provided a temporary location for local businesses to operate in the aftermath of the 2019-2020 bushfires[31]

Capacity to undertake locally-led recovery

21.28 Despite the support that is provided to local governments, we have observed capacity constraints which have limited the delivery of locally-led recovery. Many local governments appear to have limited capacity to coordinate and undertake recovery activities on a significant scale.[32] This was particularly the case for small, regional and rural councils affected by the 2019-2020 bushfires.[33] Local governments often have limited budgets, requiring them to balance their recovery roles with other full-time local government responsibilities.[34] In addition, some individuals embedded in local recovery arrangements may be directly affected by the disaster themselves and have reduced or no capacity to undertake their government roles. The effect of this can be compounded by limited training and guidance on recovery from higher levels of government.[35]

21.29 **Recovery responsibilities are a core responsibility for local governments. Local governments should be supported to undertake these functions by state and territory governments, including through the provision of training and guidance.**

21.30 During the 2019-2020 bushfires we heard of local governments supporting each other by sharing resources within a region or further afield when local capacity was overwhelmed.[36] Quite often, the sharing of recovery resources and support between councils and shires occurred on an ad-hoc basis and relied on the goodwill between local governments and existing relationships.[37] We heard of larger councils supporting smaller councils which were significantly impacted by the 2019-2020 bushfires,[38] and the valuable coordination and advocacy role provided by local government associations.[39] There is scope for state and territory governments to better support local governments in the recovery process, if necessary, particularly in monitoring and evaluating the capacity of local governments – see Chapter 11: Emergency planning.

21.31 **State and territory governments have a responsibility to ensure that local governments have the capacity to undertake recovery planning and delivery responsibilities. This should include monitoring, evaluation and coordination before, during and after a natural disaster.**

Recovery coordination and planning

Recovery coordination

21.32 There are a number of entities involved in the recovery processes. Recovery, therefore, needs to be coordinated to ensure services are delivered effectively and efficiently and address the broad range of impacts of a natural disaster. At the local, state and territory government levels, recovery is coordinated through a number of structures.[40] While labels may vary between jurisdictions, these are centred on:

- a recovery coordinator (an individual who is responsible for coordination and strategic advice or decision-making)
- a recovery committee (a decision-making body responsible for recovery operations), and

- functional recovery groups (bodies which provide specific expertise and lead planning for a particular recovery domain or a component of that domain).

21.33 The Australian Government Disaster Recovery Committee (AGDRC) is intended to support recovery planning and whole-of-government coordination at the Australian Government level.[41] However, the AGDRC was not convened during the 2019-2020 bushfires and was last activated in 2017, following Tropical Cyclone Debbie in Queensland.[42] The creation of new post-event recovery agencies has superseded the need to convene the AGDRC,[43] and highlights a shift to a more active recovery role for the Australian Government.[44] We have recommended the need for a standing and scalable national resilience and recovery agency to reflect this shift and to avoid the need to stand up separate recovery agencies during the course of a disaster – see Chapter 3: National coordination arrangements.

Recovery planning

21.34 A key part of supporting locally-led recovery is planning. There are two types of recovery plans: standing recovery plans – which are established before a disaster and set the arrangements for delivering recovery when a disaster occurs; and community recovery plans – which are completed after the event and outline specific activities to address the impacts of a disaster.[46] These plans are intended to guide the delivery of recovery services and provide an authoritative source of information to those involved in recovery processes.

> Planning for recovery can be a complex and demanding process …. Unfortunately, recovery planning can be seen as a low priority compared to more pressing or immediate issues.[45]

21.35 Most state and territory governments have standing recovery plans which provide guidance on recovery arrangements within their jurisdictions – see Appendix 23: Recovery Arrangements. There is considerable variability in the level of detail included in these plans. For example, Queensland and the ACT identify specific charities and non-government organisations which are responsible for particular recovery activities.[47] Other jurisdictions do not identify specific organisations which will undertake recovery activities.[48]

Recovery plans need to be clear and effectively implemented

21.36 A lack of clearly defined responsibilities and service coverage can result in inefficiency and duplication of support. This was apparent in the early stages of delivering emergency relief services in some locations during the 2019-2020 bushfires.

> *In some areas where there were few services, the [St Vincent de Paul Society] was thrust into, or seen as, a first responder which is not its role. The lack of clarity between agencies as to who was responsible for what meant that all agencies seemed to be offering emergency relief at Recovery Centres from the outset which was confusing for those seeking assistance…*[49]

21.37 Problems also arise when establishing new arrangements for recovery services during a crisis. This was particularly apparent in the clean-up process following the 2019-2020 bushfires. In areas hardest hit we heard that the scale of the clean-up was enormous, complex and costly.[50] It required the identification and management of vast volumes of hazardous waste, particularly asbestos which had been used in the construction of homes and other structures.[51] The time taken to finalise clean-up arrangements resulted in uncertainty and delays in debris removal[52] and added complexity to the resolution of insurance claims – see Chapter 20: Insurance. The delays in the removal of debris were compounded by perceptions of poor communication and unclear eligibility – points of significant frustration in affected communities.[53]

21.38 The coordination of issues such as clean-up would benefit from additional planning before a disaster.[54] Standing recovery plans help relevant organisations understand roles, processes and thresholds in addressing particular recovery needs. These plans can also support the establishment of core features of a recovery program (such as eligibility and whether an 'opt-in' or 'opt-out' process is used) before a disaster.[55]

21.39 These arrangements could be supported by additional coordination tools and platforms. We have been told that there would be value in developing apps that can be used to match an identified need with offers of support and access to panels of pre-identified suppliers of particular services[56] (such as Victoria's Clean-up Panel, which Victoria used to execute its state-coordinated clean-up program following the 2019-2020 bushfires).[57] In combination with standing plans, these additional supports can reduce the lag in responding to recovery needs in communities.

21.40 **All levels of government should establish standing recovery plans before a disaster. These plans should focus on known recovery needs, such as clean-up and debris removal, and clearly identify the entities responsible for addressing particular needs and outline their service coverage. Pre-established and appropriate arrangements, such as supplier panels, could further support effective and coordinated recovery**.



Figure 83: The presence of asbestos can add siginificant complications to clean-up efforts[58]

Standing recovery plans allow for an understanding of capabilities

21.41 The Australian Government does not have a standing recovery plan akin to those developed by state and territory governments. We have observed that during a crisis there is benefit in having a 'single point of truth', which outlines what Australian Government recovery capabilities are available, who is responsible for them and the relevance to, or implications for, communities.

21.42 For example, during the 2019-2020 bushfires many stakeholders initially had a limited understanding of the purpose and potential utility of, and process to make, an emergency declaration under the *Privacy Act 1988* (Cth) to facilitate information sharing, as the last emergency declaration prior to the 2019-2020 bushfires was 2011[59] – see Chapter 22: Delivery of recovery services and financial assistance for further information on the emergency declaration.

21.43 **Standing recovery plans would allow the Australian Government to provide faster recovery support in response to natural disasters. The Australian Government should develop a standing recovery plan in addition to any national, event-specific recovery plans as part of a broader strategic framework for recovery. A standing recovery plan would, among other things, outline resources and assistance available at the national-level, responsible entities and the processes for activation**.

Non-government organisations and charities

Planning and coordination

21.44 Non-government organisations and charities play a crucial role in recovery. Consistent with the National Principles, these organisations have close ties and trust with communities and are often already providing services to those communities. However, we heard that there is limited understanding of the value some of these organisations have in recovery.[60] While larger non-government organisations and charities are generally included in recovery arrangements and planning processes, many smaller non-government organisations and charities are inconsistently included, particularly at the local government level.[61]

21.45 We have observed the need to better incorporate the non-government sector in recovery planning processes before a disaster occurs.[62] Pre-planning supports rapid responses when disasters occur, prevents duplication of effort or unnecessary work in response to disasters, and ensures the efficient connection of all relevant parties.

21.46 The delivery of legal assistance services is a key example of non-government recovery support which would benefit from greater planning. Following a natural disaster, numerous legal issues can arise, including in relation to insurance, family law and family violence, tenancy and housing and social security issues.[63] During the 2019-2020 bushfires, the legal assistance sector mobilised a response to support affected individuals.[64] However, there were a number of issues that arose due to the absence of pre-planning or strategic framework.

> *In NSW, there was no pre-agreed framework to activate regarding the legal sector's response to disasters, which led to a longer period of confusion around*

roles and responsibilities in the response, and less clarity in public-facing communication in the initial periods of disaster response.[65]

21.47 We are aware of efforts, at the local level, to develop planning arrangements for the delivery of legal assistance services during a natural disaster. For example, Townsville Community Law, a community legal centre in Queensland, is undertaking the *Disaster Readiness for the Legal Assistance Sector* project. This project has been funded through the Disaster Recovery Funding Arrangements and will develop an operational model and disaster legal assistance plan which could be integrated within Queensland's disaster management arrangements.[66] There is merit in considering whether similar processes could be replicated nationally.

21.48 Establishing pre-planned disaster responses for non-government sectors allows for the timely delivery of services. We recognise that any planning for these sectors must also be sufficiently flexible to support a local, on-the-ground recovery response that reflects the nature of the disaster and its impacts on existing services.[67]

21.49 **Non-government organisations should be included in recovery planning processes at the local, regional, jurisdictional and national levels as appropriate. Non-government sectors involved in response and recovery should establish their own strategies and plans to address the recovery needs that follow natural disasters.**

Donated goods

21.50 The donation of physical goods, including food and material, by the community and charities plays a significant role in individual and community recovery. However, despite the best intentions, this often results in unsolicited donations of goods, which may be inappropriate or do not meet the specific needs of the community.[69]



Figure 84: An influx of unsolicted donations can quickly overwhelm storage capacity[68]

21.51 Responding to significant unsolicited donations of goods also requires the development of arrangements to transport, store, sort and distribute donations as well as to dispose of unneeded or inappropriate goods – diverting efforts from other aspects of recovery.[70]

21.52 The *National Guidelines for Managing Donated Goods* emphasises that financial donations are preferred in supporting recovery efforts. Financial donations provide choice, empower people by promoting personal decision-making, are more flexible and support local economies by encouraging local buying.[71] Donated goods, instead

of financial donations, means that there is delay before local businesses have customers return to replenish essential items.[72]

21.53 During the 2019-2020 bushfires, local governments and community organisations received an influx in unsolicited donations of goods. This represented a significant logistical challenge for local communities and organisations involved in recovery. The NSW[73] and Victorian[74] Governments requested the public stop donating physical goods. Unsolicited donations of food also presented issues of food safety – for example, the need for refrigeration, which can be problematic after disaster as communities can experience lengthy periods without reliable power.[75]

21.54 The National Guidelines for Managing Donated Goods, and experience during the 2019-2020 bushfire season, highlight the importance of incorporating the management of donated goods within recovery planning processes, establishing donation arrangements before a disaster, and providing clear communications to inform the public of how to best support affected communities.[76] During the 2019-2020 bushfires, arrangements to manage donated goods in NSW and Victoria, were not established until mid-late January 2020.[77] In addition, there appears to be limited public awareness of the National Guidelines for Managing Donated Goods.

21.55 Solicited donations of physical goods can support the effective recovery of disaster-affected communities, particularly when those goods are specifically requested or based on an assessment of need.[78] Organisations such as GIVIT and Foodbank can act as a valuable broker. They can purchase needed items and match offers of support from individuals and the private sector to disaster-affected communities who need specific items.[79] These organisations also alleviate the need for local communities to transport, store and sort donations and dispose of inappropriate goods.[80]

21.56 Some state and territory governments have incorporated these organisations into their recovery arrangements to manage donated physical goods and provision of food relief. For example, the ACT[81] and Queensland[82] Governments have standing arrangements for GIVIT to manage donations during the recovery phase of a disaster. Similarly, the SA Government has a standing arrangement with St Vincent de Paul.[83] Having pre-established arrangements allows these organisations to develop partnerships and networks with local groups and pre-plan relevant logistics and communications – both critical for the management of donated goods.[84]

Recommendation 21.1 Arrangements for donated goods

State and territory governments should develop and implement efficient and effective arrangements to:

(1) educate the public about the challenges associated with donated goods, for example, the storage and distribution of donated goods, and

(2) manage and coordinate donated goods to ensure offers of support are matched with need.

Fundraising and distribution of donated funds

21.57 The Australian community has long come to the aid of people affected by disasters. Throughout and following the 2019-2020 bushfires, Australian individuals, families, communities and businesses gave generously to support community recovery – the Australian Red Cross received over $227 million;[85] the NSW Wildlife Information Rescue and Education Service received $91 million;[86] donors contributed over $44 million to The Salvation Army's Disaster Appeal;[87] and St Vincent de Paul Society raised over $22 million.[88] The Salvation Army and St Vincent de Paul also received funding from the Australian Government for the provision emergency relief, including to bushfire-affected individuals.[89]

21.58 During and after the 2019-2020 bushfires, there was intense public scrutiny of charities and non-government organisations and adverse reflections on the timeliness of the distribution of donated funds.[90] Much of the criticism seems to have been based on an expectation that funds would be provided to affected communities in the immediate aftermath.

21.59 However, recovery is a protracted process and recovery needs can continue for years after an event. As such, individuals may react differently and require support at different points in time before they are able to get 'back on their feet'.



Figure 85: Homes detroyed in NSW by the 2019-2020 bushfires[91]

21.60 We heard from major charities that the distribution of donated funds must be balanced between the provision of immediate assistance, while ensuring that sufficient funding is available to support people across their longer-term recovery.[92] They noted that it was common for individuals to only seek support weeks or months after a disaster, rather than immediately after the disaster. Distributing all funding as quickly as possible would mean that individuals could miss out on needed recovery assistance or that there is insufficient funding to meet the needs of a broader community as it rebuilds.

> *It took us two months to decide to go to the Bushfire Recovery Centre. Initially we felt that we shouldn't go because 'other people needed it more' - after all we still had a house. But as time passed, we realised that there were things we did need help with, so we asked…*[93]

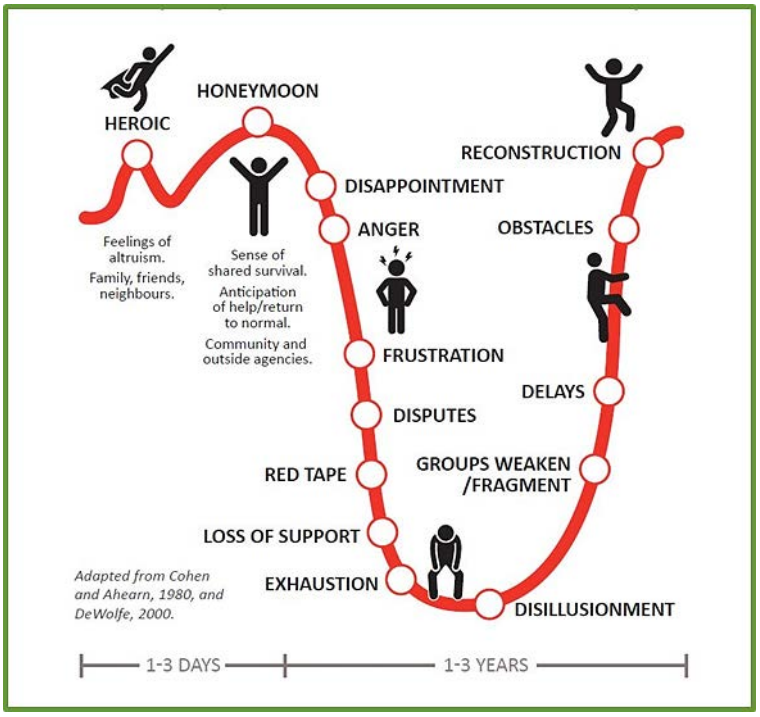


Figure 86: The recovery trajectory for communities[94]

21.61 Charities must also contend with the unfortunate reality that some individuals will seek to exploit the recovery assistance that is provided following a natural disaster. For instance, during the 2019-2020 bushfires, the Australian Red Cross had over 900 suspicious claims lodged electronically.[95] Charities need time to verify individual claims to ensure that financial assistance is provided to people in genuine need – this can slow the distribution of funds.[96]

21.62 **The distribution of donated funds over an extended period is consistent with the long-term nature of recovery. Governments could also play a role in helping to educate the public about the protracted nature of recovery processes and the need for charities to act judiciously with donated funds.**

21.63 **More frequent and transparent communication to donors and the wider public about the collection of donated funds, the nature of the assistance being provided, the administrative costs, how much has been distributed and the timeframes for distribution would support a greater understanding of the recovery process.**

Regulation of charities and fundraising

21.64 The Australian Charities and Not-for-profits Commission (ACNC) is the national regulator of charities, but fundraising is regulated by state and territory governments[97] – see Appendix 23: Recovery Arrangements. This leads to complexity, both when attempting to raise funds nationally following a natural disaster and the distribution of funding to communities. A charity that conducts a national campaign will likely need to be registered to fundraise in each state and territory and comply with several distinct regulatory schemes.[98]

21.65 In addition, social media and digital platforms are creating new opportunities for fundraising. The emergence of modes of raising funds, such as crowd funding, has

changed the fundraising landscape and presents new challenges for regulators and ensuring the integrity of fundraising efforts.[99]

21.66 Charities may also be bound by organisational constitutions, limits on the objects of donated funds and trust deeds. This will also affect the ability to raise and distribute funds.[100] These complexities are difficult to navigate both for those seeking to raise funds, and prospective donors. A high profile example that highlights the intersection of these issues was the spontaneous fundraising campaign for the Trust of the Rural Fire Service of NSW.[101]

21.67 We acknowledge that our Letters Patent are limited to natural disasters, and the regulation of fundraising is a matter that extends beyond natural disasters. However, significant fundraising events regularly occur during and after natural disasters and they are an important contribution to recovery efforts. We therefore should consider, consistent with our Letters Patent, what can be done to improve these arrangements.

Fundraising regulation

21.68 Fundraising during natural disasters is often significant, as donations are generally made as an emotional outlet in the face of the impacts of a disaster. It is important that the community understands the legal framework for fundraising and the various limitations which may apply to the dispersal of donated funds.

21.69 We heard from some charities about the importance of harmonising the regulation of charities across state and territory governments. [102] Australian, state and territory governments are in the process of developing a cross-border recognition model that would ease the registration and reporting burden on charities who raise funds in multiple, participating jurisdictions. This model is expected to be finalised by the end of October 2020.[103]

21.70 The ACNC is also working with its counterparts in state and territory governments to streamline reporting and compliance requirements. For example, as a result of ongoing dialogue with the ACNC, the WA Government recently announced changes to its *Charitable Collections Act 1946* (WA), which simplify the application process for fundraising activities, facilitate data sharing and will mean that most WA charities registered with the ACNC will no longer need to submit financial statements to the state regulator (as this information would be shared by the ACNC).[104] The Australian Government is also developing a common definition of a charity, in order to simplify reporting and compliance requirements.[105]

21.71 We heard that it can often be difficult for donors to have confidence in statements and representations made when being asked to donate funds. Likewise, it may be unrealistic to expect donors to be able to thoroughly investigate the credentials of a charity or a fundraiser.

21.72 The legal framework for fundraising could be more effective if there was a single regulator and scheme governing fundraising. For example, the Law Council of Australia, the Australian Red Cross and Justice Connect have all suggested that rather than harmonisation of the state and territory fundraising laws, these laws should be repealed and replaced by an amendment of the Australian Consumer Law (which is

part of the *Competition and Consumer Act 2010* (Cth)) to clarify its application to charitable and not-for-profit fundraising.[106] This would be consistent with the recommendations in the *Australian Charities and Not-for-profits Commission Legislation Review 2018*, which also recommended the creation of a single national scheme for fundraising.[107]

21.73 **The Australian Charities and Not-for-profits Commission Legislation Review 2018 provides a useful starting point for the creation of a national scheme for the regulation of fundraising. A national scheme could provide greater community confidence in the management of financial donations following a natural disaster.**

Digital fundraising

21.74 The growth of fundraising through social media and online channels also raises regulatory compliance issues, particularly for individuals and small organisations which may not be aware that they need to apply for a licence or register. The vast majority of fundraising activities during the 2019-2020 bushfires were through online and digital mechanisms.[108]

21.75 Online fundraising platforms can be exploited by fraudulent fundraising campaigns and scams.[109] During the 2019-2020 bushfires, over 500 related scams were reported to the Australian Competition and Consumer Commission[110] – which, regrettably, is consistent with what was reported for previous disasters.[111] Additional enforcement or regulatory action have been suggested to address these risks. For example, the Fundraising Institute of Australia has suggested providing the Australian Communication and Media Authority with powers to disable fraudulent fundraising websites, similar to its powers to regulate illegal online gambling that were introduced by the 2017 amendments to the *Interactive Gambling Act 2001* (Cth).[112]

21.76 **The Australian Government should consider whether additional regulatory responses are required to address the risk of fraud associated with digitally enabled fundraising campaigns.**

Community education and guidance

21.77 It appears that, during the 2019-2020 bushfires, there was a lack of public awareness on the need to register or get authorisation, in line with various fundraising laws. We have received evidence of the need for greater community education and guidance materials, such as dedicated handbooks, on the legal requirements and best practice of fundraising. This would support consistent approaches and practices in setting up fundraising appeals.

21.78 Some localised fundraising efforts following the 2019-2020 bushfires appeared to lack an understanding of relevant legal frameworks, best practice on raising funds and limitations on the dispersal of funds.[113] Guidance, such as template terms of reference for funds, information collection and sharing best practices, model communications to donors, licensing and registration requirements and reporting tools, could provide individuals, organisations and local governments better clarity when contemplating fundraising efforts.[114]

21.79 Work in this area has already commenced – the Fundraising Institute of Australia is developing the *Practice Note for National Disasters*, which will provide guidance for

best-practice ethical fundraising for fundraising in response to natural disasters in Australia.[115]

21.80 **There is scope to improve community awareness and education of fundraising requirements and for charities and fundraising platforms to more transparently communicate the limitations on how donated funds can be used.** This could be achieved by additional guidance, such as the development of specific handbook on fundraising by Australian state and territory governments.

Recommendation 21.2 Reform fundraising laws

Australian, state and territory governments should create a single national scheme for the regulation of charitable fundraising.

Recovery volunteerism

21.81 Following a natural disaster significant numbers of volunteers offer their time and effort to support the recovery of affected communities. This often includes individual volunteers, emergent organisations and established volunteer organisations.[116] During the 2019-2020 bushfires, recovery volunteers were applauded for embodying the 'Australian spirit' and provided significant support, particularly in the immediate recovery efforts.[117]

Volunteer coordination

21.82 State and territory governments vary in how they draw on volunteerism in recovery. In 2015, the Australia-New Zealand Emergency Management Committee (ANZEMC) published the *Spontaneous Volunteer Strategy (2015),*[119] a limited national strategy for the engagement of spontaneous volunteers during natural disasters. This strategy outlines key principles, policy considerations and suggested actions for the inclusion of volunteers in the emergency management context. Some state and territory governments have developed specific guidelines and strategies which align with these principles and suggested actions. For example, NSW has the *Community Recovery Toolkit: Planning for Spontaneous Volunteers*[120] and SA has its *Guidelines for Managing Spontaneous Volunteers*.[121]



Figure 87: Local residents volunteering in Quaama, NSW[118]

21.83 **Australian, state and territory governments should refresh the Spontaneous Volunteer Strategy and develop specific action plans and guidelines.**

21.84 During a natural disaster, it is common for individual volunteers to converge on a location in order to provide support and assistance. This often occurs in areas which have featured prominently in the media, are easily accessible or are close. Local communities can face significant pressure to respond to the offers of support. Health and safety and legal liability questions can also arise, which the community may not be well placed to assess. These challenges can lead to uncoordinated approaches to using volunteers and volunteers may even place themselves at risk – as was the case in some communities during the 2019-2020 bushfires.

> *[During the 2019-2020 bushfires] there were many examples of people, church groups informing communities they were arriving to 'clean up' things. This was without any: volunteer management practices in place, prior knowledge of contamination or risks, no understanding of what the bushfire affected community wanted, or guidance or support.*[122]

21.85 Further, the cost and timeliness of security checks on volunteers (such as national police checks or working with vulnerable people checks) can be a significant barrier to the use of volunteers.[123]

21.86 State and territory governments adopted a range of approaches for the registration and referral of volunteers, with a variety of systems and platforms being used. For example, Volunteering Queensland operates EV CREW, a platform used for volunteer recruitment and referral, which is used in Queensland, the ACT and Tasmania.[124]

21.87 A model that encourages a consistent approach to the registration and referral of volunteers is desirable as it would allow for greater interoperability between jurisdictions and more effectively leverage the capabilities of volunteers in recovery arrangements.

21.88 **Greater consistency in the processes used to register and refer volunteers would support greater interoperability between state and territory governments.** These processes should be supported by robust vetting and training mechanisms, and interoperable platforms.

21.89 In response to a need for greater coordination, state and territory governments established specific forums and groups during the 2019-2020 bushfires. For example, NSW created a Volunteer Working Group to provide a point of contact between recovery coordinators, committees and the volunteer sector.[125]

21.90 However, it is not possible for these types of groups to represent the full diversity of volunteer groups that may operate after a disaster. These groups also have limited ability to track, coordinate and position all volunteers and volunteer organisations to ensure recovery needs are appropriately addressed.[126] Several non-government organisations with significant roles in recovery suggested that there would be value in a coordinator to address these difficulties.[127]

21.91 In considering improvements to volunteer coordination, several lessons can be taken from Australia's mobilisation and international deployment of volunteers. For example, under the Australia Assist Program, RedR Australia[128] trains, recruits and

deploys technical expertise in response to Australian Government crisis priorities. RedR Australia's capabilities include: vetting and rapid deployment, accredited training of all volunteers, use of digital platforms to link the needs of RedR Australia's partners with volunteers, embedding local decision-making in-line with need, and effective civil-military coordination to operationalise a response plan.[129]

21.92 **State and territory governments should incorporate a volunteer coordination mechanism within their disaster recovery arrangements.** This mechanism, such as a coordinator, could work closely with local communities and governments and would be responsible for building capacity to manage volunteers and coordinating volunteers and volunteer groups. Any coordination mechanism would need to foster cooperation and include a wide range of volunteer groups, which may only emerge in the aftermath of a disaster.

Volunteer capacities

21.93 We have been told of a number of issues that affect the capacity of volunteers to contribute to recovery. While there is often a surge in volunteers during and after a natural disaster, volunteering peak bodies have noted that medium-term trends suggest a decline in volunteering.[130] It is worth noting that volunteers are donating their time, effort and resources to support the recovery of disaster-affected communities. However, we heard that there is scope for improvement in preparing volunteers before disasters. If not sufficiently prepared and trained, volunteers may hamper recovery efforts.[131]

21.94 Financial constraints – such as transport, volunteers' out-of-pocket expenses, insurance, volunteer camp facilities, and materials – also affect the ability to deploy volunteers.[132] Some state and territory governments cover the operational costs of volunteers – however, this not consistent across Australia. For example, NSW provides limited funding to cover the costs of establishing 'volunteer base camps'.[133] More mature guidance, training and community education about volunteer management is needed.[134] In addition, we heard that an examination of broader volunteer issues, including protections, liabilities and insurance arrangements, is needed and merits consideration.[135]

21.95 One approach, suggested by Volunteering Queensland, to support the capacity and coordination of volunteers, is to adapt the United States' national Volunteer Organisations Active in Disasters model.[136] This model consists of an association of volunteer organisations, with agreed minimum standards, training and guidance to assist in volunteer management, including spontaneous and emergent organisations.[137] International models, such as the Volunteer Organisations Active in Disaster, merit consideration.

National recovery management

Governance arrangements

21.96 At a national-level, recovery policy and strategic decision-making is facilitated through the Community Outcomes and Recovery Subcommittee (CORS) of the ANZEMC. CORS supports ANZEMC by undertaking a range of recovery projects and

develops policies that aim to enhance Australia's capacity to recover from natural disasters.[138]

21.97 CORS is advised by an independent group called the Social Recovery Reference Group (SRRG).[139] The SRRG is a national functional reference group that is focused on the social domain of recovery (Figure 76). It is an expert body that supports the development of national recovery policy and planning relating to the human and social consequences of a disaster.[140] The SRRG is the only national functional reference group. CORS is currently in the process of developing similar national functional reference groups for the other recovery domains (social, economic, built and natural).[141]

21.98 **The development of national functional reference groups across all four recovery domains will allow for more comprehensive expert policy advice to be provided to CORS.** Expert policy advice across each of the recovery domains would enhance national recovery capabilities and interoperability across jurisdictions. It would also enhance understanding of the links between the social, economic, built and natural recovery domains.[142]

National coordination groups

21.99 Before the 2019-2020 bushfires, there were no standing national mechanisms to coordinate recovery efforts delivered by non-government organisations. In response to this gap, the National Bushfire Recovery Agency created the National Charities Bushfire Recovery Coordinators Forum and National Peak Bodies Bushfire Recovery Coordinators Forum. These forums comprised representatives from a broad cross-section of relevant national charities (such as the Australian Red Cross, Foodbank and Islamic Relief Australia)[143] and peak bodies (such as the Planning Institute of Australia and the Business Council of Australia).[144]

21.100 The National Charities Bushfire Recovery Coordinators Forum and National Peak Bodies Bushfire Recovery Coordinators Forum coordinated the delivery of recovery support to communities during and after the 2019-2020 bushfires.[145] These forums played a valuable role in identifying issues of national significance, optimising recovery efforts, sharing data, and identifying any gaps or potential duplication of effort.[146] We have been informed that these forums complemented existing jurisdictional level forums and arrangements.[147] There would value in these forums continuing, and there is merit in expanding their membership to include volunteer groups.[148]

21.101 **National coordination forums provide an opportunity to collaborate on the development of national strategies to improve the delivery of recovery services to disaster-affected communities and address issues of national significance, before, during and after a natural disaster.[149] It is important that these national groups complement any existing mechanisms at the state and territory and local level.**

Recommendation 21.3 National coordination forums

The Australian Government, through the mechanism of the proposed standing national recovery and resilience agency, should convene regular and ongoing national forums for charities, non-government organisations and volunteer groups, with a role in natural disaster recovery, with a view to continuous improvement of coordination of recovery support.

National frameworks

21.102 As explored earlier in this report, Australian governments have developed national frameworks to support disaster risk reduction and preparedness and response (the National Disaster Risk Reduction Framework,[150] the Australian Disaster Preparedness Framework[151] and the Australian Government Crisis Management Framework).[152] These frameworks support the National Strategy for Disaster Resilience[153] and describe Australia's disaster risk reduction and preparedness doctrine, including national capabilities and maturity levels, guiding principles, national priorities and strategies for action and outcome-based measures of success.

21.103 National frameworks provide guidance to all levels of government and incorporate current thinking and common approaches. Frameworks are only effective when they are understood, effectively implemented and supported by strong mechanisms of assurance – see Chapter 24: Assurance and accountabilityfor further information on the importance of accountability in national strategies and frameworks for disasters.

21.104 There is currently no national framework for recovery in Australia. The absence of such a national framework results in an over reliance on funding mechanisms, particularly the Disaster Recovery Funding Arrangements, to drive national recovery decisions and the broader narrative of assistance. This narrows national discourse on recovery to the provision of funding, rather than improving outcomes for communities and strengthening resilience.[154] Other countries have established national recovery frameworks. For example, the United States has the *National Disaster Recovery Framework*, which outlines the strategy and doctrine for how communities and all levels of government develop, sustain, and coordinate the delivery of core recovery capabilities.[155]

21.105 Australian, state and territory governments, through CORS, are in the process of developing a national recovery framework. The proposed framework is intended to provide an overarching strategy and guidance for all levels of government to coordinate and deliver an inclusive set of recovery interventions. It is intended to be an all-hazards framework and will outline the roles and responsibilities during an event of national consequence and significance.[156]

21.106 **A national recovery framework could support an integrated approach to recovery, promote interoperability between jurisdictions and provide clarity in the role different entities have in recovery.** Such a framework should describe the approach that all levels of government would take to community-led recovery, including governing principles, outlining national coordination roles, responsibilities and capabilities, and including key recovery outcomes in order to set a collective measure of success. A national recovery framework should also outline areas where

collaboration and standardisation between jurisdictions could improve recovery outcomes, including through a stronger role for resilience.

21.107 **The creation of a national framework for recovery, however, must be effectively implemented; supported by clear lines of accountability, measurable outcomes, assurance, evaluation and continuous improvement.**

Recovery workforce and resource sharing

21.108 Compared to Australia's response capabilities, the national recovery workforce – people with dedicated expertise in recovery, such as community workers, administrators and government managers – is relatively limited and recovery capabilities are not mature.[157] This has been recognised across all levels of government.[158]

21.109 Resource sharing between state and territory governments has been one means to bolster the recovery capacity of jurisdictions affected by natural disasters. For example, following the 2019 North & Far North Queensland monsoon trough, a number of state and territory governments provided social and welfare recovery personnel to support Queensland's recovery efforts.[159]

21.110 The sharing of these resources was facilitated by the SRRG under the *Guidelines for Interjurisdictional Assistance (Community Recovery).* These Guidelines, however, have not been used consistently across Australia. The Guidelines are also limited to the sharing of community recovery workers, such as generalist workers supporting registrations at recovery centres and outreach teams.[160] The Guidelines do not cover the sharing of other recovery resources, such as specialists and technical experts to support the built, economic and ecological recovery.[161] The Guidelines are also reliant on an exchange of a memoranda of understanding, which can be a lengthy process.[162]

21.111 There are other resource sharing arrangements which deal with specific issues and circumstances. For example, the *Cross-Border Assistance Guidelines 2014* cover arrangements, and the sharing of resources, relating to emergency relief. This includes establishing an evacuation or relief centre in 'neighbouring jurisdictions'.[163] However, the extent to which state and territory governments are aware of, and have used these arrangements, is not clear.

21.112 During the 2019-2020 bushfires, recovery resource sharing also occurred outside of formal arrangements. For example, the ACT Government told us that, given its relative inexperience with disaster-related grants and loans, it engaged the support of the Queensland Rural and Industry Development Authority to provide loan assessment and administration support on a fee for service basis.[164] Similarly, through the informal sharing of expertise from NSW and the Australian Government, Victoria was able to implement changes to its application forms for the $10,000 small business grants, resulting in a significant increase in uptake.[165]

21.113 Work by the Australian, state and territory governments is underway to address gaps in the national recovery capability, which, in turn, would support more effective interstate resource sharing. For example, the Australian, state and territory governments, through CORS, is considering the creation of a Disaster Recovery

Capability Development Strategy. This strategy is intended to mature and grow the national recovery capability so it can sustain long-term recovery efforts after a crisis and support complex recovery across all recovery domains. Similarly, CORS is exploring the development of model arrangements for recovery from a catastrophic crisis. This would support decision-making and advice on recovery resource prioritisation across all recovery domains.[166]

21.114 A number of state and territory governments have developed programs and initiatives to maintain surge recovery workforces within their jurisdictions. For example, Queensland has a well-established 'Ready Reserve' of specially trained public servants providing a human and social recovery workforce surge capacity. Similarly, WA has recently initiated a State Recovery Cadre – a team of nominated individuals, who have expertise in a particular field, and can support local recovery efforts when gaps in capability or capacity are identified.[167]

21.115 **There is scope to build on current arrangements to create more expansive, efficient and effective arrangements for the sharing of recovery resources across the social, built, economic and natural recovery domains.**

Recommendation 21.4 National recovery resource sharing arrangements

Australian, state and territory governments should establish a national mechanism for sharing of trained and qualified recovery personnel and best practice during and following natural disasters.

Recovery exercises and training

Exercises

21.116 Exercising provides an opportunity for recovery entities to practice and fine-tune their recovery arrangements and systems. Exercising can take place in a number of ways, such as discussions or role-playing, and typically revolves around a particular scenario or hazard.[168] The extent and nature of recovery exercising varies across jurisdictions. For example, local councils in SA may undertake exercises for council recovery programs through the Local Government Association's Council Ready Program.[169] WA is in the process of incorporating a recovery component within in their State Emergency Management Exercise Framework to allow it to be exercised as a standalone component.[170] Deficiencies in recovery arrangements are also identified through 'after event' reviews.[171]

21.117 Smaller jurisdictions and local governments may not have the same capacity to develop specialised recovery exercises. For example, the NT Government has suggested that access to exercise packages, templates or materials and exercise writing and planning courses could enhance the development of specialised recovery exercises.[172]

21.118 There is also scope for regular national recovery exercises.[173] The state and territory governments have suggested that CORS could be a useful avenue for conducting national recovery exercises in the future. This subcommittee is conducting a number of foundational projects which would support national recovery exercises, such as

the Recovery Planning for Catastrophic Crisis Project.[174] This work can improve the coordination of recovery exercises and provide useful tools to conduct recovery exercises at the jurisdictional, regional and local level.

Recommendation 21.5 National level recovery exercises

Australian, state and territory governments should work together to develop a program for national level recovery exercises, building on the work currently underway through the Community Outcomes and Recovery Subcommittee of the Australia-New Zealand Emergency Management Committee.

Training

21.119 State and territory governments provide a range of training courses, materials and modules to support locally-led recovery capacities – see Appendix 23: Recovery Arrangements. However, we have also observed an absence of a national approach to building recovery competencies and training pathway for recovery practitioners.[175]

21.120 We heard that this issue was exacerbated by the closure of the Australian Emergency Management Institute (AEMI) in 2014. The AEMI was funded by the Australian Government and delivered education, research and training in national emergency management and disaster resilience. It also facilitated recovery workshops and provided mechanisms to identify gaps and common recovery issues being experienced across jurisdictions. Local governments in particular have noted that the closure of AEMI has been a disservice to the disaster management cohort, especially for skills development.[176]

21.121 **Australian state and territory governments should develop a national approach for recovery competencies and professional pathways for recovery practitioners, including for local governments and non-government organisations.** This should include consideration of national and jurisdictional education, research and training facilities, similar to the former AEMI.



Figure 88: BlazeAid volunteers helping to repair a fence in NSW[177]

Chapter 22 Delivery of recovery services and financial assistance

Summary 455

Recovery support for disaster affected communities 456

Resilience and recovery 456

Recovery support 457

Financial assistance 458

Accessing financial assistance for recovery 461

Delivery of recovery assistance 463

Recovery centre model 463

Self-mobilised community responses 465

Information sharing in recovery 466

Privacy arrangements 466

Emergency declarations and consent 467

Improvements to sharing of personal information 468

Disaster Recovery Funding Arrangements 470

Funding under the DRFA 474

Thresholds and activation of the DRFA 474

Consistency in financial assistance measures 476

Pre-agreed recovery programs 478

Betterment and resilience 481

DRFA process and eligible expenditure 484

Interaction between recovery and insurance 486

Insurance for government assets 486

Summary

22.1 Responsibility for recovery is shared across Australian, state and territory, and local governments and the broader society. The provision of recovery support seeks to restore and improve the lives of individuals and communities by addressing the diverse and varied impacts of a natural disaster. The provision of this support must carefully balance supporting those in need, while ensuring that it does not create disincentives to properly prepare for disasters. To date, the costs of recovering from disasters far outstrips expenditure for natural disaster mitigation, preparation and response. It is for this reason that recovery is increasingly seen as an opportunity to build resilience in our communities – in effect, to 'build back better'.

22.2 Financial assistance is an important means to help individuals in the immediate aftermath of a disaster. However, the 2019-2020 bushfires have demonstrated that we need to improve how this assistance is accessed. Navigating the complex system of recovery support can be traumatising. The assistance measures that are currently provided should be evaluated to ensure they are accessible and cover the range of needs and circumstances that arise following a natural disaster. In addition, delivering recovery support in a more accessible way, adopting case management services, and more effective communication can improve the recovery process.

22.3 The trauma experienced by individuals needing to tell their story multiple times to different recovery assistance providers highlights that personal information needs to be shared more effectively. Information sharing arrangements and platforms should be improved, while also appropriately balancing the need to protect personal information.

22.4 Self-mobilised community responses, providing a sense of purpose and essential relief, have increasingly become part of the recovery system. Ensuring that these responses are established safely and in a coordinated way will enhance recovery processes for future disasters and strengthen resilience of communities.

22.5 The Disaster Recovery Funding Arrangements (DRFA) is the primary mechanism for the Australian Government to provide financial assistance to state and territory governments in response to a disaster. However, state and territory governments should not rely solely on the DRFA to provide recovery support to their communities – they too must have appropriate funding arrangements in place.

22.6 There is scope of Australian, state and territory governments to improve the DRFA. Greater consistency of programs, and the development of pre-agreed programs, will facilitate the provision of more efficient and effective support to individuals, businesses and communities. DRFA processes should be streamlined to better incorporate the principle of 'build back better' to strengthen resilience in communities.

Recovery support for disaster affected communities

22.7 Natural disasters can disrupt communities or exacerbate underlying issues within them. Recovery measures attempt to restore and improve the lives of individuals by addressing the physical, economic, health, social and cultural impacts of a natural disaster. These impacts are often interlinked and tend to be long term and costly to individuals and their communities.[1]

22.8 A common myth of recovery is that disaster affected people cannot look after themselves and need someone to 'make it better'. We heard very clearly that individuals and communities want to be empowered to manage their own recovery through access to practical assistance. Responsibility for recovery is shared between governments, industry, businesses, insurers, non-government organisations, communities and individuals. While these responsibilities may not be equal, collaboration with impacted communities is necessary to provide a range of recovery services.

22.9 Recovery support is intended to assist people in need, to help them 'get back on their feet', not cover the cost of replacing lost assets or income. It is not a substitute for being properly prepared for disasters, particularly by obtaining appropriate insurance. Recovery support should not create a disincentive for appropriate risk management.[2]

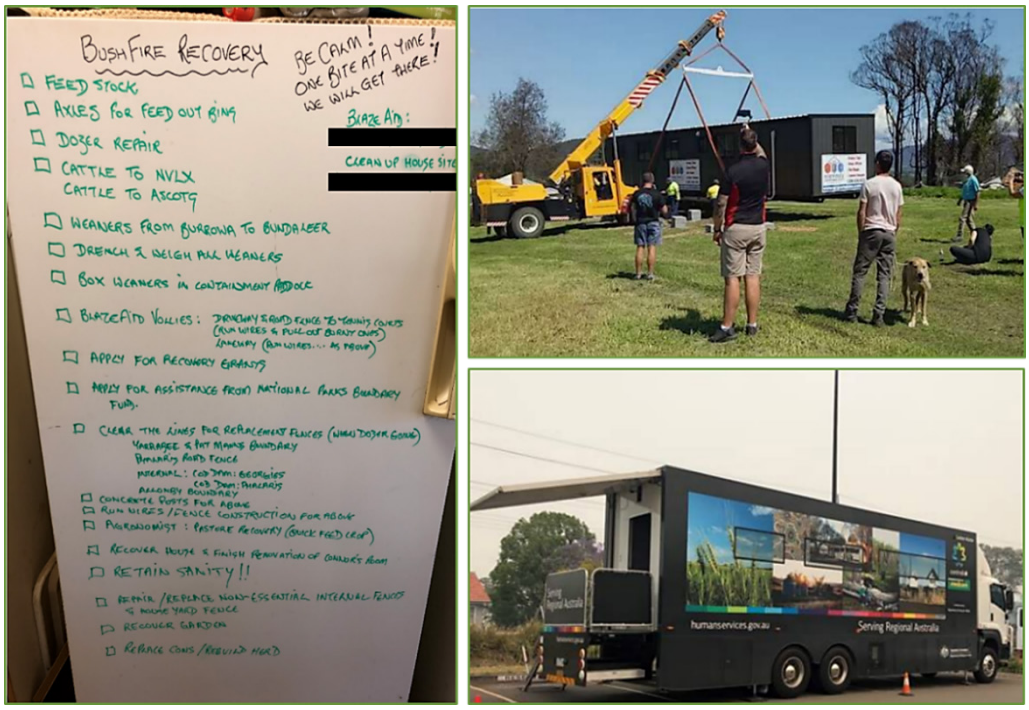


Figure 89: Recovery in action following the 2019-2020 bushfires[3]

Resilience and recovery

22.10 Recovery represents a significant proportion of disaster-related costs for governments and is only expected grow – as result of demographic changes and the increasing frequency and intensity of natural disasters, driven by climate change.[4]

The anticipated collective cost to governments of recovery is forecast to increase to an average of $3.8 billion per year by 2050.[5] This average does not include emergency response costs and does not factor in the consequence of a significant one-off disaster. Funding provided for recovery significantly exceeds funding provided for mitigation. The Productivity Commission found that:

> *Government investment in mitigation is insignificant compared to post-disaster expenditure. For example, Australian Government mitigation spending was only 3 per cent of what it spent post-disaster in recent years. Mitigation expenditure by state governments is likely to be higher, but information on this expenditure is not comprehensive. Overall, the clear impression is one of insufficient investment in mitigation.*[6]

22.11 Greater investment in mitigating the effects of natural disasters and strengthening resilience can reduce the overall cost of recovering from them. This has been recognised in a broader whole-of-society shift to disaster resilience and risk reduction. The National Strategy for Disaster Resilience, developed by the Council of Australian Governments (COAG) in 2011, established a national resilience based approach to disaster management.[7] In 2015, Australia and other members of the United Nations adopted the *Sendai Framework for Disaster Risk Reduction 2015 – 2030,* which emphasised the importance of a 'build back better' approach to recovery.[8] In March 2020, COAG endorsed the National Disaster Risk Reduction Framework, which included a national priority for enhanced investment in disaster risk reduction and resilience to decrease future disaster recovery costs.[9]

22.12 Increasingly, natural disaster recovery has been recognised as an opportunity to build resilience in disaster affected communities[10] – in effect, to 'build back better'. Building back better, to a more resilient standard, will help communities withstand the impacts of future disasters.[11]

22.13 In recognition of this, a number of state and territory governments have developed specific strategies that are focused on resilience. For example, one of the key focal points of Resilient Queensland, the implementation plan of the Queensland Strategy for Disaster Resilience, focuses on seeking new opportunities to reduce risk by improving disaster preparation, response and recovery.[12] Similarly, Victoria has developed the Resilient Recovery Strategy in order to guide its recovery programs and services.[13] Resilience NSW was established in the aftermath of the 2019-2020 bushfires in order to focus investment, strategy and policy around building resilience, across different hazards, for disaster planning, preparation, response and recovery.[14]

Recovery support

22.14 Recovery support to individuals in the early relief stage includes material aid to address basic needs, such as water, food and clothing, emergency and temporary accommodation and shelter. Once the immediate crisis passes, recovery support generally includes financial assistance and specialised services, such as legal assistance, insurance, financial counselling, building advice and primary industry or business assistance. Recovery can include a range of programs and initiatives aimed at addressing impacts across the built, social, economic and natural domains. The coordination of relief and recovery effort is discussed further in Chapter 21:

Coordinating relief and recovery. Observations on typical recovery needs and services are in Appendix 25: Recovery Needs.

22.15 During and after the 2019-2020 bushfires, a monumental level of recovery support was provided to disaster affected communities across Australia. We have conservatively estimated that, to date, over $8 billion has been provided for recovery; this is likely to be an underestimation – see Figure 90. This support was provided by all levels of government, non-government organisations, charities and the private sector, to disaster affected individuals, small businesses and primary producers.

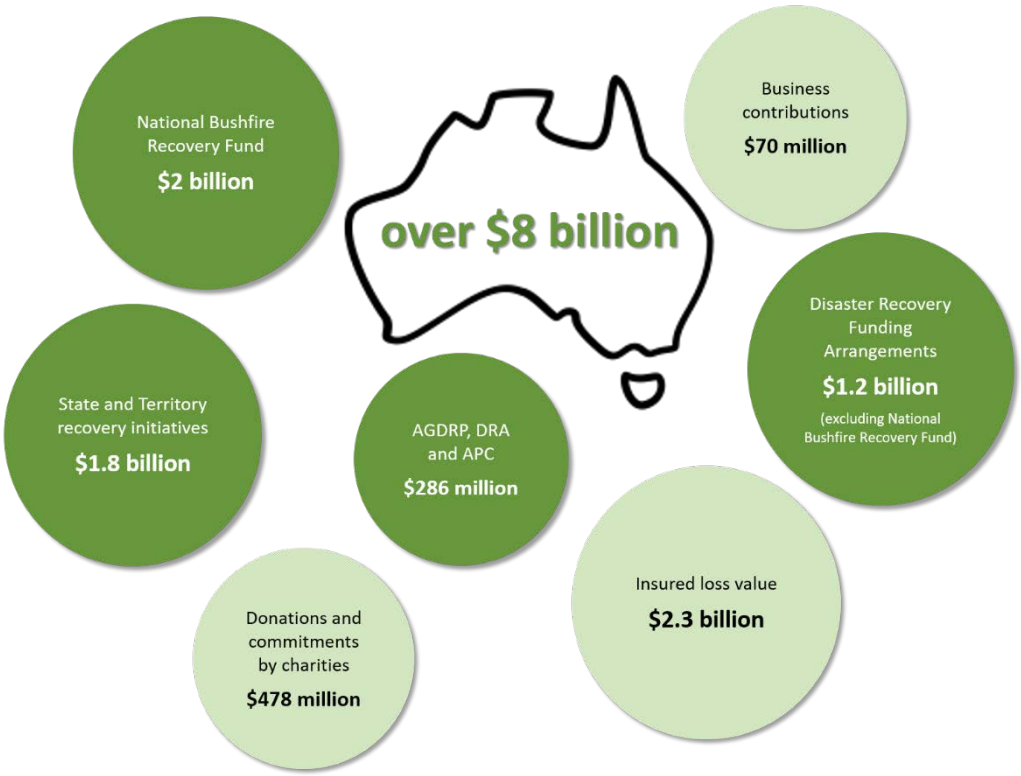


Figure 90: Recovery related expenditure for the 2019-2020 bushfires[15]

Financial assistance

22.16 A wide range of financial assistance measures are available for eligible individuals, small businesses and primary producers to support their recovery following a natural disaster. Financial assistance can take the form of grants, loans, payments, vouchers and in-kind assistance – see Table 11. This assistance is provided to individuals and businesses, by Australian, state and territory governments and charities, such as the Australian Red Cross, St Vincent de Paul and the Salvation Army.

22.17 The Australian Government makes recovery payments directly to individuals affected by a disaster: the Australian Government Disaster Recovery Payment (AGDRP); the Disaster Recovery Allowance (DRA); and related ex-gratia assistance.[16] During the 2019-2020 bushfires, the Australian Government introduced an additional discretionary payment, the Additional Payment for Children, of $400 per eligible dependent child.[17] This was a one-off payment automatically paid to principal carer parents eligible for the AGDRP.[18]

22.18 As at 31 August 2020, a total of $252.3 million (204,596 claims) had been paid under AGDRP, DRA and the ex-gratia equivalents for the 2019-2020 bushfires.[19] Further, as at 17 May 2020, a total of $33.8 million had been provided for the Additional Payment for Children (84,403 payments).[20]

22.19 In addition to the AGDRP and DRA, the Australian Government may make alterations to other support payments. In the past this has included: making advance payments for income support (such as Austudy, Youth Allowance and JobSeeker Payment); altering the eligibility requirements for specific payments (such as creating an exemption to the Child Care Subsidy activity test for a specified period); or changing reporting requirements (such as creating exemptions to mutual obligations and automated reporting applicable to income support payments).[21]

22.20 State and territory governments also provide financial assistance, specific to their jurisdiction. Common forms of assistance include: tax, rate and levy relief, emergency accommodation and other recovery programs – see Appendix 24: Recovery Supports for a list of measures provided during the 2019-2020 bushfires. For instance, the SA Government is providing grants of up to $5,000 to eligible landholders, impacted by the Cudlee Creek bushfire, to help protect and restore natural resource assets, including soil, water, native vegetation and biodiversity.[22]

22.21 Charities such as the Australian Red Cross, St Vincent de Paul Society and the Salvation Army also provide financial assistance to disaster affected individuals[23] – in part through donations from businesses and communities. For example, during the 2019-2020 bushfires, the Salvation Army provided a range of grants, including significant loss grants (a maximum of $3,000 per family unit) and total loss of residence grants (a maximum of $3,500 per household).[24] These grants were partially funded by the Australian Government – which provided funding for cash payments of up to $1,000 on a one-off basis per household, where other forms of assistance were not appropriate.[25] The Australian Red Cross provided emergency grants of up to $20,000 to support a person whose primary place of residence was destroyed.[26]

22.22 The business community, similarly, has supported relief and recovery efforts following the 2019-2020 bushfires. The Business Council of Australia has estimated that businesses donated about $70 million in both funding and in-kind contributions.[27] The support provided by businesses included: the provision of paid leave to staff volunteering for the firefighting efforts, waived or delayed debts, financial donations to charities, pro-bono provision of services (such as legal services, business advisory services, and financial advice), donation of food, water, animal feed and other essential items and financial assistance grants to bushfire-affected individuals and businesses.[28]

Table 11: Non-exhaustive list of financial assistance to individuals, small businesses and primary producers

Assistance	Description	Providers
Concessional loans and interest rate subsidies	Low interest loans for small businesses and primary producers.	• Australian, state and territory governments (DRFA) • Financial institutions and businesses
Hardship payments	Grant to address the immediate needs (eg food, clothing, emergency accommodation or medical supplies) of individuals and families who are unable to support/fund their own relief and recovery.	• Australian, state and territory governments (DRFA) • Charities • Financial institutions and businesses
Financial credit	Fast-tracked credit approvals to provide short-term assistance.	• Financial institutions and businesses
Re-establishment grants	Grant for urgent repairs necessary to reinstate the home to a habitable condition for occupation; repair or replace essential household items that have been destroyed or damaged as a result of the emergency.	• Australian, state and territory governments (DRFA) • Charities
Essential services hardship	Grant to address hardship as result of a loss of essential services.	• Australian, state and territory governments (DRFA)
Recovery grants	Fixed amount grants to support recovery in line with a specific program. For example, grants to support clean-up following a disaster, recovery of the natural environment or supporting the recovery of a local industry.	• Australian, state and territory governments (DRFA) • States and territories • Charities • Financial institutions and businesses
Recovery vouchers	Vouchers which could: be exchanged for goods or services (for example, fuel vouchers and gift cards) or provide a discount for the purchase of a particular good or service.	• Financial institutions and businesses
Australian Government Disaster Recovery Payment (AGDRP)	One-off, non-means tested payment of $1,000 for eligible adults and $400 for eligible children who have been adversely affected by a major disaster.	• Australian Government
Disaster Recovery Allowance (DRA)	Short-term income support payment (up to 13 weeks) to assist individuals who can show that their income has been adversely affected by a major disaster.	• Australian Government

Accessing financial assistance for recovery

22.23 Australian, state and territory governments tailored recovery assistance programs in response to the needs of affected communities. For example, in response to low take up of the $10,000 small business grants in Victoria, Bushfire Recovery Victoria, with the support of NSW and the National Bushfire Recovery Agency (NBRA), made changes to its application forms to make them easier to access. The NBRA also promoted grants directly to around 8,000 businesses in eligible areas by email to ABN holders in those areas. These actions saw an immediate and significant increase in applications for recovery support.[29]

22.24 However, there were a number of barriers to affected individuals, small businesses and primary producers seeking available financial support, including:[30]

- repeating information to multiple agencies – individuals may need to repeat basic information to multiple organisations in order to obtain financial assistance, which can be traumatising and tiring

> This is ridiculous. You know, your house is burning down, the last thing you think about grabbing is a utilities bill.[31]

- engagement fatigue – navigating the various support programs can be confusing, overwhelming and impact the mental health of applicants at a time of particular vulnerability
- eligibility assumptions – individuals might self-assess that they may not be eligible for available supports, so do not attempt to access them, and
- documentary requirements – the application processes for some forms of support can be burdensome and, immediately post-disaster, many applicants are often not in a position to meet the information or evidentiary requirements of assistance.

22.25 Further, there may be overlap between the various forms of financial assistance that are available to individuals. Similar financial assistance programs, provided by governments and charities, differ in the level of support provided and their eligibility and documentary requirements – see Table 12 for a snapshot of some of the financial assistance measures provided to individuals. There may be an opportunity to consolidate financial assistance provided to individuals (which would reduce the need for multiple applications, and provide greater clarity and certainty to those seeking assistance).

Table 12: Examples of some of the financial assistance measures available to individuals

	Assistance provided	Evidentiary requirements
Australian Government Disaster Recovery Payment (AGDRP)[32]	**$1000 per adult and $400 per child** - one off, non-means tested payment for eligible individuals who have been adversely affected as a result of a major disaster.	An application form must be completed and includes proof of identification. Applications can be initially submitted without identification documents but must be provided within 28 days. Some claims require supporting documents to be provided, such as proof of hospital admission or evidence of damage to principal place of residence.
Emergency relief assistance in Northern Territory (DRFA)[33]	**$507 per adult, $256 per child and up to $1,276 per family** - assistance to meet basic needs in the first few days after a disaster.	A hard copy application is completed and a statutory declaration is included in the application to confirm information is true and correct. Territory Families can verify details through other government agencies. Photo identification (such as passport, drivers licence) or combination of non-photo identification is required.
Total Loss Grant (The Salvation Army)[34]	**$3,500 per household** - to provide assistance to individuals and families in bushfire-impacted areas whose primary place of residence has been destroyed or rendered permanently uninhabitable.	At least one of the following must be provided: • building impact assessment • referral from state or territory staff • receipt of the AGDRP • local government confirmation of loss or level of damage • loss verified by combat agency or outreach worker • claims assessment from an insurer • letter from employee, or • identification with primary address of the disaster affected residence.

22.26 A number of state and territory governments have raised concerns about the effectiveness of existing financial assistance, such as concessional loans; noting their low uptake following a disaster.[35] However, there have been limited evaluations to examine the effectiveness of different types of financial assistance measures. Evaluations are important in understanding whether recovery support provided to individuals, small businesses and primary producers is reaching the right people and is achieving its objectives. Several local government associations have suggested that any evaluations into the effectiveness of financial assistance measures should involve local government.[36]

22.27 There is scope to improve the availability of assistance, to cover relative differences in need and level of impact, including indirect impacts. The Australian Government and most state and territory governments have agreed[37] that there is merit in developing a broad spectrum of financial assistance to support the recovery of

disaster affected communities.[38] Ms Jennifer Westacott AO, Chief Executive Officer of the Business Council of Australia, told us, in particular, that there is value in early financial payments to deal with the disruption of income that follows a natural disaster.[39]

22.28 We agree that establishing a broad set of recovery assistance measures that are tied to the level of impact will ensure governments can quickly deploy assistance as the effect of a natural disaster becomes known. It would also promote consistency in the treatment of affected individuals and businesses and provide greater certainty to communities by avoiding changes in recovery policies and changes in eligibility months after the disaster (and in some cases after the worst of the economic damage had been suffered).

> …I talked to the friends of ours that run this business up the road and their first two weeks of January trade is normally [$60,000 to $70,000] and they had $6,000… and then it was like 'Oh well, you know, you weren't impacted because you weren't burnt'. But people couldn't get here and that was why they were impacted as much…[40]

22.29 **Consideration should be given to understanding recovery needs that are common to natural disasters and developing a broad suite of pre-determined forms of assistance for individuals, small businesses and primary producers. This could include developing financial assistance models that scale according to the severity of impact on individuals to help address a broad range of needs and circumstances. There is also merit in regularly reviewing these measure to ensure they are effective.**

Recommendation 22.1 Evaluation of financial assistance measures to support recovery

Australian, state and territory and local governments should evaluate the effectiveness of existing financial assistance measures to inform the development of a suite of pre-effective pre-determined recovery supports.

Delivery of recovery assistance

Recovery centre model

22.30 One of the most common methods to deliver streamlined recovery support following a natural disaster is through a recovery centre. A recovery centre is intended to be a single point of entry for disaster-affected individuals in which services and assistance from a range of recovery entities is provided – a 'one stop shop'.[41] The responsibility for establishing recovery centres varies between jurisdictions, with responsibility resting with either local governments or specific state and territory agencies.[42]

22.31 The 2019-2020 bushfires highlighted a number of limitations to the establishment of recovery centres and the provision and access of services from recovery centres. In particular, physical limitations and barriers, such as road closures, meant that some locations were inaccessible and recovery services were limited or slow to arrive.[43]

22.32 A lack of space in recovery centres also limited the delivery of services. For example, the Salvation Army advised that they were unable to deliver emergency relief and financial counselling services at Parndana recovery centre (Kangaroo Island, SA), due to insufficient space when the recovery centre was established.[44]

22.33 While a recovery centre is intended to be a 'one stop shop', in effect it can be a single location where many unintegrated recovery agencies are present, with little coordination between them.[45] This was evident during the 2019-2020 bushfires, where there was limited sharing of information, even between agencies present in the same recovery centres (see Information sharing in recovery below). In addition, we heard from the community that information sharing issues occurred due to a lack of sufficient handover processes and procedures when staff rotated through a recovery centre.[46]

22.34 The recovery centre model assumes that those who need assistance will come and seek it. However, this could exclude large groups of disaster affected individuals. Following a disaster, individuals may be reluctant or unable to travel to the location in which a recovery centre has been established.[47] This could be for a range of reasons: the impact of trauma, a lack of financial resources to travel or pay for fuel, loss of vehicles and telecommunications, and social isolation.[48] Registering for call-back (where a person provides their details to receive a call from a recovery worker at a later time), may also face some of these limitations.[49]

22.35 Some governments conduct outreach to complement the delivery of services at recovery centres. For example, in NSW a number of local councils created mobile recovery centres which provided access to recovery services, normally available in fixed recovery centres, to isolated communities.[50] Similarly, Services Australia and Service NSW deployed Mobile Service Centres to bushfire-affected communities, providing access to financial support.[51] We heard that there is support for the expanded use of mobile recovery centres for future disasters.[52]

22.36 While the support offered by both fixed and mobile recovery centres was acknowledged, we also heard concerns relating to their operating hours. Services Australia's Mobile Service Centres, for example, typically operated between 10am to 3pm, seven days per week,[53] making it difficult for some individuals to access recovery services while they also addressed other immediate recovery and personal needs.[54]

22.37 **The accessibility of recovery centres could be improved by expanding the use of mobile recovery centres and flexible or extended operating hours.**

22.38 We heard even greater concern about the challenges in accessing information about the extent of services and assistance that were available,[55] which can compound the effect of existing vulnerabilities. For example, recovery related information was often available through digital and online platforms, which may not be appropriate for groups with lower digital literacy skills, and may not reach, or be accessible to, those who do not have power or communications due to disaster-related disruptions.[56]

22.39 During the 2019-2020 bushfires, state and territory governments attempted to improve the communication and experience of accessing recovery support. For example, a number of state and territory governments adopted case management

services (where individuals were provided with a single contact for advice and assistance, regular contact, follow up on enquiries, and given referrals and advocacy support)[57] and a single point of contact for some recovery services, such as the assistance measures that were provided by Service NSW.[58]

22.40 We heard from the Australian Red Cross and St Vincent de Paul Society that adopting a 'one front door' and case management system for recovery assistance should occur earlier in the recovery process. This would allow an individual to connect with a single recovery entity to access direct relief assistance and avoid multiple assessment processes;[59] but this requires the sharing of data in order to be effective – see Information sharing in recovery below.

22.41 **The early adoption of case management services and direct communication of available recovery support can improve experiences in accessing recovery support.**

Self-mobilised community responses

22.42 During the 2019-2020 bushfires, we observed self-mobilised community responses which were not connected with state and territory or local government arrangements.[60] These responses, such as establishing community relief centres, provided affected communities with a sense of purpose, essential relief and provided governments and non-government organisations with valuable local knowledge and community insight.[61]

22.43 Self-mobilised community responses were also established before formal government services arrived within the community. For example, we heard that a community-initiated recovery centre was established in Lobethal, SA following the 2019-2020 bushfires. This informal recovery centre was established immediately after the threat of the fires passed. Due to the isolation the community had experienced, many were fearful of travelling 26 kilometres to the nearest regional centre in order to obtain recovery assistance. As such, the informal recovery centre fulfilled the community's needs and operated for 16 days before a formal recovery centre was fully established within the community.[62]

22.44 Self-mobilised responses reflect the importance of community-led recovery, as identified in the National Principles for Disaster Recovery. However, at times there were tensions between self-mobilised community responses and formal recovery centres established by local or state and territory governments. These tensions centred on whether these community responses were necessary once a formal recovery centre was established.[63] Certain attitudes within some parts of the emergency management sector may contribute to these tensions. These attitudes may include an overconfidence in standing operating procedures and perceptions that ad hoc responses are counterproductive following a disaster.[64]

22.45 However, the emergency management sector must ensure the safety of the community. Communities may not be aware of health and safety requirements or have relevant training, such as how to deliver services in a trauma informed way.[65] Therefore, it can be difficult for the emergency management sector to support the establishment of community relief centres where they are not confident that services are being delivered safely. We heard that self-mobilised community responses could be supported through the provision of guidance material.[66]

22.46 Integrating community responses in formal recovery processes can leverage existing community effort and goodwill.

22.47 **State and territory governments and local governments should consider how to best to integrate self-mobilised community responses in formal recovery arrangements. This could include easy to understand and accessible guidance on establishing a self-mobilised community response.**



Figure 91: Cobargo Community Relief Centre in NSW[67]

Information sharing in recovery

22.48 We heard from affected community members of their frustration and the trauma of repeatedly recounting their experience to access assistance.[69] Individuals seeking assistance were often re-traumatised and fatigued by providing the same information to multiple relief and recovery organisations to obtain help.[70]

> …I was passed around from organisation to organisation. I had to spend days waiting in line to fill out forms, explain my situation to lots of different people and then wait wait wait to be told no.[68]

22.49 This frustration appears to stem from the inability, or perceived inability, of different levels of government, organisations, and non-government organisations to share information with each other. We heard that the lack of information sharing significantly impacted the ability to plan recovery activities for communities,[71] has hindered 'certainty of assistance' in recovery,[72] and delayed support to some community members.[73] We have identified a number of reasons why information was not shared: privacy obligations; a lack of awareness that information could be shared in certain circumstances; internal processes to verify information; and an absence of an effective information sharing system.

Privacy arrangements

22.50 In providing assistance, recovery agencies and organisations generally seek personal information and advice on disaster impacts, such as damage suffered. This information is typically sought to ensure that the appropriate level of assistance is

provided, that the person is entitled to that assistance, and to mitigate against fraudulent claims – in essence, to ensure that the right help gets to the right people.

22.51 The Australian Government, and most state and territory governments, have legislation regulating the collection, use and disclosure of personal information. Use of personal information is generally limited to the purpose for which it was collected or for a purpose that is reasonably incidental to the original purpose. This becomes relevant in the recovery context when organisations collect personal information to assess eligibility for the recovery services they provide. However, because of privacy obligations, organisations are not able to provide the collected personal information to another recovery organisation, even if the personal information allows the second organisation to assess eligibility for their services.

22.52 The legislation governing privacy considerations are not uniform across Australia,[74] and some state and territory privacy legislation restricts cross-border information disclosure.[75] It can be difficult for organisations to understand whether the disclosure of personal information in certain circumstances is permitted under one or more relevant privacy frameworks.

22.53 Charities, government and the private sector told us that the legal requirements regarding privacy acted as a barrier in the sharing of personal information.[76] The NBRA indicated that the interplay between privacy legislation at state and federal level, constitutions of different agencies and operating governance arrangements can also be barriers to information sharing.[77]

22.54 Some organisations and agencies err on the side of caution in relation to privacy obligations, even though legislation may not actually inhibit their ability to share information.[78] We also heard of a lack of awareness of mechanisms that afforded greater flexibility in information sharing, such as a declaration made under the *Privacy Act 1988* (Cth) (Commonwealth Privacy Act).

Emergency declarations and consent

Australian Government emergency privacy declaration

22.55 On 20 January 2020, the Attorney-General, the Hon Christian Porter MP, made an emergency privacy declaration under the Commonwealth Privacy Act in relation to the 2019-2020 bushfire season. The declaration was intended to allow the faster sharing of information about bushfire-affected individuals who needed immediate support.[79] We note that, except for the NT, state and territory governments do not have an emergency declaration framework under their respective privacy legislation.[80]

22.56 The declaration permits Australian Government agencies and private sector organisations subject to the Commonwealth Privacy Act to collect, use or disclose personal information that they might not otherwise be able to do for purposes related to the emergency or disaster.[81] This includes, for example, assisting impacted individuals to obtain services such as medical treatment, health services, financial assistance or other humanitarian services. The declaration was credited with allowing greater information sharing between some parties, in particular, it allowed Services Australia to share information with the Australian Red Cross.[82] It also

allowed officers of the NBRA to 'speak a little more comfortably when talking to their state partners about individual cases.'[83]

22.57 The emergency privacy declaration allows Australian Government agencies and private sector organisations, subject to the Commonwealth Privacy Act, to disclose information about affected individuals without their consent. However, this can only occur if the requirements in section 80P of the Commonwealth Privacy Act are complied with. These requirements include: that the agency or organisation reasonably believes that the individual may be involved in the emergency or disaster; the disclosure is for a permitted purpose; and the disclosure is to a relevant entity or agency.[84]

22.58 The emergency privacy declaration does not, however, facilitate personal information sharing between state and territory agencies, or allow state and territory governments to share personal information with Australian Government agencies.[85] While efforts were made to publicise the emergency privacy declaration,[86] we heard that general awareness of it was limited.[87] The last privacy declaration prior to the 2019-2020 bushfires was in 2011, and the Attorney-General's Department has said that, in 2020, most stakeholders initially had a limited understanding of the purpose or utility of the declaration.[88]

Consent-based approaches to sharing information

22.59 The NBRA advocated for a 'no wrong door' and 'one-stop-shop' approach to recovery.[89] Given full effect, this would allow an individual to access all relevant assistance regardless of the agency they approach, and would only need to tell their story once.[90] These approaches require processes to enable the exchange of personal information between recovery service providers.

22.60 Some states have adopted a consent-based approach to the sharing of information to streamline recovery support. For example, NSW agencies sought consent from individuals to allow Service NSW to share personal information it collected with a select number of charities to facilitate the provision of recovery services following the bushfires.[91]

22.61 A potential limitation of consent-based approaches is that they are only effective where consent is in fact given. This would, for example, make it difficult to use information for the purpose of proactively offering support to people. Consent must cover all the agencies and organisations with which the information is to be shared (or be otherwise able to be shared in accordance with the relevant privacy arrangements).

Improvements to sharing of personal information

22.62 Greater information sharing would improve the provision of recovery assistance and services. This would assist individuals in applying for government financial assistance,[92] enable proactive contact of affected individuals,[93] improve local government recovery support delivery,[94] and support the verification of claims for support.[95] Sharing personal information between insurers, state and territory government agencies and non-government organisations may also be beneficial, given that insurers have information relevant to recovery needs from their

engagement with their customers. However, while there are benefits from greater information sharing in the recovery process, these must be balanced with the need, and obligation, to protect sensitive personal information appropriately.

22.63 The ability for recovery support organisations to facilitate a 'no wrong door' approach through the appropriate sharing of personal information will depend on the legislative provisions for consent and the circumstances in which, and the extent to which, information can be shared.

22.64 Better sharing of information would also benefit from technical solutions that facilitate this. State governments and non-government organisations have identified the need for an information sharing platform.[96]

22.65 The NBRA considers there to be 'merit in exploring, together with States, Territories and trusted charities, the potential of national technology and mechanisms to assist to shift the burden from individuals having to chase support, to a national bureaucracy coordinating and proactively delivering support'.[97] The challenges in developing and delivering technical solutions spanning across governments and the non-government sector are great[98] – successive reviews in unrelated contexts draw out the technical, legal, financial and practical challenges in information sharing platforms – but, having regard to the trauma caused, merit consideration. The NBRA indicated that it is proactively taking steps towards this goal.

22.66 There are also other innovative solutions being explored. Services Australia has suggested that there may be opportunity to 'harness real time geospatial mapping to assist streamlining claims and determine eligibility around the proximity of an applicant's principal place of residence to areas burnt by bushfires'.[99] The Digital Transformation Agency's 'NationalMap', which allows public access to geospatial datasets uploaded by public and private sectors,[100] could be part of that solution.

22.67 In addition, the Digital Transformation Agency, in partnership with the WA, SA, Queensland, Victorian and NSW governments, will map and analyse the end-to-end experience of a person interacting with governments during a natural disaster, including the individual steps a person needs to take to access services, and identify problem areas and gaps in data sharing.[101]

22.68 **Technical solutions for information sharing to improve delivery of recovery should be explored by all levels of government, business, charities and others providing recovery assistance.**

Recommendation 22.2 Appropriate sharing of personal information

Australian, state and territory governments should ensure that personal information of individuals affected by a natural disaster is able to be appropriately shared between all levels of government, agencies, insurers, charities and organisations delivering recovery services, taking account of all necessary safeguards to ensure the sharing is only for recovery purposes.

Disaster Recovery Funding Arrangements

22.69 The Disaster Recovery Funding Arrangements (DRFA) is the primary national funding arrangement which supports recovery efforts following a disaster – replacing the Natural Disaster Relief and Recovery Arrangements (NDRRA). The DRFA is a joint agreement between Australian, state and territory governments to alleviate the financial cost of disasters and facilitate the early provision of assistance to disaster affected communities.[102] The DRFA is a funding mechanism; it is not a framework for recovery and resilience.[103]

22.70 The existence of the DRFA recognises that these events can result in significant costs which can overwhelm the financial capacity of state and territory governments. The DRFA acts as a safety net for state and territory governments. It is premised on providing support when the impacts of a natural disaster are likely to test or exceed the ability of state and territory governments to respond directly themselves.

22.71 The DRFA specifies four categories of assistance – Categories A, B, C and D – see Table 13. The Australian Government provides partial reimbursement for assistance measures, provided by state and territory governments, which fall within these categories.[104] State and territory governments determine which affected individuals and communities receive assistance and the nature of the assistance available. They are also responsible for the delivery of DRFA measures, although this could occur through a third party, including local government.

22.72 State and territory governments are not, of course, limited to funding assistance provided under the DRFA. They can provide whatever assistance they deem appropriate to support the recovery of disaster affected communities.[105] However, only measures identified in the DRFA are able to be reimbursed by the Australian Government.

22.73 In general, Australian Government funding under the DRFA is provided on a reimbursement basis. This means that state and territory governments must first incur the costs of recovery and then submit a claim to the Australian Government for reimbursement. In exceptional circumstances, the Australian Government may provide pre-payments (or advance payments) for specific recovery activities or measures. During the 2019-2020 bushfires, the Australian Government provided advance payments to NSW, Queensland, SA and Victoria totalling over $75 million.[106]

22.74 State and territory governments have approximately 24 months to submit a claim for most assistance measures (an exception is that they must submit a cost estimation for the reconstruction of essential public assets within 12 months). State and territory governments must have a claim audited before it can be submitted to the Australian Government.

Table 13: Assistance measures under the DRFA[107]

Categories	Description
Category A (Clause 4.2)	Assistance to individuals to alleviate personal hardship or distress arising as a direct result of a disaster, such as emergency food and essential housing repairs.
Category B (Clause 4.3)	Assistance to the state, territory, and/or local governments for the restoration of essential public assets and certain counter-disaster operations. It also includes concessional loans, subsidies or grants to small businesses, primary producers, non-profit organisations and needy individuals.
Category C (Clause 4.4)	Assistance for severely affected communities, regions or sectors, and includes clean-up and recovery grants for small businesses and primary producers and/or the establishment of a Community Recovery Fund. Category C assistance is only made available when the impact of a disaster is severe. Requires the Prime Minister's approval.
Category D (Clause 4.5)	Exceptional circumstances assistance beyond Categories A, B and C. Category D assistance is generally considered once the impact of the disaster has been assessed and specific recovery gaps identified. Requires the Prime Minister's approval.

22.75 The DRFA also enables assistance at the local government level. State and territory governments have arrangements in place with local governments, which largely mirror the DRFA – see Appendix 23 – Recovery Arrangements. For example, the South Australian Local Government Disaster Recovery Assistance Arrangements assist local governments with a range of costs, including counter-disaster operations (such as sandbagging and bushfire control lines) and the reconstruction of essential public assets.[108] These jurisdictional arrangements outline eligible costs for local governments which can be reimbursed by the state or territory, and ultimately, through the DRFA.

22.76 Further information on the recovery supports provided by each state and territory government during the 2019-2020 bushfires, under the DRFA, is at Appendix 24: Recovery Supports.

22.77 The DRFA provides financial assistance to state and territory governments for eligible disasters, which is natural disaster or terrorist act for which: a coordinated multi-agency response was required; and eligible state or territory expenditure exceeds, or is expected to exceed, $240,000 per event (the 'small disaster criterion').

22.78 The DRFA is automatically triggered for Category A and Category B assistance once eligible state or territory expenditure exceeds the small disaster criterion – Australian Government action or approval is not required.[109] When this occurs, the state and territory government notifies Emergency Management Australia and a joint media release is issued announcing the particular assistance that has been made available.[110]

22.79 The level of Australian Government funding provided under the DRFA, for Category A and B, is dependent on state and territory expenditure exceeding specified financial year thresholds.[111] The first threshold for a state or territory is 0.225 per cent of its general government sector revenue and the second threshold is 1.75 times the first threshold.

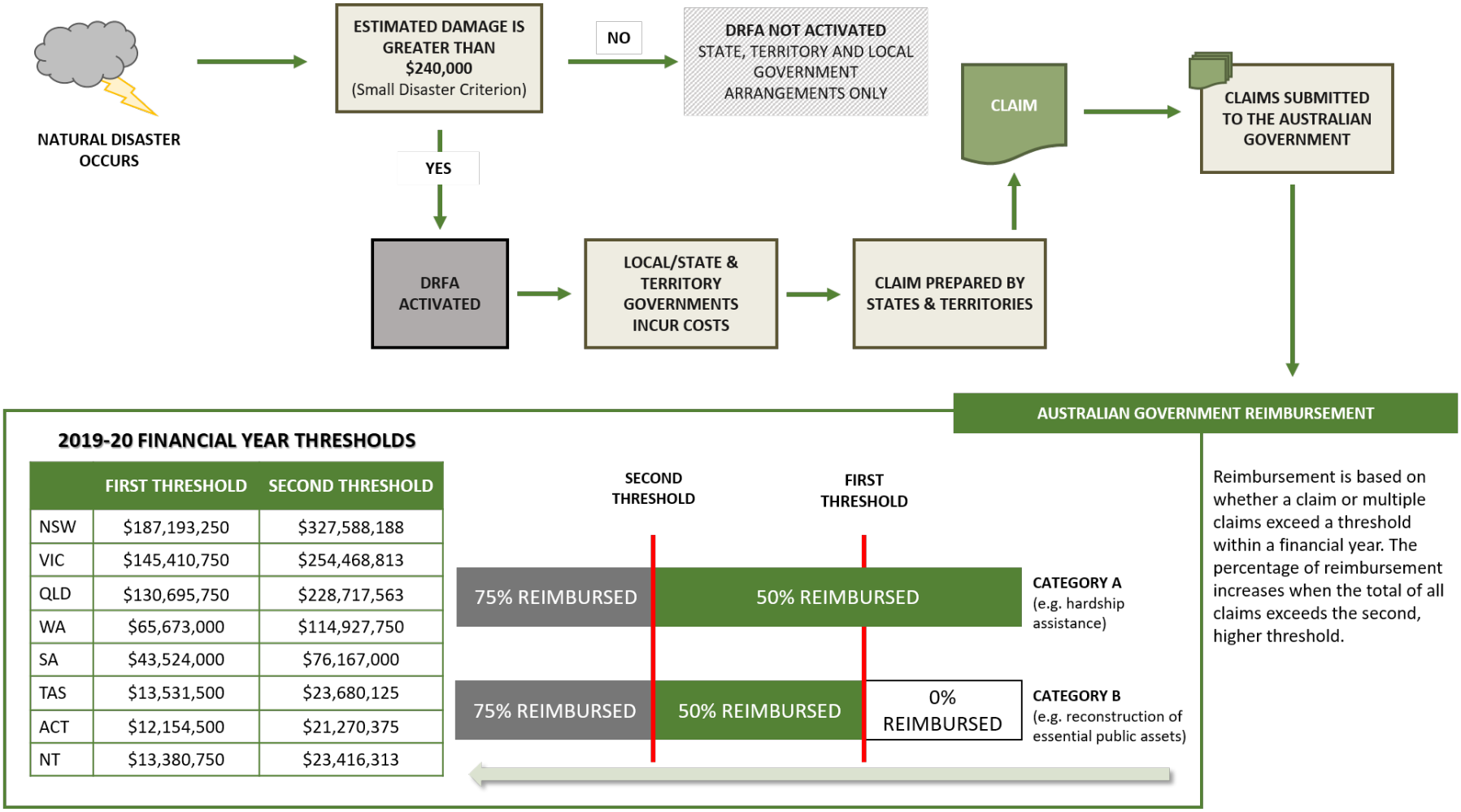
22.80 These thresholds reflect the fact that the DRFA is intended to be a safety net for state and territory governments; supporting them when the impacts of a disaster can overwhelm their capacity. Figure 93 provides a simplified overview of the DRFA process and the interaction of the small disaster criterion and financial thresholds.

22.81 Financial assistance under Categories C and D of the DRFA requires an application by state and territory governments and the approval of the Prime Minister.[112] The rate of Australian Government reimbursement for Category C is 50 per cent of costs and is not dependent on financial thresholds. Reimbursement for Category D is typically 50 per cent of the costs of those measures but is ultimately at the discretion of the Australian Government.

22.82 In March 2020, the Council of Australian Governments agreed to review the DRFA.[113] Subsequently, in June 2020, emergency ministers across Australia agreed the scope of the review would focus on exploring opportunities to streamline processes, ensure consistency in the assistance available to communities, develop pre-agreed recovery programs and better incorporate betterment and resilience.[114]



Figure 92: Hailstorm damage in Canberra, January 2020[115]



	FIRST THRESHOLD	SECOND THRESHOLD
NSW	$187,193,250	$327,588,188
VIC	$145,410,750	$254,468,813
QLD	$130,695,750	$228,717,563
WA	$65,673,000	$114,927,750
SA	$43,524,000	$76,167,000
TAS	$13,531,500	$23,680,125
ACT	$12,154,500	$21,270,375
NT	$13,380,750	$23,416,313

Figure 93: Reimbursement under the Disaster Recovery Funding Arrangements[116]

Funding under the DRFA

22.83 Since 2014-15, the DRFA (and its predecessor, the NDRRA) has been used to provide financial assistance for recovery for over 250 natural disaster events. Over this period, state and territory governments have identified approximately $5.6 billion in eligible expenditure for which they are seeking partial reimbursement under these arrangements[117] – see Figure 94. This amount is expected to grow significantly as a result of the 2019-2020 bushfires. Initial estimates, submitted by state and territory governments in May 2020, contain bushfire-related expenditure totalling $2.6 billion.[118]

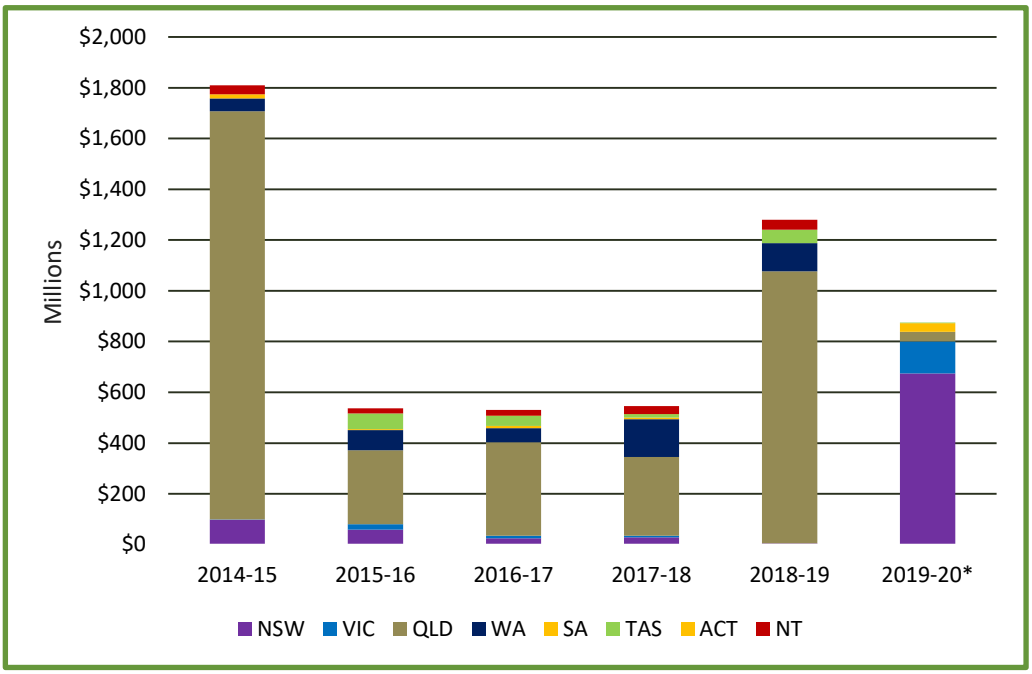


Figure 94: Comparison of eligible state and territory expenditure under the NDRRA and DRFA.[119]

Thresholds and activation of the DRFA

22.84 In the context of the 2019-2020 bushfires, we heard that small communities were unable to access recovery assistance as they did not reach the $240,000 threshold (in physical damage) for assistance. For example, the Norseman Bushfire Complex burnt approximately 546,000 hectares in the Goldfields-Esperance region of WA, affecting the Shires of Dundas[120] and Coolgardie.[121] We heard that this was, at least in part, because impact assessments do not capture less tangible impacts, such as the effect of the closure of the Eyre Highway[122] – which links WA to the eastern states.

22.85 However, in instances such as these, we consider that state and territory governments should have recovery arrangements in place to allow for the provision of financial assistance to affected local governments. State and territory governments should not solely rely upon the DRFA as a means of providing financial assistance to support the recovery of disaster affected communities.

22.86 We heard that the 'small disaster criterion' has a disproportionate impact on the less populous state and territory governments. The loss or damage of eligible assets in these areas is likely to have a relatively greater impact than the loss of the same assets in more populous jurisdictions.

> …we only got to $105,000. Now, keeping in mind $240,000 is 10 per cent of my revenue that [the Shire raises] in every year. So - and that for us that is significant.[123]

22.87 If the 'small disaster criterion' is not reached, smaller local, state and territory governments would need to absorb a higher percentage of recovery costs when compared to larger jurisdictions.[124] Further, the 'small disaster criterion' is based on single events and does not take into account the cumulative financial impact of responding and recovering from small scale but frequent or cascading disasters.[125]

22.88 However, Victoria and WA consider that the 'small disaster criterion is set at an appropriate level'. Victoria argued that lowering the criterion could result in assistance being provided for small scale incidents and may act as a disincentive for personal risk management. WA suggested that there may be merit in reviewing the types of impact which should contribute to the small disaster criterion.

22.89 We heard other concerns about the DRFA financial thresholds. SA has noted that the first threshold (0.225 per cent of total government sector revenue) is a high barrier.[126] The Local Government Association of Queensland has recommended the financial thresholds should be reduced,[127] and Emergency Management Australia considers that financial thresholds merit review.[128]

22.90 We note that some state and territory governments have developed recovery arrangements that cover natural disasters in circumstances where the DRFA does not provide cover. For example, in Queensland, the State Disaster Relief Arrangements provides for a broader range of disaster events than the DRFA.[129] Similarly, the Victorian Natural Disaster Financial Assistance scheme does similar assistance measures to the DRFA for disaster events in excess of $100,000.[130]

22.91 **There should not be an expectation that the DRFA will apply to all natural disasters or cover all loss and damage from these disasters. While the DRFA is a safety net for state and territory governments, it should not take away from the responsibility of state and territory governments to provide recovery assistance to their disaster affected communities.**

22.92 **Recognising that the DRFA is intended to be a safety net, state and territory governments should have recovery arrangements in place which provide financial assistance in circumstances when the DRFA does not apply**.

Recommendation 22.3 Review the thresholds and activation process for the Disaster Recovery Funding Arrangements

In reviewing the Disaster Recovery Funding Arrangements, Australian, state and territory governments should examine the small disaster criterion, and financial thresholds generally.

Consistency in financial assistance measures

22.93 Categories A and B of the DRFA provide a range of financial assistance measures for individuals, small businesses and primary producers. These are measures that state and territory governments can provide and which the Australian Government is willing to partially reimburse. State and territory governments have the flexibility to set the type and amount of assistance provided. As a consequence, the level of assistance provided varies between jurisdictions[131] – see Table 14 for an overview of Category A assistance provided by state and territory governments. The variation in the type and level of assistance can raise issues of equity across geographical areas,[132] which can be particularly acute for those living in border communities.

> *[in Towong] we have a number of properties that span the NSW and Victorian border… in many cases they had a NSW address rendering them incapable or they were simply told they were unable to apply for the Victorian grant…*[133]

22.94 In addition, changes to the level of assistance provided between natural disaster events can result in inconsistencies in treatment over time.

22.95 Some state and territory governments did not have the administrative processes and guidelines to provide some forms of assistance. For example, the ACT, due to its limited experience with natural disasters, did not have systems in place, prior to the 2019-2020 bushfires, to provide recovery grants and loans.[134] The inconsistency in financial assistance measures across jurisdictions was one of the reasons why Australian, state and territory governments worked together, during the 2019-2020 bushfires, to create nationally consistent loans and grants for small businesses and primary producers[135]



Figure 95: Damaged road in Queensland as a result of ex-Cyclone Debbie in 2017[136]

Table 14: Snapshot of standard Category A assistance provided by state and territory governments

	Emergency assistance	Re-establishment
NSW[137]	Immediate assistance, including food, clothing, personal items and emergency accommodation. Typically provided as in-kind assistance.	Assistance may be in-kind or in the form of a cash grant depending on the approved applicant's circumstances.

	Emergency assistance	Re-establishment
VIC[138]	**Individual:** $560 (adult) / $280 (child) **Max:** $1,960 **Emergency relief assistance** - to meet the immediate needs of families/individuals for emergency food, water, clothing, medication, transport or alternative accommodation.	**Household:** $42,250 **Re-establishment assistance** - assistance is provided where an individual's principal place is rendered uninhabitable or inaccessible for more than seven days. The home must be uninsured and expenses or losses not covered by compensation or other forms of assistance such as charitable donations. Assistance is means tested.
QLD[139]	**Individuals:** $180 **Families:** up to $900 (family of five) **Emergency Hardship Assistance** - a grant to address immediate needs. Applicants are required to complete an application form, certifying they are suffering hardship and provide proof of identity and residency.	**Single adult:** $10,995 **Families/couples:** $14,685 **Structural Assistance Grant** – assistance applies to owner-occupied home, that are not insured for the damage caused by the disaster, and where the income test criteria is met.
WA[140]	**Individual:** $200 **Family:** $800 Emergency assistance grant and in-kind assistance for temporary living arrangements. This assistance helps support people who have been evacuated or are stranded to meet their immediate and basic needs.	**Household:** $10,000 **Caravans:** $5,000 Assistance applies to owner-occupied homes and is means tested.
SA[141]	**Individual:** $280 (adult) / $140 (child) **Max:** $700 **Personal Hardship Grants** - provided to people who have had to evacuate their homes and for those who cannot yet return home because roads remain blocked.	**Household:** up to $10,000 **Re-establishment grants** – assistance for house repairs is provided to owner-occupiers where an income test is met, and losses are not being met by insurance, compensation or other assistance measures.
TAS[142]	**Family:** up to $1,000 **Emergency assistance grant** - grants to assist people to obtain essential and appropriate shelter, clothing, food, transport and/or personal items.	**Household:** up to $9,400 **Repair and restoration grant** - must be unable to occupy their principle place of residence due to severe damage, and satisfy means testing.
ACT[143]	**Individual:** $200 Emergency financial support - immediate assistance grants and in-kind assistance for temporary accommodation (two days, which can be reassessed and extended based on need).	Not provided.
NT[144]	**Individuals:** $507 (adult) / $256 (child) **Families:** up to $1,276 **Immediate Relief Payment** - assistance to meet basic needs in the first few days after a disaster.	**Household:** up to $14,036 **Essential household repairs** – assistance for properties in the impacted area and impact to property is likely to have occurred by the event. Assistance is means tested.

22.96 We recognise the arguments put forward by some state and territory governments[145] of the importance of retaining flexibility in the DRFA to provide recovery support based on genuine need, rather than aspire for consistency between jurisdictions.[146] **However, creating more nationally consistent financial assistance measures, including eligibility criteria, application and administrative processes, would help create a common Australian experience when recovering from a natural disaster.**[147]

Consistent financial assistance measures under the DRFA would not preclude governments from providing additional financial assistance should the need arise.

Recommendation 22.4 Nationally consistent Disaster Recovery Funding Arrangements assistance measures

Australian, state and territory and local governments should develop greater consistency in the financial support provided to individuals, small businesses and primary producers under the Disaster Recovery Funding Arrangements.

Pre-agreed recovery programs

22.97 In addition to Category A and B assistance, the DRFA also allows for additional assistance for severe disasters and in exceptional circumstances – through Categories C (assistance for severely affected communities) and D (exceptional circumstances assistance for recovery). The cost of this assistance is generally shared between the Australian Government and the relevant state or territory government.[148]

22.98 It is apparent that developing new recovery programs as a disaster is unfolding, as was the case during the 2019-2020 bushfires, is inefficient. New recovery programs require the establishment of administrative processes and guidelines, which can delay assistance.[150] It also leads to unnecessary and inequitable inconsistences in the assistance provided to disaster affected individuals.

> So, in some cases, you know, even with some of the [$10,000] small business grants, the announcements were made and we still had to do the work to finalise the guidelines, finalise the delivery arrangements in Victoria, which left a bit of a lag.[149]

22.99 For the communities in need of assistance, the rapid announcement and creation of recovery programs resulted in confusion. The roll-out of the coordinated clean-up program, co-funded by the Australian Government and the governments of NSW, Victoria and SA under Category D of the DRFA, highlighted the community confusion. While affected communities and individuals appreciated the assistance, the scope and eligibility of the clean-up program were not always clearly understood – the program at times delivered less than the community had anticipated[151] and uncertainty contributed to clean-up delays. This was compounded by a perception of limited consultation and coordination with or between, governments and delivery agencies, prior to the announcement of the clean-up program:[152]

> *…a range of funding initiatives were announced by [the NBRA], to be implemented by the states…The lack of state consultation prior to the decision-making resulted in criteria that didn't meet the current DRFA arrangements, states having to retrofit new processes into existing ones…*[153]

22.100 There are also gaps in the assistance provided through the DRFA in respect of certain needs that regularly arise out of natural disasters. We have previously noted that a number of social issues can emerge after a natural disaster, such as family violence, and this can lead to an urgent demand for legal assistance and social services. There

is also the question of limited access to funding for environmental and ecological recovery and rehabilitation; or for indirect economic impacts, such as the loss of tourism following a natural disaster.[154]

22.101 These impacts could be mitigated through the development of a suite of nationally agreed recovery funding programs. Establishing pre-agreed assistance packages would ensure that governments can respond quickly, effectively and consistently. It would allow delivery agencies, as well as all levels of government, to train staff and develop administrative processes, including guidelines and eligibility criteria, prior to a disaster occurring. This would reduce the time from damage to decision to delivery, as all stakeholders would be familiar with the basic components of the recovery program.[155]

22.102 Australian, state and territory governments have already recognised the value of pre-agreed recovery programs – and this aspect is a key focus of the review of the DRFA.[156] Emergency Management Australia is identifying common gaps in recovery assistance that are not currently addressed by standard recovery programs, and to identify where pre-agreed programs are needed.[157]

22.103 **Pre-agreed recovery programs can allow for the timely, efficient and equitable distribution of assistance following a natural disaster.** Pre-agreed programs should cover a wide range of circumstances and needs and set agreed: thresholds for activation, extent of assistance to be funded, cost-sharing arrangements and eligibility criteria.

22.104 During the 2019-2020 bushfires, a number of assistance measures were provided under the National Bushfire Recovery Fund. These measures include: coordinated clean-up assistance, immediate assistance to local governments and legal assistance services to support bushfire relief and recovery[158] – see Appendix 24: Recovery Supports. These measures could be developed into pre-agreed recovery programs, given the overlapping responsibilities between Australian, state and territory governments and the reliance on state and territory governments for the delivery of specific initiatives.

> *There may be more responsive mechanisms to target funding and other support to the legal assistance sector during and after a natural disaster. For example, consideration could be given to the use of pre-existing Commonwealth funding mechanisms with the States and Territories including natural disaster funding arrangements and legal assistance funding arrangements.*[159]

22.105 **All levels of government should, after each disaster event, re-evaluate the types of recovery assistance that were provided to determine its efficacy and identify any lessons.** This would allow for the identification of additional or updated assistance requirements that could be negotiated and included in a suite of programs under the DRFA.

Recommendation 22.5 Develop nationally consistent, pre-agreed recovery programs

Australian, state and territory governments should expedite the development of pre-agreed recovery programs, including those that address social needs, such as legal assistance domestic violence, and also environmental recovery.

Box 22.1 Family violence and natural disasters

> *… [it was] escalating to the point where I seriously feared for my life. I just thought, because he was so out of control, one of these days he is going to end up killing me -* ***Survivor following the 2009 Victorian bushfires***[160]

Natural disasters are often linked with increased rates of family violence and have been qualitatively well-documented, particularly from service providers. Natural disasters can increase the intensity of existing family violence incidents and can also trigger new violent behaviours in relationships that had previously been described as 'settled and happy' relationships.[161]

Following the 2010-2011 Queensland floods, the Ipswich Women's Centre Against Domestic Violence reported a spike in cases of family violence.[162] Similarly, after the 2009 Victorian bushfires, women residing in highly affected communities were seven times more likely to experience violence compared to low impact communities.[163]

> …people having lost their homes, having to live in cramped, temporary accommodation, unemployment, a lack of childcare, roads being closed … disruption to people's routines — all these things can increase tension.[164]

Many of the areas affected by the 2019-2020 bushfires had high levels of domestic and family violence before the fires struck.[165] For example, the Glen Innes Severn local government area had 673.6 domestic violence related incidents per 100,000 people (24th highest in NSW).[166]

Stress is often cited as the key reason for increased family violence following a natural disaster. Increased homelessness, unemployment and financial stress and are common stressors and are characteristic of the recovery period.[167] Natural disasters disrupt key social services, including family violence services, and in some cases these services may already be at capacity when a natural disaster occurs.[168] Gender norms, particularly stereotypes of masculinity and loss of control, also affect the dynamics of family violence.[169]

Research on family violence has emphasised the need for clear guidelines and strategies to address family violence, accurate family violence statistics recorded by all personnel responding to disaster, and training in family violence identification and referral.[170]

Betterment and resilience

22.106 Increasingly, successful recovery has been recognised as an opportunity to prepare for, and build resilience to, future disasters[171] – in effect, to 'build back better'. Upfront investment in stronger infrastructure and more resilient communities can save money for all levels of government in the long-term. Building more resilient infrastructure is a responsibility of all levels of government and should not be limited to a single program or funding mechanism.

22.107 A concern put to us by state and territory governments and local governments, is the need to include the concept of 'betterment' within the DRFA. Reconstructing infrastructure to a more resilient standard will incur higher costs in the short term. However, over the long term, it can generate savings by reducing the likelihood of assets being re-damaged in a subsequent natural disaster.

> [for the DRFA] 'betterment' is considered to be the restoration or replacement of a damaged essential public asset to a significantly more disaster resilient standard than its pre-disaster standard…[172]

22.108 We have, however, observed some misconceptions and misunderstandings of the extent to which infrastructure can be made more resilient through the DRFA.[173] Under Category B of the DRFA, funding for reconstruction is limited to that necessary to restore to a 'pre-disaster function'.[174]

22.109 However, Category B does allow for the adoption of alternative, resilience-based approaches to the reconstruction of damaged assets. The Australian Government has advised that this could include the: use of modern building, design and construction standards; use of contemporary building materials; use of different asset types (such as replacing a destroyed bridge with a culvert system); and relocation of an asset to a more suitable location.[175] This means that essential public assets can be rebuilt to a higher standard, but funding will only be provided under the DRFA to restore the asset to its 'pre-disaster function'.

22.110 We are aware that the review of the DRFA is exploring opportunities for new national guidance on Category B reconstruction works and betterment, in order to generate greater investment in disaster-resilient infrastructure.[176]

22.111 The DRFA also allows for funding to be provided for the 'betterment' of infrastructure – that is significantly improving its resilience – through Category D of the DRFA.[177] Under this category, betterment funding is discretionary, to be agreed by the Prime Minister in exceptional circumstances.[178] Betterment funding under Category D has only been approved on four occasions, all in Queensland and in response to damage from Cyclone Oswald in 2013, Tropical Cyclone Marcia in 2015, Severe Tropical Cyclones Debbie in 2017, and North and Far North Queensland Monsoon Trough in 2019.[179]

22.112 Queensland has advised us that approximately 260 of the total 370 betterment projects that have been funded since the 2017 Betterment Fund have been impacted by 16 subsequent natural disaster events. Of these, 96% remained undamaged or

sustained only superficial damage, representing approximately $145 million in avoided reconstruction costs.[180]

22.113 Approval for betterment under the DRFA requires state and territory governments to put forward a business case for approval. This process can be administratively burdensome and requires a significant level of expertise to develop[182] – Queensland has robust and internationally renowned resilience and betterments systems and processes, including a Betterment Framework, which have been developed over many years.[183]

> …councils are very financially constrained in being able to source the additional funding that may be needed to enable betterment, and hence councils are very reliant on funding from the State governments or the Federal Government to close that gap…[181]

22.114 The absence of specific guidance on relevant criteria and national standards for betterment criteria makes it difficult for state and territory governments to construct compelling business cases for betterment funding.[184] It is important for betterment funding to be targeted to areas that result in the greatest reduction in risk.

22.115 Given the objective of the DRFA, it is important that any changes to betterment, do not create a disincentive for proper asset management and maintenance. Emergency Management Australia has also raised the importance of developing betterment principles which promote the use of climate and disaster risk information to inform betterment decisions, and explore insurance options for 'bettered' assets.[185] These principles align with a broader approach to disaster risk outlined in the National Disaster Risk Reduction Framework and the National Strategy for Disaster Resilience.

22.116 **There is value in the development of national standards for betterment and more explicitly support and betterment under the DRFA.** These standards should include assurance requirements relating to proper asset management, climate and disaster risk and insurance requirements.

22.117 Most state, territory and local governments have argued that 'betterment' funding should be incorporated within the reconstruction of essential public asset provisions of Category B.[186] This would allow for the consideration of betterment funding on a project by project basis, rather than state and territory governments having to develop a consolidated business case.[187] This would allow for the more timely consideration of betterment components, which is consistent with community expectations that infrastructure will be restored quickly after a natural disaster.[188]

22.118 To ensure accountability of taxpayer funding, appropriate decision-making and assessment frameworks would need to support any inclusion of betterment funding through Category B.[189]

22.119 If Australian, state and territory governments include betterment provisions within Category B of the DRFA, we consider that it would be appropriate to include **appropriate assurance mechanisms, such as: value for money, proper asset management, and insurance options for 'bettered' assets.**

22.120 **State, territory and local governments should have an appropriate understanding of the DRFA. Australian, state and territory governments should develop and**

provide national guidance and regular training on the DRFA. This could include a broad range of issues, including the eligibility of reconstruction works and betterment.

Recommendation 22.6 Better incorporate 'build back better' within the Disaster Recovery Funding Arrangements

Australian, state and territory governments should incorporate the principle of 'build back better' more broadly into the Disaster Recovery Funding Arrangements.

22.121 The DRFA currently does not incentivise or prioritise resilience.[190] It is limited in its ability to funding greater resilience in communities through recovery. For example, Category D of the DRFA is intended to provide assistance in circumstances which the Australian Government considers 'exceptional'.[191] However, Category D includes a specific limitation which prohibits the development of new infrastructure,[192] even if it was necessary to support the recovery of disaster affected communities.

22.122 As previously observed in Chapter 21: Coordinating relief and recovery, the recovery process is complex and multifaceted and provides an important opportunity to prepare for future disasters. Following the 2019-2020 bushfires, the NBRA noted the importance of facilitating new economic opportunities and promoting regional development, including those driven by infrastructure; bolstering recovery at industry or sector levels; and reducing disaster risk and building future resilience. These priorities were identified by the NBRA through direct engagement with local communities.[193]

22.123 The limitations in the DRFA meant that it could not fund all aspects of recovery and resilience building during the 2019-2020 bushfires.[194] Financial recovery support for 2019-2020 bushfires was provided through both DRFA and bespoke programs to fund additional costs not currently within scope for DRFA. Maintaining separate funding programs to facilitate recovery is inefficient – each of these programs have different governance, delivery and audit and assurance arrangements.[195] Reforming Category D assistance within the DRFA would help create a single fit-for-purpose program for recovery and complement and enable the development of pre-agreed recovery programs.

22.124 For the reconstruction of public infrastructure, the DRFA places emphasis on reinstatement rather than betterment.[196] However, the DRFA should not be viewed as the only means of creating and funding more resilient infrastructure. This is a responsibility shared across all levels of government and range of funding mechanisms. We note that any approach that is predicated on the 'loss of an asset' invites inefficiencies and inequities, particularly where new asset funding is made available.

22.125 Government funding provided for resilience should maximise risk reduction, scaled based on the level of investment, regardless of whether an asset has been affected by a disaster.

Recommendation 22.7 Disaster Recovery Funding Arrangements recovery measures to facilitate resilience

Australian, state and territory governments should broaden Category D of the Disaster Recovery Funding Arrangements to encompass funding for recovery measures that are focused on resilience, including in circumstances which are not 'exceptional'.

DRFA process and eligible expenditure

22.126 The granting of financial assistance under Categories C and D of the DRFA requires an application by state and territory governments and the approval of the Prime Minister.[197] The sudden onset of disasters and their immediate impact requires governments to act quickly and to ensure the urgent provision of recovery assistance.

22.127 We heard that the current activation process for Category C assistance is administratively burdensome, which may delay the provision of recovery assistance to affected communities. The process requires state and territory governments to demonstrate impacts against pre-determined indicators, at a local government area level.[198] Prior to being able to receive assistance, state and territory governments must demonstrate that:

- the community is at risk of losing essential businesses as a direct result of the disaster
- there is measurable loss or reduction in essential services in the community
- there is measurable loss or damage to essential public assets
- more than five community facilities have been destroyed and/or damaged, and
- more than five community activities have ceased and/or been disrupted.

22.128 The Category C activation process relies heavily on the availability of impact data. However, the data required for the Category C assessment process do not always align with impact assessments and situation reports conducted by state and territory governments – necessitating additional data collection during a disaster.[200] The focus on demonstrating impacts within a local government area can also restrict the provision of assistance. To be eligible for assistance an individual or business would need to be located within a local government area in which the Category C indicators can be demonstrated – rather than an assessment on a needs basis.[201]

> …fires don't respect borders. Fires don't respect Local Government borders.[199]

> *…my view was I'm not really sure what is a postcode lottery around bushfires in terms of grant funding, and ideally there's a package that's put together that irrespective of what State line you sit on…*[202]

22.129 During the 2019-2020 bushfires, given the difficulty in undertaking assessments against the required indicators while a disaster was unfolding, the Prime Minister,

the Hon Scott Morrison MP agreed to a national exemption to the normal requirements of the Category C assessment process. This was to ensure that assistance could be provided quickly, and without diverting resources from the recovery effort for administrative purposes.[203] The exemption allowed state and territory governments to make assistance available through an application and assessment process. We heard from many stakeholders that this exemption was very helpful and promoted timely recovery support.[204]

22.130 On 8 September 2020, the Australia-New Zealand Emergency Management Committee agreed to trial a streamlined process to activate Category C assistance under the DRFA, over the 2020-21 disaster season. A key element of this process is the removal of the current impact indicators and a greater emphasis on contextual and qualitative information.[205]

22.131 **The provision of recovery assistance, under the DRFA, should be based on need within communities, rather than being based on geographical areas which meet predefined impact indicators.** Any change in process needs to be clear, simple and consistently applied.

22.132 Given that Category C assistance requires the approval of the Prime Minister and the relevant First Minister, the approval process may inhibit the delivery of assistance to the community. In some jurisdictions a decision of their Cabinet may be required:

> *While there is standing approval for funding to be available for immediate response and relief measures…funding for all other recovery programs is sought through the South Australian Government Cabinet… Where possible, authority to make decisions about joint funding for DRFA eligible programs or services that are consistently approved in most events with well established guidelines (such as a community recovery fund), should be given to Senior Officers.*[206]

22.133 **Activation of Category C and D measures could be further streamlined through appropriate delegations.** This could allow for the faster provision of recovery assistance to disaster affected communities, for example, by delegation to ministers responsible for emergency management – particularly for measures which have been pre-agreed.

22.134 Some state, territory and local governments expressed the opinion that the reporting, audit and assurance processes under the DRFA are overly onerous and burdensome.[207] We are supportive of streamlining reporting requirements for the DRFA, however, this must be balanced against accountability and assurance requirements. In 2015, the Australian National Audit Office had previously found that:

> *...a much more active and disciplined approach to [Emergency Management Australia's] administration of NDRRA is required so that payments are limited to those items the Australian Government intended to cover, given the significant quantum of funding that is involved.* [208]

22.135 The DRFA is also limited in the types of expenditure which can be claimed for reimbursement. We have received evidence from local, state and territory governments arguing that certain types of infrastructure, such as community halls, park facilities, water and waste treatment facilities and fire trails, should be eligible

under the DRFA.[209] Some of these matters remain state and territory government responsibilities. Repairing damaged community and recreational facilities can be an important component of disaster recovery, which helps restore social and community networks. It also helps the economic recovery and disaster resilience of local communities.[210]

22.136 The costs associated with restoring community and recreational assets and bushfire trails are currently not eligible under standard Category B provisions. However, recovery funding can be provided under Category C.[211]

22.137 Similarly, some state and territory governments have argued that the DRFA should fund firefighting costs (counter-disaster operations) related to the protection of environmental areas, in the same way that it allows claiming of costs associated with the protection of infrastructure and communities. State and territory governments are currently able to claim extraordinary firefighting costs associated with the protection of infrastructure and must reach specified expenditure thresholds before being eligible for any Australian Government contribution. Treating all firefighting costs the same under the DRFA may merit financial support as it would remove an arbitrary distinction in claimable costs.[212]

22.138 Most state and territory governments have argued for the extension of the DRFA to specifically provide funding for rebuilding community infrastructure and certain counter-disaster operations. Care would need to be taken in expanding the DRFA, in light of state and territory responsibilities. Any expansion should be applied consistently.

22.139 **Australian, state and territory governments should review the eligibility of expenditure under the DRFA. This review should seek to establish clear and coherent principles on eligible expenditure and clarify whether certain expenditure is solely the responsibility of state and territory governments.**

Recommendation 22.8 Streamline the Disaster Recovery Funding Arrangements processes

Australian, state and territory governments should create simpler Disaster Recovery Funding Arrangements application processes.

Interaction between recovery and insurance

Insurance for government assets

22.140 A key principle of the DRFA is that recovery assistance should not replace or discourage self-help and appropriate strategies of natural disaster mitigation.[213] This includes in circumstances where assets may be covered by state or territory based insurance arrangements. Under the DRFA, state and territory governments have a responsibility to put in place insurance arrangements which are cost effective for the state or territory and the Australian Government.[214]

22.141 Most state and territory governments have a captive state insurer and/or self-insurance fund backed up by additional commercial insurance or reinsurance arrangements for public assets – see Appendix 23 Recovery Arrangements. Some

asset types are excluded (such as roads, stormwater assets and tracks) as, based on the evidence before us, insuring these assets may not be cost effective.

22.142 Some payments made under self-insurance arrangements for affected essential public assets may be considered 'eligible expenditure' under the DRFA. Therefore, costs associated with the restoration or replacement of that asset may be recoverable by the jurisdiction. However, retention levels exist for various state-based self-insurance schemes and any amounts claimed above this retention level are not eligible for recovery under the DRFA as they are likely covered under commercial insurance arrangements. For amounts below this retention level, the cost of reconstructing that asset, subject to other requirements in the DRFA, can be reimbursed.[215]

22.143 **Allowing for reconstruction costs below the retention level of self-insured government owned assets to be claimed under the DRFA may undermine its policy objectives.**



Figure 96: Delivery of fodder for livestock being escorted, following the 2019-2020 bushfires[216]

Chapter 23 National research and emerging technology

Summary 489

Driving the development of expertise and technology 490

Australia has a strong research base 490

National research capabilities 491

Practical application of research 496

National research and investment priorities 497

Summary

23.1 There is a need for Australia-wide agreement on a prioritised research agenda that identifies and targets critical knowledge gaps. Such an agenda would assist in ensuring that finite resources are strategically targeted to critical priorities, while reducing duplication and leveraging co-investment from other levels of government, the private sector and research institutions. National research priorities may include research that is national in coverage, or relates to a localised research priority but with national significance. Australia has strong research and development capabilities in climate and natural disasters to support this.

23.2 In order to be of practical use, for the translation of research, pathways and structures for interaction between governments, research institutions, the private sector, individuals and end-users are necessary. Focused investment in research is required to improve knowledge and understanding of natural hazards and disaster risk. This will drive the development of expertise and technology to deal with natural disasters.

23.3 The Australian Government invests in the infrastructure and institutions required to support many of the national research capabilities relevant to natural disasters. The state and territory governments also invest in research relevant to natural disasters, including through investment in the Australian Government Cooperative Research Centres (CRC) Program, and in research to understand and assess the impact of local and regional natural disasters.

23.4 The private sector is an essential contributor to long term natural disaster resilience. Australian, state and territory governments should take steps to facilitate engagement with the private sector, to maximise utilisation of ideas and technologies.

23.5 There are opportunities to develop and utilise technologies in all phases of a natural disaster. This should not just be through the development of new technology, but also through better use of existing technology.

Driving the development of expertise and technology

23.6 Focused investment in research is required to improve knowledge and understanding of natural hazards and disaster risk. Improved knowledge and understanding will drive the development of expertise, tools, systems and technology to deal with natural disasters.

23.7 Two of the four priorities under the National Disaster Risk Reduction Framework have direct relevance to research and investment:

- priority 1 – 'understand disaster risk', including by supporting 'long-term and solution-driven research, innovation and knowledge practices', and
- priority 3 – 'enhanced investment', including by pursuing 'collaborative commercial financing options' for 'disaster risk reduction initiatives' and developing 'disaster risk reduction investment tools to provide practical guidance on investment mechanisms'.

23.8 The value of research and the use of technology was the subject of extensive input to our inquiry, both from public submissions and in response to notices we issued.

23.9 Australian, state and territory government agencies and other organisations provided us with hundreds of suggested areas where research and technology can improve disaster management arrangements. Although there were varied and competing interests in the priorities identified, there were areas of common interest, many of which have informed our recommendations in this report.

Australia has a strong research base

23.10 Australia has strong research and development capabilities in climate and natural disasters. These include:

- publicly-funded research agencies – including the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Bureau of Meteorology and Geoscience Australia
- national initiatives – including the Bushfire and Natural Hazards Cooperative Research Centre (BNHCRC) and its proposed successor
- universities – including their research hubs, centres, institutes, and groups, and
- the private sector – including insurers, private research providers and technology companies, many of which often work in partnership with universities and publicly-funded research organisations, and contribute to the development of new technologies.

23.11 Investment in research to drive continuous improvement in science and technology is not only important but also necessary for Australia, particularly in light of the disaster outlook (see Chapter 2: Natural disaster risk). As the Office of Australia's Chief Scientist notes:

Australia's ability to adapt to a changing climate and increased incidence of bushfires and other crises will continue to depend on universities and research institutes to expand Australia's diverse knowledge base, critical thinking and research capability, and to translate the research into continued improvements in preparation, response and recovery.[1]

National research capabilities

23.12 The Australian Government has made considerable investments in the infrastructure and institutions required to support many of the national research capabilities relevant to natural disasters.

23.13 The key national research institutions involved in natural hazard, climate and disaster research appear to be the Bureau of Meteorology, CSIRO and Geoscience Australia. These institutions have developed important partnerships and collaborations with international research institutions, state and territory agencies, universities, the private sector and non-government organisations.

Bureau of Meteorology

23.14 The Bureau of Meteorology undertakes research on Australia's weather, climate and water, leveraging its network of observational infrastructure and its partnerships with domestic and international agencies and research bodies. Drawing on its research, the bureau provides weather forecasts advice and analysis to governments, emergency services, industry, and the community.

23.15 The Bureau of Meteorology also contributes to work supporting Australian, state and territory government initiatives in climate and disaster risk. For example, it contributed to the development of the National Disaster Risk Reduction Framework, the Australian Vulnerability Profile and the report to the Prime Minister on Climate and Disaster Resilience.

Commonwealth Scientific and Industrial Research Organisation

23.16 The CSIRO delivers applied research to support a broad range of government, non-government and private sector stakeholders to understand, mitigate, and respond to natural hazards.

23.17 CSIRO collaborates with the Bureau of Meteorology to produce national climate projections and modelling for Australia. CSIRO also assists state emergency service agencies to predict, manage and assess the impacts of bushfires, and works with rural fire services and research bodies to understand ecosystems and bushfire dynamics. In recent years, CSIRO has developed SPARK, a fire prediction platform for bushfire modelling that integrates fire weather data with geographic information and fire spread models.[2]

23.18 CSIRO also leads work to support Australian Government initiatives in climate and disaster risk. For example:

- developing the Climate Compass with the Australian Government Department of Environment and Energy – a climate risk management framework for Australian Government agencies

- leading the preparation of the technical report supporting the Australian Vulnerability Profile, and
- preparing a recent report to the Prime Minister: CSIRO Report of Climate and Disaster Resilience.

23.19 CSIRO hosts the Earth Systems and Climate Change (ESCC) Hub, a partnership between CSIRO, the Bureau of Meteorology, University of NSW, Australian National University, Monash University, University of Melbourne and the University of Tasmania.[3]

Geoscience Australia

23.20 Geoscience Australia develops tools and models to support and improve understanding of natural hazards and disaster risk in Australia and the Asia Pacific region. For example, the National Seismic Hazard Assessment, the Probabilistic Tsunami Hazard Assessment, Digital Earth Australia Hotspots and Waterbodies, statistical modelling of coastal storm waves, statistical-parametric modelling to assess wind hazard from tropical cyclones and hazard impact tools.

23.21 Geoscience Australia develops national-scale datasets, collated from a range of public and commercial sources. It develops platforms to present these data to end-users, for example, Land cover, National Wind Multiplier Dataset, Marine Sediments Database (MARS), Tropical Cyclone Hazard Assessment Data, National Exposure Information (NEXIS).

23.22 Geoscience Australia has participated in a number of international initiatives that contribute to the implementation of the Sendai Framework for Disaster Risk Reduction (Sendai Framework). For example:

- supporting the United Nations Office for Disaster Risk Reduction (UNDRR) to develop a subset of the Words into Action guidelines, designed to support countries in developing a national disaster risk reduction strategy that is aligned with the Sendai Framework, and
- reviewing a number of Hazard Information Profiles as part of the 2020 Sendai Hazards Definitions and Classification Review. Facilitated by the UNDRR and the International Science Council, the review aims to achieve consistency in risk assessment with agreed definitions.[4]

23.23 Geoscience Australia is also a partner in the BNHCRC, contributing to projects relating to the built environment, flood and coastal management and emergency management capability.[5]

Other Australian Government research capabilities

23.24 The Australian Nuclear Science and Technology Organisation monitors fine particle air pollution. For example, black carbon monitoring from bushfire smoke, including through the multi-wave absorption black carbon (MABI) technology.[6]

23.25 The Australian Space Agency (ASA) funds civil space activities and is the primary source of advice to the Australian Government on civil space policy.[7] After the bushfires in 2019-2020, the ASA established and led the Bushfire Earth Observation

Taskforce, working with the CSIRO, Geoscience Australia and the Bureau of Meteorology, to identify ways in which space based Earth observations could support planning, response and recovery for bushfires.[8]

Cooperative research centres

23.26 The Australian Government, through the Cooperative Research Centres (CRC) Program, supports industry-led collaborations between industry, researchers and the community.[9] It links researchers with industry to focus on research and development that will have commercial uses. State and territory governments also participate in the CRC Program. A number of CRCs have been established over the years many with capabilities relevant to natural disaster resilience, response and recovery. The CRC Program has strong international collaborations with many international participants.[10]

23.27 A recent example is the SmartSat CRC which was established in 2019 to conduct translational research to make the Australian space industry more competitive and future-proof. It has three research programs:

- advanced communication, connectivity and 'Internet of Things' (IoT) technologies
- advanced satellite systems, sensors and intelligence, and
- next generation earth observation data services.

23.28 Earth observation capabilities, remote sensing systems and data fusion and analytics have the potential to support more effective land management, planning, emergency response and recovery. Advanced satellite enabled communications and IoT connectivity technologies have the potential to provide short notice emergency connectivity and the rapid restoration of medium-term communications during the response and recovery phases of a natural disaster.[11]

23.29 The BNHCRC, which was established on 1 July 2013 and is due to conclude on 30 June 2021, coordinates national research efforts in hazards, including bushfires, flood, storm, cyclone, heatwave, earthquake and tsunami. Examples of the programs, activities and technologies to which the BNHCRC has contributed include:

- development of the Phoenix RapidFire fire spread modelling system which provides real-time information regarding the predicted spread of bushfires
- Queensland Government's Household Resilience Program, which provided homeowners with grants to upgrade their homes against damage caused by strong cyclonic winds, and
- understanding risk and resilience priorities of Indigenous communities in southern Australia, the emergency management sector's priorities for these communities, and how these interests interact.[12]

23.30 On 24 July 2020, the Australian Government announced funding of $88.1 million to 'support the transition of the BNHCRC to a new, world-class research centre for natural hazard resilience and disaster risk reduction'.[13]

23.31 The new research centre will be co-funded by the states and territories, universities, and industry partners.[14] We were told that the Department of Home Affairs will consult with the Department of Industry, Science, Energy and Resources and other stakeholders, such as CSIRO, BNHCRC and AFAC to determine the governance and funding arrangements for the new research centre.[15]

23.32 During our inquiry, the Australian, state and territory governments have told us they support, or support in-principle, the research centre for natural hazard resilience and disaster risk reduction:

- reinforcing Australia as a major world centre of bushfire research
- targeting delivery of national research priorities that address national knowledge gaps and national research needs, and
- facilitating research that brings together universities, government agencies and delivery partners.

23.33 The NSW, Queensland, Victorian, SA and WA Governments encouraged the Australian Government to consult and collaborate with state and territory governments to establish the centre and/or identify research priorities.

23.34 We welcome the Australian Government's commitment to continuing to support natural hazards research in Australia.

23.35 **Research partners and end-users of the research should be consulted on research priorities for the new national research centre for natural hazard resilience and disaster risk reduction, including as to the implementation of ideas and the practical applications of the results of that research.**

Australian Learned Academies

23.36 The Australian Learned Academies include the Australian Academy of Science, Academy of the Social Sciences in Australia, Australian Academy of the Humanities, Australian Academy of Technology and Engineering, and Australian Academy of Health and Medical Sciences. The Bushfire Research and Technology: Mapping Australia's Capability report of the Office of the Chief Scientist of Australia, published in June 2020, noted that Australia's Learned Academies play a critical role in promoting international engagement and providing opportunities for researchers and innovators to connect with counterparts.[16]

23.37 Other examples of the roles the Learned Academies play in advancing natural disaster research include:

- Australian Academy of Science, following the 2019-2020 bushfires, prepared and published a series of evidence briefs on bushfire recovery,[17] and
- Australian Academy of Humanities conducts research on community recovery and resilience, Indigenous land use management, human adaptation to climate change and the use of media and communications in extreme events.[18]

State and territory governments

23.38 The state and territory governments invest significantly in research relevant to natural disasters, including through investment in various CRCs and research to understand and assess the impact of local and regional natural disasters. For example, the NSW Rural Fire Services has engaged CSIRO to review the survival rates and loss context of houses impacted in the 2019-2020 bushfire season in the state of NSW.[19]

Private sector

23.39 The private sector, including business, non-government and philanthropic organisations, and individuals such as entrepreneurs, are making an increasingly significant contribution to Australia's national research capabilities relevant to natural hazards, climate and disasters.

23.40 For example:

- The Australian Business Roundtable for Disaster Resilience and Safer Communities was established in 2012.[20] Its members include the Australian Red Cross, Insurance Australia Group, Investa Property Group, Munich Re, Optus and Westpac Group.[21] The Roundtable has produced five research reports in relation to natural disasters.[22]
- The Insurance Australia Group (IAG) has collaborated with the US National Center for Atmospheric Research (NCAR), to produce the report Severe Weather in a Changing Climate.[23] This report examines the impact of climate change on severe weather types and natural disasters, particularly in the context of catastrophe losses and insurance.[24]
- The James Cook Cyclone Testing Station is an independent centre for the testing of building products and the development of testing techniques. Its partners include IAG, RACQ, the Queensland Government and Suncorp.[25]
- The Minderoo Foundation, an independent Australian philanthropic organisation, has committed to fund a range of initiatives, including flood and fire resilience.[26]

23.41 The National Disaster Risk Reduction Framework notes that there is a need to focus on:

- finding or developing financing and funding pathways to address existing high priority risks across all environments, and
- identifying financing mechanisms and pathways to pursue disaster risk reduction measures in planned projects, particularly infrastructure and development projects. Strategies to promote private sector research include commercial financing and investment models such as loans, equity contributions, guarantees and public-private partnerships. [27]

23.42 **The private sector is an essential contributor to long term natural disaster resilience.**

Practical application of research

23.43 There is broad agreement among disaster management practitioners and research institutions that, in order to be of practical use, research requires pathways and structures for interaction between governments, research institutions, the private sector, individuals and end-users. Such pathways can contribute to research outcomes having practical application. Existing structures, such as the BNHCRC and the Australian Institute for Disaster Resilience, provide two examples of relevant pathways.

23.44 AIDR initiatives that are designed to bridge the gap between research and end-user include:

- Centre for Excellence on Prescribed Burning, a hub for prescribed burning practitioners to share and promote best practices, research, and 'lessons learned'[28]
- Australian Disaster Resilience Handbook Collection, a source of knowledge about disaster resilience principles in Australia, and
- Australian Disaster Resilience Knowledge Hub, a national, open-source platform providing access to curated content collections. [29]

23.45 Some jurisdictions have incorporated new research pathways in their research governance arrangements. For example, the Queensland Government facilitates sector-wide, collaboration to disaster management research through its Research Advisory Panel and the Queensland Disaster Management Research Framework, coordinated by the Office of the Inspector-General Emergency Management.

23.46 Technology can be used to deliver key functions across all phases of disaster management such as through emergency information to communities**,** aerial support, fire spread modelling, and tactical radio systems.

23.47 We heard of difficulties that some private sector entrepreneurs experienced in engaging with government to provide and explain their potential contributions.

23.48 **Australian, state and territory governments should take steps to facilitate engagement with the private sector to maximise utilisation of ideas and technologies.**

23.49 However, our hearings highlighted examples of private sector and individual initiatives which are pursuing innovative research and technology to assist disaster management. These included:

- Ninox Robotics, a specialised drone company, which has researched and produced bespoke aerial intelligence for use in the emergency response to bushfires to provide additional operational capabilities.[30]
- Attentis, a company designing and manufacturing patented multi-sensors[31] providing a range of capabilities, including: fire ignition and flame detection; 360 degrees cameras; time lapse and high definition video; air quality sampling; flood detection with water heights; lightning detection; and vibration and structural and ground movement.[32]

- Smartrak, a company offering a range of telemetry products which can track vehicles and personnel in remote locations.[33]
- Bushfire.io, a group of individuals that developed a web-based system that fuses data to provide a national view of emergency warnings and alert information for bushfires.[34] We heard that Bushfire.io hopes to expand its system to include other natural hazards.[35]
- Red Helmet Technology, a developer of a suite of products relevant to natural disasters, including *Alert to Me*, an app that brings together data to provide a national view of emergency warnings and alert information for all hazards.[36]

23.50 Improvements in technology have helped resolve many natural disaster challenges over recent decades. However, in many areas, available technology has not been leveraged or applied to its full extent. For example:

- fuel load estimates are often based on visual assessments, yet remote sensing and other technologies such as radar and LiDAR,[37] that improve the direct capture and spatial mapping of fuel loads across landscapes and ecosystems, are available
- in some parts of Australia, early detection of fires is undertaken using manned fire towers to spot smoke, yet multiple early fire detection technologies exist, such as remotely piloted aircraft and sensors, and
- some jurisdictions use manual recording of information during impact assessments, yet there are digital platforms that are centrally connected and allow instantaneous sharing.

23.51 We are, of course, also mindful that technology, and its incorporation into existing processes and approaches, comes at a cost and that, prior to the adoption of any new technology, careful consideration should be given to costs and benefits.

23.52 **There are opportunities to develop and utilise technologies in all phases of natural disaster management. This should not just be through the development of new technology, but also through better use of existing technology.**

National research and investment priorities

23.53 The Australian Government provides funding for research and technology investment through a number of pathways, including the ARC, NHMRC, Disaster Risk Reduction funding package, and the Medical Research Future Fund for mental health and suicide prevention research. A number of initiatives provide additional funding for research or technology. Existing Australian Government initiatives also address disaster risk reduction and resilience, such as the Future Drought Fund, the Roads of Strategic Importance Initiative, the Emergency Response Fund, and the National Water Infrastructure Development Fund.

Box 23.1 Earth observation systems - a key technology for managing disasters

Earth observation (EO) systems support emergency management by providing information, data and knowledge to monitor and examine the world's environments, human activities and infrastructure.

EO sensors can be mounted on platforms in space (satellites); in the air (including remotely piloted aircraft systems); or on-the-ground (fire towers, elevated structures, ships and buoys).

EO systems are an important source of situational awareness for emergency management agencies and the community across mitigation, preparation response and recovery phases of hazard and disaster events.

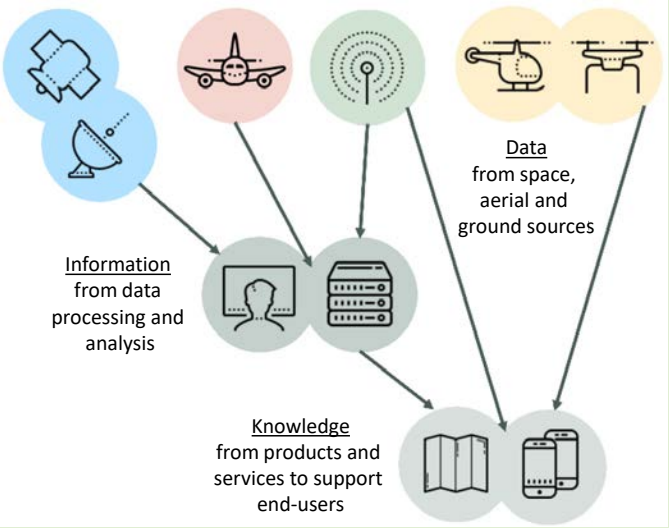


Figure 97: The basics of Earth observation and data collection

- **Satellites** provide EO information to a range of users in Australia, including research institutions and emergency management agencies. For example, satellite imagery can be used to assess fuel loads in bushland and inform land management practice.
- **Remotely Piloted Aircraft** (RPA) such as drones can improve information gathering, mapping and communications. For example rapid damage assessment, fire detection and tracking, weather monitoring and air quality.
- **Ground-based EO platforms** also provide situational awareness for natural hazards. For example, Geoscience Australia maintains a network of 60 stations on the Australian National Seismograph Network which it uses to monitor, analyse and report on significant earthquake events.

Following the 2019-2020 bushfires, Australia's Space Agency partnered with other national agencies to explore the role of space-based EO in supporting planning, response and recovery efforts for bushfires.

They identified four key areas to improve Australia's satellite and other EO capabilities: building on partnerships with international satellite operators; streamlining data systems; helping users access and tailor EO products and services; and exploring opportunities to develop Australia's space industry to provide new satellite imagery capabilities.

23.54 The First National Action Plan[38] under the National Disaster Risk Reduction Framework identifies several priority strategies intended to promote a greater understanding of disaster risk. The aggregated Australian government funding for these strategies is $815 million. These strategies include, among others:

- a new National Climate and Disaster Intelligence Capability
- the National Environmental Science Program (NESP)
- Special Research Initiative – Health Threats in Environmental Change, and
- Australian Flood Risk Information Portal.

23.55 The NESP is a long-term investment by the Australian Government into environment and climate research. The program's second phase, NESP 2, announced on 27 March 2020, to commence from mid-2021, will promote and build national research depth to respond to the extraordinary environmental challenge of managing the risks of a changing climate.[39] Climate adaptation will be a core mission of all four thematic research hubs of the program.[40]

23.56 Some state governments advocated for the creation of an ambitious national research agenda. For example:

- The Victorian Government proposed the development of a nationally coordinated and streamlined approach to natural disaster research, including a research strategy for national risk reduction, focusing on gaps in knowledge.[41]
- The Queensland Government suggested various resilience and adaptation research initiatives.[42]

23.57 All state and territory governments (except WA which did not provide a response) supported the Australian, state and territory governments working together to establish a spatial technology acceleration program to improve capability to detect ignitions and accurately monitor all fire edge intensity and progression automatically across the nation in real time. SA has already commenced initial discussions with the SmartSat CRC to consider such information gathering.[43]

23.58 In a world of finite resources, it would be unrealistic to expect all areas of interest for research and technology to be progressed at once. Any research or development strategy should contain clear objectives and priorities, and should be supported by a robust implementation plan, and direction and oversight from an appropriate governance body.

23.59 In our view, 'national' research and technology priorities should be identified. It may be that proposed research is national in coverage, or relates to a localised research priority but with national significance.

23.60 Australian, state and territory governments all support, or support in-principle, prioritisation of investment in national research that addresses national knowledge gaps, acknowledging that the emergency management sector is not the only stakeholder in natural hazard resilience and disaster risk reduction. There was broad public support for this concept.

23.61 Undoubtedly, there will be opportunities to leverage co-investment from other levels of government, the private sector and research institutions. Careful coordination would help to deliver maximum value and unlock practical, tangible improvements in resilience and decision making.

23.62 **There is a need for Australia-wide agreement on a prioritised research agenda that identifies and targets critical knowledge gaps. Such an agenda would assist in ensuring that finite resources are strategically targeted to critical priorities, while reducing duplication.**

Chapter 24 Assurance and accountability

Summary 502

National accountability for disaster risk and emergency management 503

The importance of accountability 503

Accountability in strategies and frameworks for disaster risk, resilience and climate adaptation 505

Assurance, continuous improvement and best practice 509

The value of independent assurance bodies 509

A public record of national significance 513

Summary

24.1 Inquiries into natural disasters are complex, time consuming and, generally, costly. They provide insights, observations and recommendations. Many recommendations are accepted by governments – and then disappear. Further, details of monitoring and implementation are not communicated to the public – and then there is another disaster and another inquiry, often into the same subject matter.

24.2 Australia has a history of more than 240 previous inquiries related to natural disasters. As a nation, we need to do more than just identify lessons from past disasters, we need to learn our lessons and follow through with action. If a recommendation is not accepted, reasons should be provided for doing so. If it is accepted, steps should be taken to implement as soon as practicable, and to monitor, and report on, the extent of implementation.

24.3 While state and territory governments maintain primary responsibility for management of natural disasters, Australian, state and territory governments should also be accountable for their respective responsibilities. This includes understanding and communicating the extent to which they are contributing to, and tracking, disaster mitigation, preparedness, response and recovery.

24.4 An approach to continuous improvement and best practice that has worked successfully for some states is the establishment of an Inspector-General for Emergency Management. Similar arrangements would be desirable for other jurisdictions.

24.5 This is the first Royal Commission to be convened into Australia's natural disaster arrangements at a national level. A large body of material has been gathered and analysed, contributing to a significant public record. The public work of our inquiry should remain available and accessible on a long-term basis for the benefit of individuals, communities, organisations, businesses and all levels of government.

National accountability for disaster risk and emergency management

The importance of accountability

24.6 Accountability is a core component of effective governance, made up of four key elements – transparency, answerability, enforcement and responsiveness.

24.7 In an emergency management and disaster risk context, accountability is required of all those with responsibility for disaster management on behalf of others, including federal, state and local governments, businesses and non-government organisations.

24.8 The United Nations Office for Disaster Risk Reduction (UNDRR) highlights characteristics of accountability governance arrangements at these levels, including:[1]

- at the national level:
  - efforts by government agencies directed and coordinated towards disaster risk reduction
  - funds (eg from public sources) which are spent
  - information gathered by officials made more widely available
  - assets accruing to those institutions and other actors remaining under appropriate control, and
  - service to the community demonstrated.
- at the community level:
  - devolved structures that enable participation
  - access to information
  - capacities of communities to influence plans and actions
  - inclusion of vulnerable groups in decision-making
  - participatory monitoring and evaluation systems, and
  - high level of volunteerism for disaster risk reduction.

24.9 As the UNDRR notes, 'governments need to create the necessary conditions in order to make accountability a living reality. These conditions are appropriate policies, enabling legislation, necessary institutional arrangements or reforms, allocation of sufficient resources, definition of clear roles and responsibilities, and effective enforcement mechanisms'.

24.10 Australia has a long history of seeking to understand the causes and impacts of natural disasters, and how disaster arrangements can be improved. We identified more than 240 previous inquiries relating to natural disasters. 45 of those inquiries were at a national level.[2] Figure 98 gives an indication of the subject matter and timing of previous reviews across recent decades.

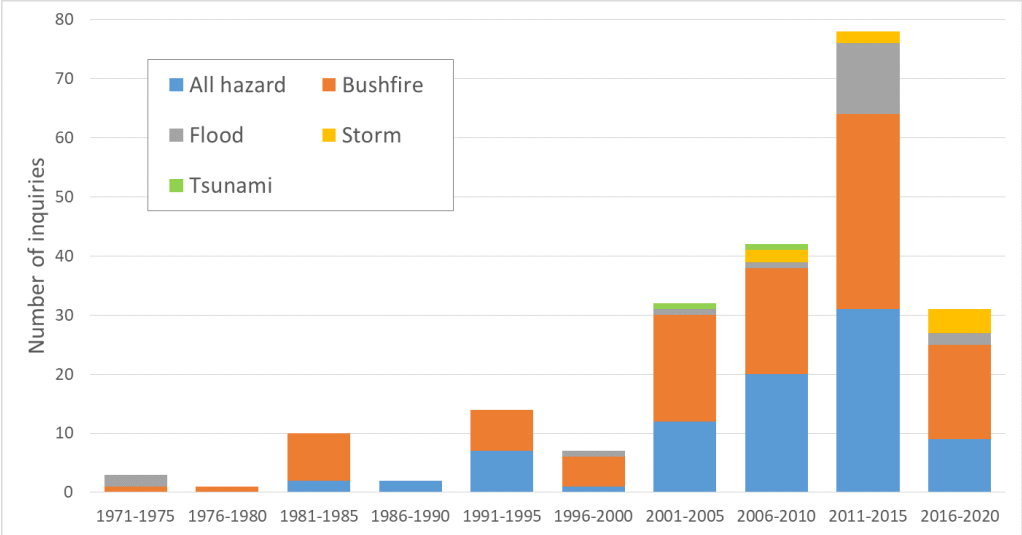


Figure 98: Disaster inquiries in Australia 1970-2020[3]

24.11 **The existence of such a large number of reports may speak to the intractability of some of the problems, perhaps even a reluctance to implement recommended solutions.**

24.12 For example, we learnt that recommendations, findings and directions from the last 20 years of natural disaster inquiries, roadmaps, strategies and frameworks have advocated for consistent disaster risk information, greater investment in national resilience and in mitigation of risk, and improved collaboration. Yet, based on the evidence available to us, many initiatives appear not to have been adequately implemented to date.

24.13 Determining the implementation status for many recommendations is difficult and for many inquiries, if examining solely based on publicly available information, impossible. Such information as was publicly available was not always readily accessible, consolidated, or comprehensive.

24.14 We required Australian, state and territory governments to provide us with information on the implementation of findings and recommendations of previous inquiries. Even with those responses, it remained difficult for us to assess the implementation status of some recommendations, because that status was not always tracked.

24.15 **Governments should be transparent about these matters, to enable better accountability to the public for decisions.**

24.16 We have seen that governance and accountability arrangements have been improved in recent years within the emergency management sector with the introduction of external review and assurance bodies. Victoria and Queensland have Inspectors-General of Emergency Management (IGEMs), who have published updates or progress reports on the implementation of recommendations from the 2009 Victorian Bushfires Royal Commission and the 2011 Queensland Floods Commission of Inquiry respectively. In so doing, these offices have supported public accountability in addition to their core objectives of encouraging a culture of

continuous improvement and best practice in emergency management within their states.

Accountability in strategies and frameworks for disaster risk, resilience and climate adaptation

24.17 National acknowledgement of disaster resilience, preparedness and risk reduction is prevalent, as indicated by the numerous strategies, frameworks, policies and programs that have been brought to our attention, including:

- National Climate Resilience and Adaptation Strategy (2015)
- National Disaster Risk Reduction Framework (2018)
- National Partnership Agreement on Risk Reduction (2020), and
- First National Action Plan to implement the National Disaster Risk Reduction Framework (2020).

24.18 **National frameworks and strategies generally establish sensible principles. It has, however, been difficult for us to determine the extent to which these principles have been, or will be, translated into tangible outcomes.**

24.19 Many of these frameworks, strategies and plans include agreed review periods, some of which are due over the course of 2020.[4]

Example – National Disaster Risk Reduction Framework

24.20 The National Disaster Risk Reduction Framework (NDRRF) is a commendable and contemporary national strategy for reducing disaster risk. It was developed between Australian Government, states and territories, and select private sector organisations, and originally released in April 2018.[5]

24.21 It aligns with the United Nation's Sendai Framework for Disaster Risk Reduction 2015-2030. It addresses drivers of increased disaster risk including: more frequent and intense natural hazards and exposure of interconnected and interdependent essential services; and forecast growing costs of natural disasters, both human and economic. It is intended to be applied holistically across four domains: built, social, natural and economic.

24.22 The NDRRF lists broad goals to be achieved by 2030, priorities to guide achievement of these goals, and outcomes to be achieved against these priorities within five years.

24.23 It has four priority areas: understanding disaster risk; accountable decisions; enhanced investment; and governance, ownership and responsibility, and identifies three broad goals to achieve by 2030:

- take action to reduce existing disaster risk
- minimise creation of future disaster risk through decisions taken across all sectors, and

- equip decision-makers with the capabilities and information they need to reduce disaster risk and manage residual risk.

24.24 In March 2020, the NDRRF was endorsed by state and territory governments. Jurisdictions also entered into a new $261 million Commonwealth-State partnership agreement to fund implementation of risk reduction.

24.25 To implement the NDRRF, emergency management ministers adopted *The First National Action Plan*[6] (National Action Plan). The National Action Plan highlights actions that the Australian, and state and territory governments are taking 'to enable the nation to reduce disaster risk now and into the future'. The National Action Plan 'will be reviewed and updated annually in consultation with stakeholders' and 'reflect how best to progress the systemic changes needed to reduce disaster risk'.

24.26 The National Action Plan mostly refers to existing initiatives, as actions that the Australian Government is taking to deliver on the NDRRF's four priorities. It does not outline whether, or how, existing initiatives are being enhanced.

24.27 The National Action Plan identifies various government and inter-governmental initiatives against the existing strategies agreed under the NDRRF, and lead agencies and timeframes for the work. For example, Priority 2 of the NDRRF concerns 'accountable decisions', whose specified strategies are:

> *A – Consider potential avoided loss (tangible and intangible) and broader benefits in all relevant decisions*
>
> *B – Identify highest priority disaster risks and mitigation opportunities*
>
> *C – Build the capability and capacity of decision-makers to actively address disaster risk in policy, program and investment decisions*
>
> *D – Establish proactive incentives, and address disincentives and barriers, to reducing disaster risk*
>
> *E – Maintain planning and development practices that adapt to rapid social, economic, environmental and cultural change*
>
> *F – Promote compliance with, and embed resilience requirements into, relevant standards, codes and specifications*

24.28 The National Action Plan sets out the following plan of action for Priority 2 (see Figure 99).

Strategy	Title	Domain	Lead agency	Timeframe
C	**Guidance for Strategic Decisions on Climate and Disaster Risk**	Commonwealth	Department of Home Affairs, CSIRO & Department of Agriculture, Water and the Environment (with Department of Industry, Science, Energy and Resources)	2020
B	**Reef Restoration and Adaptation Program**		Australian Institute of Marine Science	Current
B	**Bushfire Mitigation**		Department of Defence	Current
F	**Compliance Framework through Estate Engineering, Governance and Integrity System (EEGIS)**			Current
A	**Defence Estate Climate Adaptation Partnership**			Current (first half of 2020)
C	**Climate Compass – Climate Risk Framework for Commonwealth Agencies**		Department of Agriculture, Water and the Environment	Current
E	**Infrastructure Investment Program**		Department of Infrastructure, Transport, Regional Development and Communications	Current
B	**Strengthening telecommunications emergency resilience**			Current
C	**Organisation for Economic Co-operation and Development (OECD) Report - Policies to strengthen resilience and manage risk**		Department of Agriculture, Water and Environment and OECD	Current
E	**Healing and Rebuilding from the 2019 – 20 Bushfires**		Department of Industry, Science, Energy and Resources	Planned
F	**Improving Building Resilience**	COAG	Australian Building Codes Board	Current
C	**Development of climate change financial risk guidance**	Australian Government regulators	Minister for Agriculture, Drought and Emergency Management	Planned 2020-21
C	**Climate change financial risk vulnerability assessment**		APRA, Reserve Bank of Australia and Australian Securities and Investment Commission	Planned 2020-21
PRIORITY 2: AGGREGATED AUSTRALIAN GOVERNMENT FUNDING: $207 MILLION				

Figure 99: National Action Plan – Actions being undertaken to address priority 2 (accountability decisions)[7]

24.29 However, many of the main objectives of the NDRRF are reflected as 'Future areas of work' in the First National Action Plan, which leads us to query: if not now, then when? Examples of the National Action Plan's deferred bodies of work, many of which we have sought to address in this report, include:

- data and information - to make authoritative climate and disaster data and information available and accessible
- risk disclosure – to identify the relevant stakeholders who can take action to improve the disclosure of climate and disaster risks
- research and learning – to address gaps in knowledge and coordinate and harmonise research to understand high priority disaster risks and vulnerabilities
- priority risks – to work with partners to identify risks with the greatest potential impact on the nation to guide investment and mitigation efforts
- investment – to identify how increased investment literacy across all sectors can be supported to ensure investment opportunities are leveraged to reduce disaster risk, and
- transparency of risk transaction – to identify how transparency of disaster risk and potential impacts in transactions can be supported where disaster risk may be shifted from one party to another.[8]

24.30 To assist with determining its effectiveness, the NDRRF also notes that success will be measured against nationally relevant targets of the Sendai Framework, including the reduction of disaster mortality, number of people affected by disasters, direct economic loss, damage to critical infrastructure and disruption of basic services.

24.31 The disaster risk reduction goals under the NDRRF, to be achieved by 2030, are to:

- take action to reduce disaster risk
- minimise creation of future disaster risk through decisions taken across all sectors, and
- equip decision-makers with the capabilities and information they need to reduce disaster risk and manage residual risk.

24.32 We heard that the NDRRF does not directly adopt the seven global disaster loss targets under the Sendai Framework as national targets. Instead, the NDRRF focuses on enabling and tracking systemic change to reduce disaster risk. Member states, including Australia, are required to collect data and report on seven targets set out in the Sendai Framework. We heard that the Department of Home Affairs collates data to track progress against the Sendai goals for reporting to the United Nations Office for Disaster Risk Reduction, including against the associated indicators to understand disaster loss trends in Australia. In October 2018, Deloitte Access Economics undertook a review on behalf of the Department of Home Affairs to inform Australia's obligations to collect data and report to the United Nations on the Sendai Framework. The report determined that Australia was able to report on 25 of the 38 indicators associated with the seven global targets.[9] We addressed the importance of new data and its collection in Chapter 4: Supporting better decisions.

24.33 Evaluating Australia's success against these frameworks is vital so that governments, businesses and individuals have confidence that Australia continues to take cost-effective action to reduce disaster risk. This is especially so, in light of the disaster outlook.

24.34 **The status and currency of national strategies, plans and frameworks for disaster risk, resilience and climate adaptation should be clearly and publicly communicated.**

24.35 **The Australian Government, together with state and territory governments where appropriate, should consider whether national strategies, plans and frameworks for disaster risk, resilience and climate adaptation remain fit for purpose, and how they can align with national level strategic settings.**

24.36 **It would be desirable for national strategies, plans and frameworks for disaster risk, resilience and climate adaptation to incorporate clear lines of accountability, and measurable targets.**

24.37 Consistent with these principles, in developing an appropriate accountability mechanism, consideration is required as to the way to track, review, evaluate and report on the key responsibilities of the Australian Government, for example:

- the extent to which the Australian Government has implemented recommendations, accepted by the Australian government, of previous inquiries into natural disasters, climate adaptation, natural hazard resilience, and natural disaster risk reduction, and
- the extent to which the Australian, state and territory governments have implemented national frameworks, strategies, action plans, partnership

agreements and other such arrangements directed to climate adaptation, natural hazard resilience, and natural disaster risk reduction and recovery.

Assurance, continuous improvement and best practice

24.38 Quality assurance and monitoring supports accountability and builds consistency across all levels of disaster management arrangements. With the goal of promoting best practice and continuous improvement across all phases of disaster management, these encourage the best use of resources, and best possible outcomes for our communities. The process of assurance, particularly when conducted by an external and independent body, enables a statement of confidence to be made as to the effectiveness of agencies operating within disaster mitigation and management arrangements. Assurance can also reinforce a shared responsibility for better disaster mitigation and management outcomes for the community.

24.39 States and territories have shown interest in learning from each other. They have told us of the value of lessons management – be it through sharing experiences in operational matters, or examining and learning from each other's strategic arrangements in practice. There are various formal and informal arrangements that support this. For example, the Australasian Fire and Emergency Service Authorities Council (AFAC) has been described as a collaborative forum, where emergency services leaders actively share best practice;[10] the Australian Institute for Disaster Resilience runs a Lessons Management Forum, bringing together practitioners to share good practice, learnings and innovations.[11]

24.40 We heard that post-event analyses are vital in many circumstances, but have limitations when it comes to providing broader forward-facing policy direction:

> *Part of the problem in after-action reviews and in inquiries is that we can come up with a range of different recommendations but, in fact, they can be contradictory to each other. They can then create other problems and bottlenecks further down the track.*[12]

The value of independent assurance bodies

24.41 The 2009 Victorian Bushfires Royal Commission and the 2011 Queensland Floods Commission of Inquiry both recommended ongoing evaluation and reporting on implementation of their inquiries' recommendations, which provided the basis for establishing a formal external assurance body, the IGEM. These recommendations were made in the wake of two of Australia's biggest disaster events.

24.42 The Victorian[13] and Queensland[14] IGEMs have developed and maintained monitoring and assurance frameworks for emergency management, against which the capacity, capability and performance of the emergency management sector is to be assessed. They are independent, and report to Parliament.[15] In establishing the IGEMs, Victoria and Queensland have provided their respective emergency management sectors with an important resource for 'reassurance and a calibration and a feedback mechanism, particularly for people who are involved in real-time performance monitoring'.[16]

24.43 If the Australian Government intends to adopt greater responsibility in national coordination of disaster management, as we propose in this report, those responsibilities need to be underpinned not only by clear lines of accountability, but also quality assurance mechanisms to enable ongoing learning, continuous improvement and promote best practice as to:

- the effectiveness of the national committees and co-ordination mechanisms for natural disasters that the Australian Government facilitates (see Chapter 3: National coordination arrangements)
- the effectiveness of the Australian Government non-financial assistance processes for natural disasters (see Chapter 3: National coordination arrangements and Chapter 7: Role of the Australian Defence Force)
- the effectiveness of Australian Government natural disaster related information systems (see Chapter 4: Supporting better decisions), and
- the effectiveness of the Australian Government financial assistance processes for natural disasters (see Chapter 22: Delivery of recovery services and financial assistance).

Recommendation 24.1 Accountability and assurance mechanisms at the Australian Government level

The Australian Government should establish accountability and assurance mechanisms to promote continuous improvement and best practice in natural disaster arrangements.

24.44 **Queensland and Victoria's IGEM arrangements perform valuable assurance, evaluation and continuous improvement functions for their state fire and emergency services. Other jurisdictions should establish similar arrangements.**

24.45 **It is important that the discharge of these functions is independent, and conferred and discharged as a whole, not fragmented between different agencies.**

24.46 In establishing similar arrangements, states and territories without IGEMs should consider conferring the following functions:

- tracking and reporting on the extent to which that state or territory government has implemented recommendations, accepted by that government, of previous inquiries into climate adaptation, natural hazard resilience, natural disasters and disaster risk reduction
- sharing best practice in relation to climate adaptation and natural hazard resilience, disaster risk reduction, natural disaster response and recovery, including the sharing of recommendations and findings of post-action reviews
- reviewing and assessing the effectiveness of the state's or territory's engagement with and implementation of the national natural disaster frameworks, strategies and plans, including resource sharing arrangements
- monitoring implementation of critical infrastructure resilience arrangements, assessing incremental improvements, and identifying improvement opportunities

- regularly reviewing and assessing the effectiveness of disaster management by that state or territory, including relevant natural disaster management plans and their implementation
- regularly reviewing and assessing the effectiveness of disaster management by district and local groups, including state or territory, district and local disaster management plans
- reviewing and assessing cooperation between entities responsible for disaster management in that state or territory, including whether the disaster management systems and procedures employed by those entities are compatible and consistent
- recommending or making disaster management standards
- regularly reviewing and assessing disaster management standards
- reviewing, assessing and reporting on performance by entities responsible for disaster management in the state or territory against the disaster management standards
- working with entities performing emergency services, departments and the community to identify and improve disaster management capabilities, including volunteer capabilities
- monitoring compliance by departments with their disaster management responsibilities
- identifying opportunities for cooperative partnerships to improve disaster management outcomes, and
- reporting regularly and advising about issues relating to these functions.

24.47 **Those states with an IGEM should also consider whether the functions of their IGEM encompass each of the above functions.**

Recommendation 24.2 An independent accountability and assurance mechanism for each state and territory

Each state and territory government should establish an independent accountability and assurance mechanism to promote continuous improvement and best practice in natural disaster arrangements.

Box 24.1 Best practice in assurance and evaluation

Queensland and Victoria's IGEMs are statutory positions created in response to an identified lack of overarching assurance for the emergency management sector in their respective states. Their benefits and attributes include:

- providing greater confidence to government and the community in emergency management
- promoting a culture of continuous improvement within the sector, and encouraging all levels of the emergency management system to conduct their own self-assurance processes
- identifying benefits in consistency and collaboration
- strong engagement with stakeholders, community involvement and facilitation of better cooperative arrangements between agencies
- performing an accountability function through monitoring the implementation of previous review recommendations
- independent and accountable to Parliament, and
- building trust and relationships and taking a non-adversarial approach.

Queensland and Victoria's IGEMs undertake ongoing engagement with each other.

A public record of national significance

24.48 This is the first Royal Commission to be convened into Australia's natural disaster arrangements at a national level.

24.49 An extraordinary body of material has been gathered and analysed, contributing to a public record of national significance.

24.50 Continued availability and accessibility of the material published on our website, including exhibits, transcripts, submissions, papers, presentations, videos and photographs, will promote accountability, continuous improvement and best practice in national disaster arrangements.

Recommendation 24.3 A public record of national significance

The material published as part of this Royal Commission should remain available and accessible on a long-term basis for the benefit of individuals, communities, organisations, businesses and all levels of government.

List of tables

Table 1: Fatalities in Australia between 1900 and 2015 resulting from natural hazards 67
Table 2: Number of personnel deployed through NRSC and MOUs during the 2019-2020 bushfire season 155
Table 3: Defence assistance provided during Operation Bushfire Assist 2019-2020 190
Table 4: DACC categories 1-3 195
Table 5: Thresholds for assistance 196
Table 6: Use of sheltering terminology by states and territories 275
Table 7: Overview of Bushfire Warning System colour and symbols. 295
Table 8: Current NEPM AAQ – Standards for pollutants 314
Table 9: Sample of air quality health advice provided by NSW and Victoria 320
Table 10: Impact of insurance taxes 423
Table 11: Non-exhaustive list of financial assistance to individuals, small businesses and primary producers 460
Table 12: Examples of some of the financial assistance measures available to individuals 462
Table 13: Assistance measures under the DRFA 471
Table 14: Snapshot of standard Category A assistance provided by state and territory governments 476

List of figures

Figure 1: Members of the South Australian Country Fire Service illustrating the bushfire progression on Kangaroo Island for Commissioners, March 2020 50
Figure 2: Australian mean temperature anomaly, 1910-2019 58
Figure 3: Register of Australian pyrocumulonimbus wildfire (pyroCb) events: 1994-2019 59
Figure 4: Projected changes in climate-driven natural hazards. Confidence estimates are provided in brackets. 60
Figure 5: Climate projections for Australia 61
Figure 6: Future projections of fire weather conditions show increasing fire danger days 64
Figure 7: Formation of pyrocumulonimbus clouds and fire-generated thunderstorms 65
Figure 8: Elements of disaster risk associated with natural hazards 66
Figure 9: Insured losses from natural hazards – 2010 to 2020 68
Figure 10: Compound disasters from 1966-1967 to 2018-2019 within a three-month window, and at least ten normalised deaths and/or $100 million normalised losses. 69
Figure 11: Australia's capacity for disaster resilience 72
Figure 12: National Crisis Coordination Arrangements as set out in the AGCMF as in place during the 2019-2020 bushfires and prior to the COVID-19 pandemic 79
Figure 13: National Crisis Coordination Arrangements during the COVID-19 pandemic. Note that in response to the COVID-19 pandemic, the National Cabinet was convened to support coordination between first ministers 80
Figure 14: Simplified diagram of indicative high-level arrangements 95
Figure 15: Information needs for strategic and operational decision makers 113
Figure 16: Proportion of 38 indicators across the seven targets set out in the *Sendai Framework* that Australia could report on in 2018. 114
Figure 17: Contemplating the impact of bushfire 131
Figure 18: Adapted from the Australian Government Crisis Management Framework (October 2020) outlining Australian Government responsibilities. 139
Figure 19: Timeline of state and territory emergency declarations made during the 2019-2020 bushfire season 151
Figure 20: Firefighters conducting a roadside back burn 156
Figure 21: Firefighting trucks during the 2019-2020 bushfire season 161
Figure 22: Incident Management Team Hawksbury Gospers Mountain Fire December 2019 165
Figure 23: Firefighters working together, 2019-2020 bushfires 172
Figure 24: Volunteers as percentage of the fire and emergency services workforce 2018-2019 181
Figure 25: Number of fire and emergency services volunteers 2009-2019 181
Figure 26: Victorian CFA protecting house from Floodwater 2016 182
Figure 27: Enhanced medical team from HMAS Choules 188
Figure 28: Evacuees are transported from Mallacoota, Victoria to awaiting ships as part of Operation Bushfire Assist 2019-2020 189
Figure 29: People being evacuated on HMAS Choules 191
Figure 30: SEATs can be used to drop suppressant on bushfires. 206
Figure 31: A DC-10 LAT 207

Figure 32: Suppressant can be used to protect critical infrastructure such as telecommunications towers. 208
Figure 33: A Type-1 helicopter refilling its water tank 209
Figure 34: A RAAF C-130J Hercules transporting firefighting personnel. 215
Figure 35: Example of interdependencies 228
Figure 36: Australia's national freight (road and rail) routes 234
Figure 37: Example of educational material supporting disaster preparedness 250
Figure 38 Cross Border Sub-Plan 255
Figure 39: Side by side comparison of Towong Shire Council (left) and Moreton Bay Regional Council (right) 259
Figure 40: Beach evacuation at Lake Conjola, NSW 267
Figure 41: Cars queueing to evacuate Batemans Bay, NSW 271
Figure 42: Fires burning near Corryong 279
Figure 43: People evacuate to the beach with their animals at Malua Bay 280
Figure 44: Australian Emergency Warnings Arrangements 288
Figure 45: FDRS in NSW showing a severe rating 290
Figure 46: Fire Danger Rating System in each jurisdiction 293
Figure 47: A comparison of the 'Fires Near Me (NSW)' app (left) and 'VicEmergency' app (right) 302
Figure 48: An ABC broadcast tower impacted by the Mount Wandera bushfire in NSW 307
Figure 49: Size comparison of $PM_{2.5}$ and PM10 312
Figure 50: Satellite images of southeast Australia during the 2019-2020 bushfires. The light grey is the dispersal of bushfire smoke and the red and orange areas are detected fire and thermal anomalies. 313
Figure 51: Comparison of air quality action categories for $PM_{2.5}$ as at February 2020 – adapted from table produced by Environment Protection Authority (EPA) Victoria. 317
Figure 52: Bushfire smoke over Parliament House in Canberra 321
Figure 53: A NSW ranger carries out a controlled hazard reduction burn 322
Figure 54: US Wildfire Smoke Guide for Public Health Officials and factsheets 324
Figure 55: Visible satellite image (left); AQFx $PM_{2.5}$ forecast (right) 327
Figure 56: Air quality forecast for the Sydney Metropolitan Region on 1 January 2020 328
Figure 57: NIR activated for the COVID-19 pandemic 334
Figure 58: National committees involved in health emergencies 335
Figure 59: Ambulance on standby in Queensland, during the 2019-2020 bushfires 337
Figure 60: AUSMAT outside a field hospital in Batemans Bay, NSW 338
Figure 61: AUSMAT supporting the health response at a local hospital in Wangaratta, Victoria (left) and co-deployed AUSMAT and ADF personnel in NSW (right) 338
Figure 62: Local doctor in Cobargo, NSW, provides primary healthcare services in a motorhome after his practice was destroyed by the 2019-2020 bushfires 351
Figure 63: Clockwise top left: (1) Tae Rak channel and holding pond, Budj Bim Cultural Landscape in Victoria which was fire affected in 2019-2020 bushfires; (2) Release of a nationally endangered Eastern Bristlebird in Victoria after it had been extracted during the fires; (3) the nationally threatened Northern Corroboree Frog, which was defended by aerial firefighting; (4) the Alpine Sphagnum Bogs and Associated Fens, a nationally threatened ecological community that was defended in the ACT during the fires. 356

Figure 64: Pumping creek water to moisten ground fuel surrounding the Wollemi Pines 358
Figure 65: Land use in Australia 367
Figure 66: National fire return frequency for Australia, January 1988 to September 2020 370
Figure 67: Native forest fire extent during the 2019-2020 summer fire season 371
Figure 68: Photograph of Willinga Park at the boundary with the National Park, showing one of the bushfire risk mitigation measures 380
Figure 69: Figure from guidance on the 10/50 vegetation clearing rule in NSW 382
Figure 70: Indigenous fire management on public land in Queensland 389
Figure 71: Key steps that can help Traditional Owners and partners in sharing and weaving knowledge 394
Figure 72: Predicted distribution of exposure to high natural hazard risk in 2100. 402
Figure 73: Example of a house built to be resilient to natural hazards becoming less so due to a lack of maintenance and compliance with protective measures 405
Figure 74: Flooding in February 2020 in Jandowae, Queensland 407
Figure 75: Cycle of insurer-recognised mitigation with financial incentives 409
Figure 76: Four domains of community recovery 429
Figure 77: The recovery cycle, adapted from the Australian Disaster Resilience Handbook 2: Community Recovery 430
Figure 78: Bushfires and then flooding in Towong Shire, Victoria. 431
Figure 79: Firefront in Bingie, Eurobodalla, January 2020 432
Figure 80: Eurobodalla youth in recovery 432
Figure 81: Australian Red Cross volunteer outside the Bairnsdale relief centre, Victoria 434
Figure 82: Pop-up mall in Mogo, NSW provided a temporary location for local businesses to operate in the aftermath of the 2019-2020 bushfires 435
Figure 83: The presence of asbestos can add siginificant complications to clean-up efforts 438
Figure 84: An influx of unsolicted donations can quickly overwhelm storage capacity 440
Figure 85: Homes detroyed in NSW by the 2019-2020 bushfires 442
Figure 86: The recovery trajectory for communities 443
Figure 87: Local residents volunteering in Quaama, NSW 446
Figure 88: BlazeAid volunteers helping to repair a fence in NSW 453
Figure 89: Recovery in action following the 2019-2020 bushfires 456
Figure 90: Recovery related expenditure for the 2019-2020 bushfires 458
Figure 91: Cobargo Community Relief Centre in NSW 466
Figure 92: Hailstorm damage in Canberra, January 2020 472
Figure 93: Reimbursement under the Disaster Recovery Funding Arrangements[116] 473
Figure 94: Comparison of eligible state and territory expenditure under the NDRRA and DRFA.[119] 474
Figure 95: Damaged road in Queensland as a result of ex-Cyclone Debbie in 2017[136] 476
Figure 96: Delivery of fodder for livestock being escorted, following the 2019-2020 bushfires[216] 487
Figure 97: The basics of Earth observation and data collection 498
Figure 98: Disaster inquiries in Australia 1970-2020 504
Figure 99: National Action Plan – Actions being undertaken to address priority 2 (accountability decisions) 507

Endnotes

Chapter 1 Introduction

[1] The Letters Patent are set out at Appendix 1: Letters Patent.
[2] Associate Professor Owen, University of Tasmania, Transcript 2676; RCN.900.100.0031.
[3] Photograph taken by staff of the Office of the Royal Commission, Kangaroo Island 4 March 2020.
[4] Royal Commissions have broad powers to gather information to assist with their inquiries: for example, the power to summons witnesses, and to require individuals and organisations to provide documents, and provide information.
[5] The Bushfire and Natural Hazards Cooperative Research Centre has catalogued these and other related inquiries and reviews, and categorised their recommendations. A list of past inquiries, drawn from the Centre's database, is set out in Background paper: Australian Inquiries and Reports Concerning Natural Disasters <https://naturaldisaster.royalcommission.gov.au/publications/background-paper-australian-inquiries-and-reports-concerning-natural-disasters>.

Chapter 2 Natural disaster risk

[1] Dr Braganza, Bureau of Meteorology, Transcript 7; BOM.502.001.0001.
[2] Bureau of Meteorology, Monthly Weather Review – Australia March 2020 <http://www.bom.gov.au/climate/mwr/aus/mwr-aus-202003.pdf>
[3] Bureau of Meteorology, Monthly Weather Review – Australia April 2020 <http://www.bom.gov.au/climate/mwr/aus/mwr-aus-202004.pdf>
[4] Bureau of Meteorology, Monthly Weather Review – Australia May 2020 <http://www.bom.gov.au/climate/mwr/aus/mwr-aus-202005.pdf>
[5] Bureau of Meteorology, Monthly Weather Review – Australia June 2020 <http://www.bom.gov.au/climate/mwr/aus/mwr-aus-202006.pdf>
[6] Bureau of Meteorology, Monthly Weather Review – Australia July 2020 <http://www.bom.gov.au/climate/mwr/aus/mwr-aus-202007.pdf>
[7] Bureau of Meteorology, Monthly Weather Review – Australia August 2020 <http://www.bom.gov.au/climate/mwr/aus/mwr-aus-202008.pdf>
[8] Dr Buckley, Insurance Australia Group, Transcript 2879.
[9] Ms Carson, Geoscience Australia, Transcript 41.
[10] https://www.ga.gov.au/scientific-topics/community-safety/earthquake; a magnitude 6.5 earthquake at Meckering in 1968 caused extensive damage to buildings and was felt over most of southern Western Australia. Earthquakes of magnitude 4.0 or more are relatively common in Western Australia, with one occurring approximately every five years in the Meckering region.
[11] https://www.ga.gov.au/news-events/features/30-years-on-commemorating-the-1989-newcastle-earthquake
[12] Dr Cleugh, Commonwealth Scientific and Industrial Research Organisation, Transcript 31.
[13] Dr Braganza, Bureau of Meteorology, Transcript 10.
[14] Dr Braganza, Bureau of Meteorology, Transcript 14.
[15] BOM.501.001.0001.
[16] Figure from presentation of Dr Karl Braganza, Bureau of Meteorology, BOM.502.001.0001; Mean temperature anomalies averaged over Australia (as calculated from the 1961-1990 average). The black lines shows the 11-year moving average.
[17] Dr Cleugh, Commonwealth Scientific and Industrial Research Organisation, Transcript 32
[18] BOM.502.001.0001.
[19] BOM.503.001.0017.
[20] BOM.502.001.0001.
[21] BOM.502.001.0001.
[22] BOM.502.001.0001.
[23] Dr Braganza, Bureau of Meteorology, Transcript 18.
[24] Giovanni Di Virgilio et al, 'Climate Change Increased the Potential for Extreme Wildfires' (2019) 46(14) *Geophysical Research Letters*.
[25] Graph produced using Table S3 (Register of Australian pyroCb events) contained in 'Supporting Information' from Giovanni Di Virgilio et al, 'Climate Change Increased the Potential for Extreme Wildfires' (2019) 46(14) *Geophysical Research Letters*.

[26] Professor Jason Sharples, UNSW Canberra, Transcript 2390-2392; NND.001.00945.01_0001.
[27] Professor Bradstock, University of Wollongong, Transcript 626; Professor Bowman, Transcript 627.
[28] Professor Bowman, University of Tasmania, Transcript 267
[29] RCN.900.125.0305.
[30] RCN.900.125.0305.
[31] Figure from the Climate Measurement Standards Initiative, RCN.900.125.0305; 'Confidence' in a climate projection is a measure of how plausible the projected range of change is for a given emission scenario.
[32] RCN.900.125.0305; Dr Cleugh, Commonwealth Scientific and Industrial Research Organisation, Transcript 28.
[33] BOM.503.001.0017.
[34] BOM.501.001.0001.
[35] Dr Grose, Commonwealth Scientific and Industrial Research Organisation, Transcript 2857.
[36] Dr Grose, Commonwealth Scientific and Industrial Research Organisation, Transcript 2857.
[37] Figure from M. R. Grose, Narsey S, Delage F P, Dowdy A J, Bador M, Boschat G et al, 'Insights From CMIP6 for Australia's Future Climate', AGU Advancing Earth and Space Science, RCN.900.135.0001.
[38] Dr Grose, Commonwealth Scientific and Industrial Research Organisation, Transcript 2856.
[39] Dr Grose, Commonwealth Scientific and Industrial Research Organisation, Transcript 2866.
[40] BOM.501.001.0001.
[41] Dr Braganza, Bureau of Meteorology, Transcript 18.
[42] Dr Cleugh, Commonwealth Scientific and Industrial Research Organisation, Transcript 35.
[43] Dr Grose, Commonwealth Scientific and Industrial Research Organisation, Transcript 2866
[44] Dr Grose, Commonwealth Scientific and Industrial Research Organisation, Transcript 2866.
[45] BOM.501.001.0001; CSI.505.001.0001; Dr Cleugh, Commonwealth Scientific and Industrial Research Organisation, Transcript 35.
[46] CSI.505.001.0001.
[47] BOM.501.001.0001.
[48] CSI.505.001.0001.
[49] Insurance Australia Group, IAG.500.001.0001.
[50] Insurance Australia Group, IAG.500.001.0001.
[51] BOM.503.001.0017.
[52] BOM.503.001.0017.
[53]Bureau of Meteorology and CSIRO, 'Climate Change in Australia'; CSIRO, Department of the Environment and Climate Change in Australia, *Climate Change in Australia, Regional Report - Chapter Seven, Projections: Atmosphere and the Land*.
[54] Commonwealth Scientific and Industrial Research Organisation, CSI.502.001.0046.
[55] BOM.501.001.0001; CSI.502.001.0046.
[56] CSI.502.001.0046.
[57] BOM.501.001.0001.
[58] Ms Carson, Geoscience Australia, Transcript 41.
[59] Allen, T., Leonard, M., Ghasemi, H., Gibson, G. 2018. The 2018 National Seismic Hazard Assessment for Australia: Earthquake Epicentre Catalogue. Record 2018/030. Geoscience Australia, Canberra.
[60] Dr Crompton, Risk Frontiers, Transcript 64.
[61] BOM.501.001.0001.
[62] BOM.501.001.0001.
[63]CSI.502.001.0046; BOM.501.001.0001.
[64] BOM.501.001.0001.
[65] BOM.501.001.0001.
[66] IAG.500.001.0001.
[67] BOM.501.001.0001.
[68] BOM.502.001.0001.
[69] BOM.501.001.0001.
[70] Figure from Dowdy et al (2019), as cited in CSI.505.001.0001. Results are presented as the percentage change from the time period 1990-2009 to 2060-2079. FFDI calculation exceeds a value of 25 which represents conditions classed as 'very high' in operational fire danger forecasts. Predictions include greenhouse gas as a 'high emission' scenario.
[71] BOM.503.001.0001; CSI.505.001.0001.
[72] IAG.500.001.0001.
[73] IAG.500.001.0001.
[74] BOM.501.001.0001.
[75] CSI.502.001.0046.
[76] BOM.503.001.0001; CSI.505.001.0001.

[77] BOM.503.001.0001; BOM.501.001.0001. 'there were there were multiple pyrocumulonimbus events, particularly on the south coast of NSW and into Gippsland, Victoria': Professor Bradstock, University of Wollongong, Transcript 626.
[78] BOM.501.001.0001.
[79] BOM.503.001.0001.
[80] Figure from presentation of Dr Karl Braganza, Bureau of Meteorology, BOM.502.001.0001.
[81] Mami Mizutori, 'Time to Say Goodbye to "Natural" Disasters' (16 July 2020) <https://www.preventionweb.net/experts/oped/view/72768>.
[82] HAF.8001.0001.0049.
[83] HAF.8001.0001.0049.
[84] Figure based on the three aspects of disaster risk, as outlined in the Sendai Framework (DMC.001.001.0921); Figure adapted from a similar depiction of disaster risk produced by Professor Holger Maier, Mr Graeme Riddell and Adjunct Associate Professor Hedwig van Delden <see: https://theconversation.com/natural-hazard-risk-is-it-just-going-to-get-worse-or-can-we-do-something-about-it-84286>
[85] HAF.8001.0001.0049.
[86] RYC.500.001.0001.
[87] NND.001.01013.06; This was a 10-year average and reflected total economic cost at a point in time. It does not capture the variability in disaster costs from year-to-year which could be well above or well below this historical average. Similarly, it presents historical data on economic cost rather than an estimate of risk that Australia may be exposed to for various disaster types.
[88] Graph producing using data sourced from the Insurance Council of Australia's ICA Catastrophe Database, ICA DataGlobe. Accessed 5 October 2020. <https://www.icadataglobe.com/metadata-search>
[89] RCN.900.127.0068.
[90] CSI.508.001.0027.
[91] NND.001.01013.06.
[92] Figure from A Gissing, M Timms, S Browning, L Coates, R Crompton, J McAneney, 'Compound Natural Disasters in Australia: A Historical Analysis', Bushfire and Natural Hazards CRC, RCN.900.122.0001.
[93] Figure from A Gissing, M Timms, S Browning, L Coates, R Crompton, J McAneney, 'Compound Natural Disasters in Australia: A Historical Analysis', Bushfire and Natural Hazards CRC, RCN.900.122.0001; Years along the x-axis refer to financial years. Long-term stressors included.
[94] RCN.900.122.0001.
[95] See, eg Associate Professor Tolhurst, University of Melbourne, Transcript 639; Professor Bradstock, University of Wollongong, Transcript 644; Mr De Haan, Transcript 736.
[96] NND.001.01368.01.
[97] GEO.502.001.0002.
[98] HAF.8001.0001.0049
[99] RCN.900.112.041.
[100] RCN.900.112.041.
[101] RCN.900.005.0449.
[102] RCN.900.148.0001.
[103] Bushfire & Natural Hazards CRC, 'Australian Disaster Resilience Index: Building Safer, Adaptable Communities' (2020) <https://adri.bnhcrc.com.au/#!/maps>

Chapter 3 National coordination arrangements

[1] The Commonwealth Constitution confirms the territorial boundaries of the States, and preserves the States as self-governing polities with extensive legislative, executive and judicial authority.
[2] HAF.8001.0001.0049.
[3] RCN.900.034.0092.
[4] RCN.900.117.0001.
[5] RCN.900.034.0001. Some states and territories have preparedness frameworks, reports, guidelines or preseason briefs. See CLQ.001.001.0266, SWA.004.001.0008, TPF.500.001.0039, EMV.0003.0003.0217 and ESA.500.001.0002.
[6] SWA.502.001.0133.
[7] HAF.0003.0001.0639.
[8] The Royal Commission has heard that the NSW Premier and Emergency Services Minister receive briefings from the NSW State Emergency Management Committee: see NSW.005.002.0001; Shane Fitzsimmons AFSM, Resilience NSW, Transcript 2542-2543.
[9] The Northern Territory does not have a strategic policy and/or operational level decision making committee, all decisions are made at the ministerial level. Queensland's Emergency Management Committee is chaired by the Premier. Queensland is unique in comparison to the other jurisdictions because this committee, chaired by the

Premier, is not only comprised of ministers but also members responsible for policy and operations including the Emergency Services Chiefs.
[10] PMC.505.001.0002.
[11] HAF.0003.0001.0519.
[12] HAF.0003.0001.0519.
[13] HAF.0003.0001.0478.
[14] HAF.8001.0001.0180.
[15] WAH.001.001.0009.
[16] RCN.900.140.0001.
[17] RCN.900.144.0972; RCN.900.144.0862
[18] HAF.0003.0001.0639
[19] For the purposes of NATCATDISPLAN, the term 'State' includes the Northern Territory, ACT, Island and Offshore Territories.
[20] HAF.0003.0001.0478.
[21] HAF.8001.0001.0180.
[22] Clauses 3 and 8 of NATCATDISPLAN respectively includes among the circumstances and events defining a catastrophic natural disaster to be when the 'affected Executive Government is temporarily incapacitated'.
[23] Professor Cheryl Saunders, University of Melbourne, Transcript 2706-2709.
[24] Meeting of the Council of Australian Governments Sydney 13 March 2020 Communique, PMC.0001.0002.0446.
[25] Prime Minister of Australia, Press Conference 29 May 2020 <https://www.pm.gov.au/media/press-conference-australian-parliament-house-act-29may20>. See also Mr Philip Gaetjens, Secretary, Commonwealth Department of Prime Minister and Cabinet, Transcript 2752.
[26] Council of Australian Governments, 'COAG Councils' <https://www.coag.gov.au/coag-councils>
[27] The Ministerial Council for Police and Emergency Management (MCPEM) sits once a year to consider a broad range of issues associated with law enforcement reform and emergency management. MCPEM is comprised of Ministers for police and emergency management from the Australian Government, states and territories and New Zealand, and the President of the Australian Local Government Association (ALGA).
[28] Department of Home Affairs, 'Australia-New Zealand Emergency Management Committee' <https://www.homeaffairs.gov.au/help-and-support/how-to-engage-us/committees-and-fora/australia-new-zealand-emergency-management-committee>
[29] HAF.0005.0006.0011.
[30] HAF.0003.0001.0519.
[31] HAF.0003.0001.0519.
[32] HAF.0003.0002.0004.
[33] HAF.0003.0001.0519.
[34] HAF.0003.0002.0004.
[35] HAF.8001.0001.0001, 12; HAF.8001.0001.0171
[36] HAF.0003.0002.0001.
[37] HAF.8001.0001.0001.
[38] HAF.507.001.0001.
[39] Mr McTavish, NSW Cross Border Commissioner, Transcript 1201.
[40] PMC.505.001.0002. Version 2.3, published on 9 October 2020, replaced version 2.2, and reflects updated administrative arrangements following 'the establishment of new ministerial portfolios focused on natural disasters and emergency management and revised Defence Assistance to the Civil Community (DACC) arrangements', as well as to reflect the 'retirement of the Council of Australian Governments arrangements and associated structures'. It also notes that a 'redraft of the arrangements is planned for 2021, following the Government's response to the findings and recommendations' of this Royal Commission.
[41] PMC.505.001.0002. In Figure 2, 'AGDRC' refers to the Australian Government Disaster Recovery Committee. 'IDETF' refers to Inter-Departmental Emergency Taskforce, which manages the whole-of-government response to overseas incidents or crises that harm or threaten to harm, Australians or Australia's interest overseas.
[42] HAF.8001.0001.0001.
[43] HAF.8001.0001.0180.
[44] NND.001.00824.01.
[45] NND.001.00824.01.
[46] Australian Maritime Safety Authority, the Bureau of Meteorology (BOM) and Geoscience Australia: NND.001.00824.01. BOM is also an official observer at CCOSC meetings: AFC.502.001.0049.
[47] RCN.900.009.0009.
[48] AFC.511.001.0813.
[49] AFC.502.001.0141.
[50] AFC.502.001.0049.
[51] RCN.900.082.0001.

[52] HAF.0003.0001.0494. See also AFC.509.001.0001.
[53] Mr Spain, Northern Territory Fire and Rescue Service, Transcript, 2436; Mr Ellis, AFAC, Transcript 292, 305, 322.
[54] AFC.512.001.0001 – Mr Ellis AM, Australasian Fire and Emergency Service Authorities Council. See also Commissioner Fitzsimmons, Resilience NSW, Transcript 2550.
[55] Mr Cameron OAM, Director-General, EMA, Transcript 430, 2629.
[56] AFC.512.001.0001.
[57] HAF.0003.0001.0519.
[58] NND.001.00824.01.
[59] Bilateral or cross-border resource sharing is arranged outside of the CCOSC and the NRSC.
[60] AFC.505.001.0716.
[61] HAF.0005.0007.0360; AFC.512.001.0001.
[62] HAF.0003.0001.0494; NND.001.00824.01.
[63] HAF.0005.0004.0053.
[64] HAF.0003.0001.0504; HAF.0003.0001.0494.
[65] NND.001.00824.01; HAF.0003.0002.0047; HAF.0003.0002.0055; AFC.502.001.0836; AFC.502.001.0647.
[66] HAF.0003.0001.0494.
[67] AFC.511.001.0019.
[68] AFC.511.001.0019.
[69] AFC.502.001.1641; AFC.511.001.0452.
[70] NND.001.00824.01; AFC.502.001.0101
[71] AFC.503.001.0003.
[72] NND.001.00824.01.
[73] AFC.502.001.0194.
[74] AFC.502.001.0049.
[75] AFC.505.001.0145; AFC.505.001.0147.
[76] Mr Mullins, Former Commissioner, Fire and Rescue NSW, Transcript 1500.
[77] NND.001.00824.01.
[78] NND.001.00824.01.
[79] NND.001.00824.01.
[80] NND.001.00824.01.
[81] AFC.506.001.0496.
[82] See eg Mr Spain, Northern Territory Fire and Rescue Service, Transcript 2439–2440.
[83] Commissioner Baxter, Fire and Rescue NSW, Transcript 2614; Mr Ellis AM, Australasian Fire and Emergency Service Authorities Council, Transcript 301–302; An example of the CCOSC Summary Report as at Tuesday 21 October 2020 is AFC.504.001.0001.
[84] QFS.501.001.0001; NND.800.200.00055; Commissioner Whelan, ACT Emergency Services Agency, Transcript 2026; HAF.0005.0007.0006.
[85] In 2017, the Council of Australian Governments decided to replace the Law, Crime and Community Safety Council with separate councils for Ministers for Police and Emergency Management and Attorney-Generals. The Ministerial Council for Police and Emergency Management and Council of Attorney-Generals were subsequently established. (<https://www.homeaffairs.gov.au/help-and-support/how-to-engage-us/committees-and-fora/ministerial-council-police-emergency-management>)
[86] As at October 2013, EMA was part of the Attorney-General's Department.
[87] AFC.511.001.0850.
[88] AFC.502.001.0049.
[89] AFC.511.001.0019; and Mr Ellis AM, Australasian Fire and Emergency Service Authorities Council, Transcript 311.
[90] AFC.508.001.0037.
[91] QFS.002.001.0039; SAF.203.004.0017; RFS.001.001.0001; QFS.002.001.0039.
[92] NSW.006.001.0001.
[93] AFC.508.001.0016.
[94] AFC.502.001.0006.
[95] Mr Richard Adler, Transcript 325.
[96] AFC.500.001.0001.
[97] AFC.502.001.1566.
[98] HAF.9001.0001.0014
[99] AFC.502.001.0006.
[100] AFC.511.001.0011.
[101] Commissioner Arnol, Tasmanian Department of Fire and Emergency Services, Transcript 2082.
[102] HAF.8003.0001.0001.
[103] NND.001.00824.01.
[104] Commissioner Whelan, ACT Emergency Services Agency, Transcript 2493–2494.

[105] AFC.510.001.0001.
[106] HAF.0005.0002.0008.
[107] HAF.0005.0007.0360; NND.800.200.00053.
[108] Commissioner Fitzsimmons, Resilience NSW, Transcript 2012; Commissioner Rogers, NSW Rural Fire Service, Transcript 2012; Acting Commissioner Waters, Western Australian Department of Fire and Emergency Services, Transcript 2459.
[109] HAF.0005.0007.0360; NND.800.200.00053.
[110] Compound disasters could comprise: two or more extreme disaster events occurring simultaneously or successively; combination of extreme events with underlying conditions that amplify their impact; or combination of events that are not themselves extreme but which collectively lead to an extreme impact: RCN.900.122.0032.
[111] AFC.512.001.0001.
[112] Mr Cameron OAM, EMA, Transcript 428.
[113] Commissioner Whelan, ACT Emergency Services Agency, Transcript 2497.
[114] Mr Cameron OAM, EMA, Transcript 429.
[115] HAF.0003.0001.0519.
[116] Mr Klemm, Western Australian Department of Fire and Emergency Services, Transcript 2171.
[117] AFC.508.001.0016.
[118] Mr Klemm, Western Australian Department of Fire and Emergency Services, Transcript 2171.
[119] VIC.900.001.0001.
[120] HAF.8001.0001.0001.
[121] Commissioner Baxter, Fire and Rescue NSW, Transcript 2609.
[122] AFC.510.001.0001.
[123] AFC.510.001.0001. Mr Stuart Ellis AM, the CEO of AFAC, provided a statement to us setting out the accountability arrangements for AFAC, CCOSC, NRSC and NAFC: AFC.512.001.0001.
[124] CJN.002.001.0038.
[125] AFC.512.001.0001.
[126] Commissioner Arnol, Tasmanian Department of Fire and Emergency Services, Transcript 2485; SAG.515.001.0009; SAG.515.001.0001; SAG.515.001.0006; Commissioner Crisp, Emergency Management Victoria, Transcript 2517.
[127] Commissioner Baxter, Fire and Rescue NSW, Transcript 2569. Commissioner Whelan, ACT Emergency Services Agency, Transcript 2493.
[128] HAF.8003.0001.0001. See similarly Commissioner Whelan, ACT Emergency Services Agency, Transcript 2491, 2496; Commissioner Crisp, Emergency Management Victoria, Transcript 2518–2519.
[129] AFC.511.001.0019.
[130] AFC.512.001.0001.
[131] AFC.512.001.0001.
[132] AFC.512.001.0001.
[133] NND.001.00824.01.
[134] FRN.002.001.0001.
[135] FRN.002.001.0001.
[136] NSW.006.001.0001 – NSW Government, *Final Report of the NSW Bushfire Inquiry,* (31 July 2020).
[137] RCN.900.138.0001 – Australian Institute for Disaster Resilience, '2019-20 Major Incidents Report'.
[138] Mr Stark, South Australian Country Fire Service, Transcript 2125, 2236, 2491.
[139] For further detail about health impacts of natural disasters refer to Chapter 15: Health.
[140] Commonwealth, Royal Commission on Australian Government Administration, *Report* (1976).
[141] Mr Darby, former Director-General, EMA, Transcript 2700.
[142] Mr Jennings, Australian Strategic Policy Institute, Transcript 2899–2900.
[143] NND.300.005.0003.
[144] Professor Cheryl Saunders, University of Melbourne, Transcript 2706-2713 and RCN.900.083.0001; Professor Murphy, Commonwealth Department of Health, Transcript 2595–2596; Commissioner Halton, National COVID-19 Coordination Commission Advisory Board, Transcript 2603; Mr Michael Pezullo AO, Secretary, Department of Home Affairs, Transcript 2720; Mr Philip Gaetjens, Secretary, Commonwealth Department of Prime Minister and Cabinet, Transcript 2746-2749.
[145] Professor Murphy, Commonwealth Department of Health, Transcript 2595–2596; Mr Philip Gaetjens, Commonwealth Department of Prime Minister and Cabinet, Transcript 2747-2748.
[146] Commissioner Halton PSM, National COVID-19 Coordination Commission Advisory Board, Transcript 2603.
[147] Commonwealth Department of Health, 'Australian Health Protection Principal Committee' <https://www.health.gov.au/committees-and-groups/australian-health-protection-principal-committee-ahppc>.
[148] Professor Murphy, Commonwealth Department of Health, Transcript 2595.
[149] Dr Finkel, Australia's Chief Scientist, Transcript 2312; Professor Saunders, the University of Melbourne, Transcript 2707.

[150] Mr Pezzullo AO, Commonwealth Department of Home Affairs, Transcript 2736.
[151] CTH.900.001.0001.
[152] HEA.9001.0002.0001; Mr Philip Gaetjens, Commonwealth Department of Prime Minister & Cabinet, Transcript 2747-2749.
[153] CTH,900.001.0001; NSW.900.001.0003; CLQ.003.001.0001; VIC.900.001.0001; SWA.007.001.0002.
[154] PMC.8002.0001.0001; see also Mr Philip Gaetjens, Commonwealth Department of Prime Minister & Cabinet, Transcript 2747-2749.
[155] HAF.8001.0001.0049; HAF.8001.0001.0001.
[156] Prime Minister of Australia, (Press Conference, 4 September 2020) <https://www.Pm.Gov.Au/Media/Press-Conference-Australian-Parliament-House-Act-040920>.
[157] RCN.900.034.0092.
[158] HAF.8001.0001.0049.
[159] HAF.8003.0001.0001.
[160] PMC.8002.0001.0001.
[161] PMC.8002.0001.0001
[162] Mr Mark Crossweller, former Director-General, EMA, Transcript 2698.
[163] Mr Mark Crossweller, former Director-General, EMA Transcript 2698.
[164] PMC.505.001.0002.
[165] PMC.8002.0001.0001.
[166] HAF.8001.0001.0001 2-4.
[167] Mr Cameron OAM, Transcript 2632.
[168] HAF.8001.0001.0001, 13-14.
[169] Mr Gaetjens, Commonwealth Department of the Prime Minister and Cabinet, Transcript 2933.
[170] AFC.512.001.0001.
[171] NTT.900.001.0003; NSW.900.001.0003; SSA.900.001.0003; SWA.007.001.0002; TAS.900.001.0003.
[172] NSW.900.001.0003; SWA.007.001.0002; TAS.900.001.0003; NTT.900.001.0003.
[173] NSW.500.001.0001.
[174] VIC.900.001.0001.
[175] Mr Pezzullo AO, Department of Home Affairs, Transcript 2727.
[176] Mr Pezzullo AO, Department of Home Affairs, Transcript 2740.
[177] Mr Pezzullo AO, Commonwealth Department of Home Affairs, Transcript 2727.
[178] Professor Murphy, Commonwealth Department of Health, Transcript 2590.
[179] LGA.500.001.0001; ADC.501.001.0002; ACT.500.001.0001; Ms Prendergast, Resilience NSW, Transcript 1952.
[180] ADC.501.001.0002; SRC.500.001.0001.
[181] ADC.501.001.0002; SRC.500.001.0001.
[182] SSA.468.056.0001; Mr Burkevics, ACT Security and Emergency Management Branch, Transcript 1854; ADC.501.001.0002; SRC.500.001.0001.
[183] PMC.8002.0001.0001.
[184] RCN.001.001.2304 – Productivity Commission, *Natural Disaster Funding Arrangements,* (Inquiry Report No 74, 17 December 2014) stated: *There are other practices that can also reduce waste…the funding arrangements should seek to prevent repeated disaster events causing repeated recovery costs if mitigation, betterment or not rebuilding damaged assets would be more efficient and effective*.
[185] NND.300.006.0151.
[186] TAS.900.001.0001; SWA.007.001.0002.
[187] ACT.900.001.0001; TAS.900.001.0001.
[188] SWA.007.001.0002
[189] CLQ.003.001.0001; SSA.900.001.0003; TAS.900.001.0001; VIC.900.001.0001.
[190] CLQ.003.001.0001.
[191] TAS.900.001.0001.
[192] PMC.8002.0001.0001.
[193] Under the *Public Governance, Performance Accountability Act 2013*, these entities are described as 'listed entities', which are a type of non-corporate Commonwealth entity.
[194] Mr Stone, Coordinator General, National Drought and North Queensland Flood Response and Recovery Agency, Transcript 538-539.
[195] Mr Jennings, Australian Strategic Policy Institute, Transcript 2900.

Chapter 4 Supporting better decisions

[1] CTH.901.001.0005.

[2] Department of Home Affairs, *Deconstructing Disaster: The strategic case for developing an Australian Vulnerability Profile to enhance national preparedness* (2018) <https://knowledge.aidr.org.au/media/6689/avp_nrt_report_deconstructing-disaster_march-2017.pdf>.
[3] HAF.9008.0001.0001.
[4] Figure from Deloitte Access Economics 'Sendai Data Collection and Analysis', HAF.9008.0001.0001.
[5] HAF.9008.0001.0001; HAF.0001.0002.0036.
[6] HAF.8001.0001.0049.
[7] HAF.9008.0001.0001.
[8] HAF.8001.0001.0199.
[9] Department of Home Affairs, *Deconstructing Disaster: The strategic case for developing an Australian Vulnerability Profile to enhance national preparedness* (2018) <https://knowledge.aidr.org.au/media/6689/avp_nrt_report_deconstructing-disaster_march-2017.pdf>.
[10] RCN.900.112.0415.
[11] NND.300.005.0001; NSW.900.001.0003.
[12] NSW.001.001.0040; CLQ.001.001.0071; EMV.0005.0001.0068; SSA.468.021.0001; FES.007.001.0002_0001; NTT.500.001.0060; ACT.500.001.0001; TAS.500.001.0452.
[13] AWE.9003.0001.0018.
[14] *A report to the Council of Australian Governments by a high level officials' group, Natural Disasters in Australia - Reforming Mitigation, Relief and Recovery Arrangements* (August 2002).
[15] RCN.001.0001.0489.
[16] EPA.500.001.1491.
[17] RCN.001.001.1920.
[18] BOM.501.001.0001; CSI.500.001.0001; AWE.501.001.0001; NSW.500.001.0001; ENN.500.001.0032; FES.003.001.0003; HAF.9001.0001.0013; NTP.501.001.0026; PTS.501.001.0002; SDQ.001.001.0001; ESA.500.001.0074; QFS.002.001.0012; SAF.500.001.0005; PLH.003.001.0003; EPA.500.001.0002; EMV.0005.0001.0068.
[19] LiDAR stands for *Light Detection and Ranging*, and is a remote sensing method that can generate precise, three-dimensional information about the shape of the Earth and its surface characteristics using light in the form of a pulsed laser.
[20] NND.001.01141.01; GEO.502.001.0002; PMC.0003.0001.0001; NND.001.01062.02; SHP.500.001.0002; NND.001.01360.02.
[21] Commissioner Georgeina Whelan, ACT Emergency Services Agency, Transcript 750; Mr Julian Lyngcoln, Department of Environment Land, Water and Planning for Victoria, Transcript 1671.
[22] CTH.900.001.0001.
[23] NSW.500.001.0001; ESQ.002.001.0012; EPA.500.001.0002; QFS.002.001.0012; SAS.500.001.0003; EMV.0005.0001.0068; NND.600.00381; NTP.501.001.0026; FES.003.001.0003.
[24] SSA.900.001.0003; SWA.007.001.0002; TAS.900.001.0003.
[25] Dr Dan Metcalfe, Deputy Director CSIRO Land and Water, Transcript 2852.
[26] Dr Dan Metcalfe, Deputy Director CSIRO Land and Water, Transcript 2852.
[27] CTH.902.001.0003.
[28] BNH.500.001.0001; NND.001.00860.01; HAF.501.001.0001; SHP.500.001.0002; CSI.501.001.0001; NSW.500.001.0001.
[29] RCN.900.125.0096.
[30] RCN.900.125.0096.
[31] RCN.900.125.0253.
[32] RCN.900.125.0253.
[33] RCN.900.125.0305.
[34] RCN.900.125.0241.
[35] HAF.0012.0002.0003.
[36] VIC.900.001.0001.
[37] SSA.900.001.0003.
[38] TAS.900.001.0003.
[39] CTH.900.001.0001.
[40] CTH.900.001.0001.
[41] PMC.9003.001.001.
[42] PMC.9003.001.001.
[43] CTH.901.001.0005.
[44] CTH.901.001.0005.
[45] CTH.901.001.0005.
[46] CSI.508.001.0027.
[47] Dr Helen Cleugh, CSIRO, Transcript, 30.

[48] Dr Helen Cleugh, CSIRO, Transcript, 29-30.
[49] CSI.502.001.0092.
[50] CSI.500.001.0001.
[51] BOM.501.001.0001.
[52] Mr Shoni Maguire, Bureau of Meteorology, Transcript 576.
[53] RCN.900.112.0910.
[54] EWS.500.001.003 53; ESQ.002.001.0012; RCN.900.125.0029; PTS.501.001.0002.
[55] RCN.900.112.0281.
[56] RCN.900.125.0029.
[57] RCN.900.125.0029.
[58] RCN.900.125.0029.
[59] RCN.900.125.0029.
[60] RCN.900.112.0817.
[61] CSI.505.001.0001; Dr Helen Cleugh, CSIRO, Transcript 29.
[62] Dr Helen Cleugh, CSIRO, Transcript 30.
[63] CSI.502.001.0092.
[64] Dr Helen Cleugh, CSIRO, Transcript 30.
[65] Dr Michael Grose, CSIRO, Transcript 2855.
[66] Dr Michael Grose, CSIRO, Transcript 2855.
[67] Dr Michael Grose, CSIRO, Transcript 2855.
[68] NSW.900.001.0003; SSA.900.001.0003; AdaptNSW, About NARCliM, <https://climatechange.environment.nsw.gov.au/Climate-projections-for-NSW/About-NARCliM>
[69]VIC.900.001.0001; CLQ.003.001.0001; Department of Environment, Land, Water and Planning Victoria, Victorian Climate Projections 2019, <https://www.climatechange.vic.gov.au/adapting-to-climate-change-impacts/victorian-climate-projections-2019>; The Queensland Government, The Long Paddock, Queensland Future Climate: Understanding the data, <https://www.longpaddock.qld.gov.au/qld-future-climate/understand-data/>
[70] TAS.900.001.0003; Climate Futures – Climate science for Australia's future, About, <https://climatefutures.org.au/about/>
[71] SSA.901.001.0047.
[72] HAF.0012.0002.0003.
[73] The Task Force on Climate-related Financial Disclosures (TCFD) was set up and tasked with creating a set of internationally comparable and consistent disclosures that companies can use to demonstrate climate change resilience to their investors. The business community is experiencing pressure from stakeholders, including investors and regulators to disclose these risks. However, meaningful and useful climate risk related information is required to support them. Task Force on Climate-Related Financial Disclosures, *Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures*, June 2019, https://www.fsb-tcfd.org/publications/final-recommendations-report/> ; Deloitte, *Clarity in financial reporting – Disclosure of climate-related risks*, February 2020, <https://www2.deloitte.com/content/dam/Deloitte/au/Documents/audit/deloitte-au-audit-clarity-disclosure-climate-related-risks-070220.pdf>
[74] RCN.900.112.0918; RCN.900.112.0092.
[75] RCN.900.112.0633; RCN.900.112.0092.
[76] See, eg the Climate Explorer in the U.S. Climate Resilience Toolkit uses a slider across a map of the USA to view present-day and future scenarios for a range of user-appropriate climate variables: https://crt-climate-explorer.nemac.org/.
[77] LEP.500.001.0013.
[78] NSW.500.001.0001; ENN.500.001.0032; EWS.500.001.0003; EPA.500.001.0002; EMV.0005.0001.0068.
[79] CSI.501.001.0001.
[80] CSI.501.001.0001.
[81] GEO.502.001.0002.
[82] HAF.0012.0002.0003.
[83] HAF.0012.0002.0003.
[84] GEO. 502.001.0002.
[85] EWS.500.001.0003.
[86] HAF.8001.0001.0049.
[87] HAF.8001.0001.0338.
[88] RCN.900.112.0415.
[89] GEO.502.001.0002.
[90] RCN.900.112.0415.
[91] SHP.500.001.0002.
[92] GEO.502.001.0002.

[93] EMV.0014.0001.0345.
[94] HAF.0012.0002.0003.
[95] RCN.900.088.0001.
[96] RCN.900.088.0001.
[97]AID.500.001.0001.
[98] Mr Darragh, Northern Territory Department of the Chief Minister, Transcript 1814; NND.800.001.00021; VIC.0009.0001.0001; NND.800.200.00020.
[99] Bushfire History Project contribution, Gavan Willis, Tumbarumba NSW, 5 January 2020
[100] FEC.360.001.0001.
[101] VIC.0009.0001.0001.
[102] SSA.468.056.0001.
[103] See Appendix 14: 2019-2020 Bushfire Season
[104] TAS.500.001.0452.
[105] FES.007.001.0002.
[106] ACT.500.001.0001; FES.007.001.0002; SSA.468.056.0001; NND.800.001.00043.
[107] ESE.002.001.0001; AGR.501.001.0001; ESE.001.001.1429.
[108] NND.300.005.0035.
[109] Mr Andrew Colvin APM OAM, National Bushfire Recovery Agency, Transcript, 514–15; PMC.8001.0001.0297.
[110] FES.007.001.0002; ACT.500.001.0001; NTT.500.001.0060; EMV.0015.0001.0001.
[111] HAF.0010.0001.0001.
[112] HAF.0010.0001.0001.
[113] HAF.0010.0001.0093; RCN.900.139.0001.
[114] RCN.900.139.0001.
[115] CLQ.001.001.0650.
[116] NSW.009.002.0027.
[117] SWA.006.001.0001.
[118] NSW.009.002.0027; ESA.508.001.0008; VIC.0011.0001.0001.
[119] TAS.507.001.0403.
[120] CLQ.001.001.0650.
[121] PMC.8001.0001.0297.
[122] PMC.9005.0001.0001.
[123] NTT.500.001.0060; VIC.0011.0001.0001; NSW.009.002.0027; NTT.509.001.0033.
[124] NSW.009.002.0027.
[125] Mr Andrew Colvin APM OAM, National Bushfire Recovery Agency, Transcript 515.
[126] SSA.468.056.0001.
[127] Mr Len Darragh, Northern Territory Department of the Chief Minister, Transcript, 1814.
[128] VIC.0011.0001.0001.
[129] VIC.0011.0001.0001.
[130] SSA.632.001.0006.
[131] SSA.468.056.0001.
[132] NSW.001.001.0001.
[133] VIC.0009.0001.0001.
[134] SSA.468.056.0001; NSW.001.001.0001; NTT.500.001.0060.
[135] FES.007.001.0002; EMV.0015.0001.0001.
[136] NSW.001.001.0001; SSA.468.056.0001.

Chapter 5 Declaration of national emergency

[1] CTH.902.001.0001.
[2] CTH.902.001.0003.
[3] CTH.900.001.0002.
[4] PMC.505.001.0002.
[5] This plan is also discussed in Chapter 3: National coordination arrangements.
[6] HAF.0003.0001.0478. NATCATDISPLAN – refer to clauses 3 and 8.
[7] HAF.0003.0001.0478. Refer to clause 13.
[8] PMC.8003.0001.0001; PMC.8003.0001.0003.
[9] HAF.8001.0001.0180.
[10] *Biosecurity Act 2015* (Cth).
[11] *Biosecurity (Human Biosecurity Emergency) (Human Coronavirus with Pandemic Potential) Declaration* 2020, made on 18 March 2020 and most recently varied on 11 September 2020,

<https://www.legislation.gov.au/Series/F2020L00266>; Professor Murphy, Commonwealth Department of Health, Transcript 2590.
[12] CJN.003.001.0001.
[13] EMV.0007.0001.0001.
[14] HAF.9006.0001.0001.
[15] PMC.8002.0001.0001.
[16] *Emergency Management Act 1986* (Vic), s 24.
[17] The Constitution does not provide for the ACT or the Northern Territory to refer powers to the Commonwealth Parliament. However, under s 122 of the Constitution, the Commonwealth Parliament has significant powers in relation to the territories.
[18] CTH.900.001.0002.
[19] CTH.902.001.0003.
[20] *New South Wales v Commonwealth* (2006) 229 CLR 1, para 51.
[21] An unintended gap could be addressed by a referral of power from states, followed by any consequential legislative action to give effect to that referral.
[22] The 'incidental power' allows the Commonwealth to introduce laws that give practical effect to each of its powers.
[23] This principle protects the continued existence of the states as independent entities with legislative, executive and judicial functions, and the capacity of the states to function as governments.
[24] CTH.900.001.0001.
[25] CJN.003.001.0001.
[26] EMV.0007.0001.0001.
[27] EMV.0007.0001.0001.
[28] RCN.900.067.0002.
[29] RCN.900.067.0003.
[30] RCN.900.067.0001.
[31] EMV.0002.0001.0007.
[32] EMV.0002.0001.0029.
[33] EMV.0007.0001.0001.
[34] EMV.0007.0001.0001.
[35] ESA.507.001.0003; ACT.504.001.0006.
[36] RCN.900.156.0001.
[37] EMC.500.001.0002.
[38] SAP.310.001.0013.
[39] CLQ.002.001.0007.
[40] HAF.9006.0001.0001.

Chapter 6 National emergency response capability

[1] Australian Disaster Preparedness Framework October 2018 defines capability as the collective ability and power to deliver and sustain an effect within a specific context and timeframe. Capacity as the key determinant of how long a capability can be sustained for at a particular level of ability. The level of capability is determined by the combination of ability and capacity across the following core elements. RCN.900.034.0001—Australia-New Zealand Emergency Management Committee, *Australian Disaster Preparedness Framework: A Guideline to Develop the Capabilities Required to Manage Severe to Catastrophic Disasters* (October 2018), 8.
[2] Adapted from definition of emergency response definition AFAC glossary.
[3] Mr Cameron, Emergency Management Australia, Transcript, 2416; RCN.500.001.2615; HAF.0005.0002.0008.
[4] BOM.502.001.0001.
[5] Dr Braganza, Bureau of Meteorology, Transcript, 11–15; Associate Professor Fletcher, University of Melbourne, Transcript, 802; Mr Pezzullo, Commonwealth Department of Home Affairs, Transcript, 2740; Commissioner Fitzsimmons, Resilience NSW, Transcript, 1970.
[6] FEC.360.001.0001 – Keelty et al., *Independent Review into South Australia's 2019-20 Bushfire Season* (2020); NSW.006.001.0001 – NSW Government, *Final Report of the NSW Bushfire Inquiry* (2020); VIC.0009.0001.0001 – Victorian Inspector-General for Emergency Management, *Inquiry into the 2019-20 Victorian Fire Season, Phase 1: Community and Sector Preparedness for and Response to the 2019-20 Fire Season* (2020).
[7] AFC.503.001.0003; FEC.360.001.0001; NSW.006.001.0001; VIC.0009.0001.0001.
[8] AFC.503.001.0003.
[9] FEC.360.001.0001; NSW.006.001.0001; VIC.0009.0001.0001.
[10] FEC.360.001.0001; NSW.006.001.0001; EMQ.001.001.0711.

[11] Commissioner Klemm, Western Australian Department of Fire and Emergency Services, Transcript, 2180; Mr Stalker, Samford Rural Fire Brigade - Queensland, Transcript, 1452; Mr Baldock, Darlington Volunteer Bush Fire Brigade - Western Australia, Transcript, 1456; AFC.503.001.0003.
[12] Table includes firefighters, aerial specialists and Incident Management Team personnel from Australian states and territories, New Zealand, the United States, and Canada. Data for domestic deployments from SSA.632.001.0006; CLQ.001.001.0650; VIC.0011.0001.0001; TAS.507.001.0403; SWA.006.001.0001; ESA.508.001.0008; NTT.509.001.0033; NSW.009.002.0001. For international deployments from AFC.503.001.0003.
[13] VIC.0009.0001.0001).
[14] Mr Mullins, Former Commissioner, Fire and Rescue NSW, Transcript, 1502.
[15] Image from Bushfire History Project contribution anonymous, NSW.
[16] Adapted from the elements of capability in RCN.900.034.0001.
[17] AFC.503.001.0003.
[18] Mr Barnett, Volunteer Fire Brigades Victoria, Transcript, 1420; ESA.502.001.0117, 502; MFS.204.004.0016; AFC.503.001.0003.
[19] Adapted from the elements of capability, RCN.900.034.0001.
[20] Mr Jennings, Australian Strategic Policy Institute, Transcript, 2895.
[21] VIC.0011.0001.0001; CLQ.001.001.0650; SSA.632.001.0006; TAS.507.001.0403; NTT.509.001.0033; ESA.508.001.0008; NSW.009.002.0001.
[22] RYC.500.001.0001; Mr Jennings, Australian Strategic Policy Institute, Transcript, 2895.
[23] eg 2019-2020 QFES pre-season preparedness checks assessed the level of incident management capacity in each of the regions and resources were moved around the state accordingly. CLQ.001.001.0650.
[24] RYC.500.001.0001; Mr Jennings, Australian Strategic Policy Institute, Transcript, 2895.
[25] NSW.009.002.0001.
[26] ESA.508.001.0001.
[27] VIC.0011.0001.0001.
[28] eg slow uptake of Automatic Vehicle Location technology see FEC.360.001.0001.
[29] Mr Barnett, Volunteer Fire Brigades Victoria, Transcript, 1417–18; NND.800.001.00096.
[30] VIC.0011.0001.0001; AFC.502.001.0912.
[31] NSW.006.001.0001.
[32] NND.001.00906.
[33] AFC.502.001.0912.
[34] AFC.512.001.0001; AFC.502.001.0912.
[35] AFC.512.001.0001.
[36] AFC.502.001.0912.
[37] AFC.512.001.0001.
[38] Commissioner Whelan, ACT Emergency Services Agency, Transcript, 2029.
[39] FES.003.001.0008.
[40] Dr Braganza, Bureau of Meteorology, Transcript, 16.
[41] FES.003.001.0008; FEC.360.001.0001 – Keelty et al., *Independent Review into South Australia's 2019-20 Bushfire Season* (2020).
[42] Commissioner Fitzsimmons, Resilience NSW, Transcript, 2002.
[43] See AFC.508.001.0010.
[44] AFC.502.001.0049.
[45] AFC.502.001.0049.
[46] AFC.502.001.0049.
[47] NND.001.00824.
[48] HAF.0003.0001.0494.
[49] Commissioner Leach, Queensland Fire and Emergency Services, QFS.501.001.0001.
[50] AFC.503.001.0003.
[51] HAF.0005.0007.0360.
[52] QFS.002.001.0039; Commissioner Whelan, ACT Emergency Services Agency, Transcript, 2026.
[53] Commissioner Baxter, Fire and Rescue NSW, Transcript, 2614. An example of the CCOSC Summary Report: AFC.504.001.0001.
[54] QFS.002.001.0039; SAF.203.004.0017; EMV.0007.0001.0001; HAF.8001.0001.0001.
[55] AFC.503.001.0003.
[56] EMV.0007.0001.000; ESA.502.001.0117; Mr Warrington, Victorian Country Fire Service, Transcript, 2529 and 2531.
[57] AFC.502.001.1049; NND.001.00824.01.
[58] QFS.002.001.0039; SAF.203.004.0017; EMV.0007.0001.0001.
[59] Mr Ellis, Australasian Fire and Emergency Service Authorities Council, Transcript, 302 and 304.
[60] Mr Ellis, Australasian Fire and Emergency Service Authorities Council, Transcript, 303.

[61] Commissioner Whelan, ACT Emergency Services Agency, Transcript, 2027–28.
[62] Bushfire History Project contribution Maddy Wallace, VIC.
[63] CSI.508.001.0027; EMV.0007.0001.0001.
[64] PMC.0003.0001.0001.
[65] NSW.006.001.0001.
[66] NSW.006.001.000.
[67] NSW.009.002.0001; CLQ.001.001.0650; SWA.006.001.0001; TAS.507.001.0403; ESA.502.001.0117; SSA.632.001.0046; ESA.508.001.0001.
[68] AFC.504.001.0001.
[69] NSW.009.002.0001; CLQ.001.001.0650; SWA.006.001.0001; TAS.507.001.0403, 001; ESA.502.001.0117; SSA.632.001.0046; ESA.508.001.0001.
[70] ESA.508.001.0001.
[71] TAS.507.001.0403; SWA.006.001.0001.
[72] Acting Commissioner Waters, Western Australian Department of Fire and Emergency Services, Transcript, 2451; Commissioner Rogers, NSW Rural Fire Service, Transcript 1997.
[73] Commissioner Leach, Queensland Fire and Emergency Services, Transcript 2150; VIC.0009.0001.0001.
[74] Commissioner Fitzsimmons, Resilience NSW, Transcript 1999.
[75] NND.001.00397; see FEC.360.001.0001.
[76] NND.001.00561; NND.001.00397; Mr McDonough, NSW Rural Fire Service Association, Transcript 1412.
[77] NND.800.001.00056.
[78] Mr Choveaux, Rural Fire Brigades Association Qld Inc.,Transcript, 1440.
[79] Mr Choveaux, Rural Fire Brigades Association Qld Inc.,Transcript, 1440.
[80] Mr Ellis, Australasian Fire and Emergency Service Authorities Council, Transcript, 309.
[81] AFC.508.001.0037.
[82] AFC.508.001.0016.
[83] Acting Commissioner Waters, Western Australian Department of Fire and Emergency Services, Transcript, 2452.
[84] Commissioner Baxter, Fire and Rescue NSW, Transcript, 2611.
[85] Commissioner Baxter, Fire and Rescue NSW, Transcript, 2611.
[86] AFC.508.001.0037; Commissioner Baxter, Fire and Rescue NSW, Transcript 2612.
[87] AFC.502.001.0006.
[88] AFC.502.001.0006; ESA.502.001.0117; RFS.001.001.0001; QFS.002.001.0039.
[89] AFC.502.001.0006; Mr Alder, National Aerial Firefighting Centre, Transcript 341.
[90] AFC.502.001.0006.
[91] Acting Commissioner Waters, Western Australian Department of Fire and Emergency Services, Transcript, 2452.
[92] South Australia CFS and Victoria CFA have some interoperability of resource information systems – SSA.632.001.0006.
[93] ESA.502.001.0117.
[94] Bushfire History Project contribution Rolfe Poole, NSW.
[95] ESA.502.001.0067; ESA.502.001.0085; NSW.011.001.0001; QFS.501.001.0001.
[96] NND.001.00561; CVC.500.001.0001.
[97] QFS.002.001.0039.
[98] QFS.002.001.0039.
[99] NSW.011.001.0001.
[100] ESA.502.001.0067; Commissioner Leach, Queensland Fire and Emergency Services, Transcript, 2153.
[101]Mr Stephenson, Emergency Management Victoria, Transcript, 2063; RFS.001.001.0001.
[102] VIC.0009.0001.0001.
[103] Mr Stephenson, Emergency Management Victoria, Transcript, 2063–64.
[104] EMV.0001.0001.0376.
[105] NSW.006.001.0001.
[106] Ms Paterson, Community Witness, Transcript, 229–30; VIC.0009.0001.0001.
[107] Mr Lazarus, Hume Forests Limited, Transcript, 1538–39; Mr Saunder, Forest Owners' Conference, Transcript, 1539; NSW.006.001.0001; NND.001.01335; NND.001.01317.
[108] Mr Saunder, Forest Owners' Conference, Transcript, 1535; CLQ.001.001.0622; SSA.632.001.0046.
[109] Mr Lazarus, Hume Forests Limited, Transcript, 1543–44.
[110] CLQ.001.001.0622.
[111] NSW.009.002.0001.
[112] ESA.508.001.0001.
[113] NSW.006.001.0001; FEC.360.001.0001.
[114] See eg NND.800.001.00095.
[115] Mr Forrest, Beechworth Rural Fire Brigade - Victoria, Transcript, 1454.
[116] Mr Lazarus, Hume Forests Limited, Transcript, 1539.

[117] NND.001.00096; Mr Forrest, Beechworth Rural Fire Brigade - Victoria, Transcript, 1454; Mr Stalker, Samford Rural Fire Brigade - Queensland, Transcript, 1458.
[118] RCN.900.032.0006 – Productivity Commission, *Public Safety Mobile Broadband,* Productivity Commission Research Report (2015).
[119] EMV.0007.0001.0001.
[120] RCN.001.001.3820 – Parliament of Victoria, *2009 Victorian Bushfires Royal Commission: Final Report Summary*, (2010) ; RCN.001.003.5766 – Australian Emergency Management Committee, *Review of Australia's Ability to Respond to and Recovery From Catastrophic Disasters* (2005); Stuart Ellis, Peter Kanowski and Whelan Rob, National Inquiry on Bushfire Mitigation and Management (Council of Australian Governments, 31 March 2004) <https://www.dfes.wa.gov.au/publications/GeneralReports/FESA_Report-NationalInquiryonBushfireMitigationandManagement.pdf>; NSW.006.001.0001; FEC.360.001.0001; EMQ.001.001.0711.
[121] Ms De Courteney, NSW Telco Authority, Transcript, 1340–41.
[122] Ms De Courteney, NSW Telco Authority, Transcript, 1340–41; Commissioner McTavish, NSW Cross Border Commission, Transcript, 1198.
[123] NND.800.001.00057.
[124] ESA.502.001.0117; Major General Dunn (Retd), ACT Emergency Services Authority, Transcript, 1489.
[125] Mr Scott, ACT Rural Fire Service, Transcript, 2026; Major General Dunn (Retd), ACT Emergency Services Authority, Transcript, 1489.
[126] NND.001.00096.
[127] Mr Forrest, Beechworth Rural Fire Brigade - Victoria, Transcript, 1454.
[128] Mr Forrest, Beechworth Rural Fire Brigade - Victoria, Transcript, 1454.
[129] Mr McDonough, NSW Rural Fire Service Association, Transcript, 1419; Mr Barnett, Volunteer Fire Brigades Victoria, Transcript, 1420.
[130] NND.800.200.00058; NND.800.001.00057; NND.001.00091.
[131] NND.800.200.00058.
[132] AFC.502.001.0006.
[133] AFC.502.001.0006.
[134] AFC.502.001.0006.
[135] Council of Australian Governments, *COAG Meeting Communique 7 December 2009* (2009). <www.coag.gov.au/meeting-outcomes/coag-meeting-communique-7-december-2009/>
[136] RCN.001.001.3820 – Parliament of Victoria, *2009 Victorian Bushfires Royal Commission: Final Report Summary*, (2010) ; RCN.001.003.5766 – Australian Emergency Management Committee, *Review of Australia's Ability to Respond to and Recovery From Catastrophic Disasters* (2005); Stuart Ellis, Peter Kanowski and Whelan Rob, National Inquiry on Bushfire Mitigation and Management (Council of Australian Governments, 31 March 2004) <https://www.dfes.wa.gov.au/publications/GeneralReports/FESA_Report-NationalInquiryonBushfireMitigationandManagement.pdf>; NSW.006.001.0001 – NSW Government, *Final Report of the NSW Bushfire Inquiry* (2020); FEC.360.001.0001 – Keelty et al., *Independent Review into South Australia's 2019-20 Bushfire Season* (2020); EMQ.001.001.0711 – Queensland Inspector-General Emergency Management, *Queensland Bushfires Review: 2019-20* (2020).
[137] SWA.502.001.0133– National Coordinating Committee for Government Radiocommunications, *National Framework to Improve Government Radiocommunications Interoperability: Towards a Harmonised Radiocommunications Environment for Public Protection and Disaster Relief - 2010-2020,* Report to COAG of the National Disaster Arrangements Working Group (2009).
[138] Ibid, 2.
[139] CTH.900.001.0001; VIC.900.001.0001; SWA.007.001.0002; NSW.900.001.0003; TAS.900.001.0003; NTT.900.001.0003; SSA.900.001.0003; ACT.900.001.0001.
[140] SWA.007.001.0002.
[141] NTT.900.001.0003.
[142] SSA.900.001.0003.
[143] RCN.900.032.0006 – Productivity Commission*, Public Safety Mobile Broadband*, Productivity Commission Research Report (2015).
[144] Ibid.
[145] Ibid.
[146] NND.001.00096; Mr McDonough, NSW Rural Fire Service Association, Transcript, 1407; QFS.002.001.0039.
[147] Council of Australian Governments, *COAG Meeting Communique 7 December 2009* (2009); <www.coag.gov.au/meeting-outcomes/coag-meeting-communique-7-december-2009/>
[148] RCN.900.0032.0427 – Council of Australian Governments, *Strategic Roadmap for Public Safety Mobile Broadband 2018* (2018).
[149] Ms De Courteney, NSW Telco Authority, Transcript, 1344–45.
[150] EMV.0007.0001.0001, 90; Ms De Courteney, NSW Telco Authority, Transcript, 1343–44; RFS.001.001.0001.

[151] HAF.9001.0001.0014, 15; EMV.0007.0001.0001; Ms De Courteney, NSW Telco Authority, Transcript, 1343–44; NSW.006.001.0001.
[152] HAF.8003.0001.0001.
[153] Ms De Courteney, NSW Telco Authority, Transcript, 1406; Mr Johnson, Former Commissioner, Queensland Fire and Rescue Service, Transcript, 1517; QFS.002.001.0039; Mr McDonough, NSW Rural Fire Service Association, Transcript, 1407; EMV.0007.0001.0001.
[154] NTA.001.001.0001; CMA.500.001.0001.
[155] NSW.006.001.0001
[156] NND.800.200.00056.
[157] NND.800.200.00056.
[158] NND.800.200.00066.02.
[159] Mr Barnett, Volunteer Fire Brigades Victoria, Transcript, 1415; Mr Saunder, Forest Owners' Conference, Transcript, 1540; Mr Lazarus, Hume Forests Limited, Transcript, 1540; AFC.508.001.0010.
[160] NND.800.200.00053.
[161] Bushfire History Projecy contribution David Williams, NSW.
[162] NND.800.200.00053.
[163] NND.001.00824.
[164] NND.800.200.00053.
[165] ESA.502.001.0117; FRN.002.001.0001; EMV.0007.0001.0001; QFS.002.001.0085; FES.003.001.0008; SAF.203.004.0017; TPF.500.001.0056; BNT.501.001.0065.
[166] FES.003.001.0003.
[167] AFC.508.001.0844.
[168] AFC.508.001.0844.
[169] RFS.001.001.0001; FES.003.001.0006; AFC.508.001.0844.
[170] SAF.203.004.0017.
[171] ESA.502.001.0117; Mr Lazarus, Hume Forests Limited, Transcript, 1540; Mr Saunder, Forest Owners' Conference, Transcript, 1540; NND.001.00068.
[172] Mr Saunder, Forest Owners' Conference, Transcript, 1540.
[173] Mr Wilson, Victorian Cross Border Commissioner, Transcript 1191.
[174] Mr Morgan, Forest Fire Management Committee of the Institute of Foresters Australia & Former Chief Fire Officer, Victorian Department of Sustainability and Environment, Transcript, 1532.
[175] FRN.002.001.0001; SAF.203.004.0017; BNT.501.001.0065. NND.800.200.00059. NND.800.001.00093.
[176] Mr Saunder, Forest Owners' Conference, Transcript, 1540.
[177] AFC.503.001.0003.
[178] Commissioner Baxter, Fire and Rescue NSW, Transcript, 2126.
[179] Commissioner Fitzsimmons, Resilience NSW, Transcript, 1994; Commissioner Whelan, ACT Emergency Services Agency, Transcript, 2027; FES.003.001.0006; AFC.508.001.0844.
[180] AFC.503.001.0003.
[181] EMV.0007.0001.0001.
[182] FES.003.001.0003.
[183] Mr Barnett, Volunteer Fire Brigades Victoria, Transcript, 1418.
[184] QFS.002.001.0039; MFS.204.004.0016; FES.003.001.0003; Mr Barnett, Volunteer Fire Brigades Victoria, Transcript, 1415; Mr Lazarus, Hume Forests Limited, Transcript, 1450.
[185] NND.800.200.00066.02; ESA.502.001.0117.
[186] NND.800.001.00096.
[187] CTH.900.001.0001.
[188] The Jurisdictional Emergency Management Education Network (JEMEN) was established in March 2017 by the Australian Institute for Disaster Resilience (AIDR). It comprises one representative from each Australian state and territory, and Emergency Management Australia.
[189] NND.800.200.00056, 800; CJN.003.001.0001; FES.003.001.0003.
[190] QFS.002.001.0039.
[191] AFC.508.001.0010.
[192] FEC.360.001.0001; NSW.006.001.0001); VIC.0009.0001.0001.
[193] EMV.0007.0001.0001; ESA.502.001.0117; SAF.203.004.0017.
[194] FES.003.001.0006.
[195] SSA.632.001.0046.
[196] Associate Professor Owen, University of Tasmania, Transcript 2684–85; SSA.632.001.0046.
[197] SSA.900.001.0003; ESA.502.001.0117.
[198] SSA.900.001.0003; ESA.502.001.0117; AFC.508.001.0010.
[199] Mr Coyne, Australian Strategic Policy Institute, Transcript, 2897.

[200] Mr Lollback, Local Government Association of Queensland, Transcript, 875–86; Mr Johnson, Former Commissioner, Queensland Fire and Rescue Service, Transcript, 1516; NND.800.001.00036; NND.800.001.00026; NND.800.200.00029.
[201] SSA.900.001.0003.
[202] CTH.902.001.0001; VIC.900.001.0001; NSW.900.001.0003; CLQ.003.001.0001; TAS.900.001.0003; ACT.900.001.0001.
[203] CLQ.003.001.0001.
[204] AFC.503.001.0003.
[205] NND.300.005.0003.
[206] Australian Institute for Disaster Resilience, *Australian Disaster Resilience Handbook 3: Managing Exercises, Second Edition* (2012) <knowledge.aidr.org.au/media/3547/handbook-3-managing-exercises.pdf>.
[207] Australian Institute for Disaster Resilience, Australian Disaster Resilience Handbook 3: Managing Exercises, Second Edition (2012) <knowledge.aidr.org.au/media/3547/handbook-3-managing-exercises.pdf>.
[208] Commissioner Fitzsimmons, Resilience NSW, Transcript, 1994; VIC.900.001.0001.
[209] eg RFS.001.001.0001.
[210] eg TAS.500.001.0001.
[211] eg CLQ.001.001.0650.
[212] TAS.507.001.0403.
[213] Commissioner Fitzsimmons, Resilience NSW, Transcript, 2550.
[214] AFC.503.001.0003; FES.003.001.0006.
[215] QFS.002.001.0039; EMV.0007.0001.0001.
[216] FES.003.001.0006.
[217] SWA.007.001.0002.
[218] ACT.900.001.0001; VIC.900.001.0001; SSA.900.001.0003.
[219] CLQ.003.001.0001; TAS.900.001.0003.
[220] PMC.0003.0001.0001 – CSIRO, *Climate and Disaster Resilience* (2020).
[221] RCN.900.040.0001 – Productivity Commission, *Report of Government Services 2020* (2019).
[222] NND.001.00155; NND.001.01235.
[223] NND.001.00561.
[224] RCN.900.040.0001.
[225] Chief Officer Arnol, Tasmanian Department of Fire and Emergency Services, Transcript, 2098; Mr Wood, South Australian Council of Australian Volunteer Fire Associations, Transcript, 1392.
[226] NND.001.01366.
[227] Chief Officer Arnol, Tasmanian Department of Fire and Emergency Services, Transcript, 2098. EMV.0007.0001.0175.
[228] Mr Wood, South Australian Council of Australian Volunteer Fire Associations, Transcript, 1397.
[229] EMV.0007.0001.0001, 56–57; QFS.002.001.0039, 10.
[230] EMV.0007.0001.0001.
[231] Mr Wood, South Australian Council of Australian Volunteer Fire Associations, Transcript, 1410; NND.001.01235; Mr McDonough, NSW Rural Fire Service Association, Transcript, 1410.
[232] NND.001.01235.01 – Council of Australian Volunteer Fire Associations, *2018 Volunteer Welfare and Efficiency Survey,* National Report Volunteer Fire Services (2018).
[233] ESA.500.001.0074; NND.001.01051.
[234] NND.800.200.00053.
[235] ESA.500.001.0074; NSW.006.001.0001; RFS.001.001.
[236] NND.001.00035; NND.001.00753; NND.001.01070; NND.001.00696.
[237] NND.600.00157; NND.600.00005; NND.001.00104; Mr Williams, NSW Volunteer Fire Fighters Association, Transcript, 1439.
[238] NND.001.01337; Mr Barnett, Volunteer Fire Brigades Victoria, Transcript, 1409; Mr Williams, NSW Volunteer Fire Fighters Association, Transcript, 1439.
[239] Mr Gossage, Bushfire Volunteers WA, Transcript, 1438; Mr Barnett, Volunteer Fire Brigades Victoria, Transcript, 1410.
[240]Mr Barnett, Volunteer Fire Brigades Victoria, Transcript, 1410.
[241] NSW.006.001.0001 – NSW Government, *Final Report of the NSW Bushfire Inquiry* (2020).
[242] NND.001.01366.
[243] NND.001.01366.
[244] Commissioner Klemm, Western Australian Department of Fire and Emergency Services, Transcript, 2182.
[245] All data from RCN.900.040.0001 – Productivity Commission, *Report of Government Services 2020* (2019).
[246] All data from RCN.900.040.0001 – Productivity Commission, *Report of Government Services 2020* (2019).
[247] All data from RCN.900.040.0001 – Productivity Commission, *Report of Government Services 2020* (2019).

[248] Image from ABC News attributed to Tom Fedorowytsch (2016) <www.abc.net.au/news/2016-10-02/buckland-park-market-gardener-loses-next-crop-to-flood/7896302>
[249] Mr Barnett, Volunteer Fire Brigades Victoria, Transcript, 1409; Mr Williams, NSW Volunteer Fire Fighters Association, Transcript, 1439.
[250] NND.600.00176; Mr Williams, NSW Volunteer Fire Fighters Association, Transcript, 1439; Mr Barnett, Volunteer Fire Brigades Victoria, Transcript, 1409.
[251] NND.001.00696; NND.800.200.00059; Mr Williams, NSW Volunteer Fire Fighters Association, Transcript, 1439.
[252] NSW.900.001.0003; SSA.632.001.0006; VIC.0011.0001.0001.
[253] SSA.632.001.0040.
[254] VIC.0011.0001.0001.
[255] eg SWA.006.001.0001.
[256] NND.800.200.00050.01.
[257] ESA.500.001.0074_UR.
[258] ESA.500.001.0074_UR.
[259] ESA.500.001.0074_UR; SAF.203.004.0017; EMV.0007.0001.0001; DEF.0001.
[260] ESA.500.001.0074_UR.
[261] NND.800.200.00053.
[262] *Fair Work Act 2009* (Cth) s110.
[263] *Fair Work Act 2009* (Cth) s772.
[264] NSW.006.001.0001; SWA.003.001.0001; SSA.632.001.0006.
[265] NSW.009.002.0001; SSA.632.001.0006.
[266] NSW.009.002.0001.
[267] SWA.003.001.0001.
[268] SWA.003.001.0001.
[269] Mr Barnett, Volunteer Fire Brigades Victoria, Transcript, 1409.
[270] ESA.500.001.0074; SAF.203.004.0017; EMV.0007.0001.0001.

Chapter 7 Role of the Australian Defence Force

[1] Lieutenant General Bilton, Chief of Joint Operations, Australian Defence Force, Transcript 450.
[2] Image from Department of Defence (2020)
<https://images.defence.gov.au/assets/20200101ran8100087_069.jpg>.
[3] Vice Admiral Johnston AO, Vice Chief of the Australian Defence Force, Transcript 483.
[4] Image from Department of Defence (2020)
<https://images.defence.gov.au/assets/Evacuees%20are%20transported%20from%20Mallacoota%20via%20LARC.jpg>.
[5] PMC.9004.0001.0001.
[6] DEF.9002.0001.0001.
[7] DEF.500.001.0001.
[8] Lieutenant General Bilton, Chief of Joint Operations, Australian Defence Force, Transcript 469.
[9] DEF.500.001.0001.
[10] DEF.500.001.0001.
[11] DEF.9002.0001.0001.
[12] DEF.9002.0001.0001.
[13] HAF.8001.0001.0171.
[14] EMV.0007.0001.0001 150; FEC.360.001.0001; QFS.002.001.0039 001.
[15] Operation Bushfire Assist 2019-20 was announced on 31 December 2019 and backdated to the start of Phase 1, to cover the full scope of military assistance provided during the bushfire season: DEF.80002.0001.0001; Vice Admiral Johnston AO, Vice Chief of the Australian Defence Force, Transcript, 474.
[16] DEF.8002.0001.0001.
[17] DEF.500.001.0001.
[18] Lieutenant General Bilton, Chief of Joint Operations, Australian Defence Force, Transcript, 461.
[19] Lieutenant General Bilton, Chief of Joint Operations, Australian Defence Force, Transcript, 473.
[20] DEF.0001.0003.0025.
[21] Image from ABC News attributed to News Corp/AAP Ian Currie (9 January 2020)
<https://www.abc.net.au/news/2020-01-09/evacuees-on-hmas-choules/11853596?nw=0>.
[22] DEF.0001.0002.0123.
[23] Vice Admiral Johnston AO, Vice Chief of the Australian Defence Force, Transcript, 472.
[24] FEC.360.001.0001; BMC.500.001.0003.
[25] BMC.500.001.0003.

[26] PMC.9004.0001.0001; RCN.900.144.0862.
[27] Mr Dawson, Queensland Inspector-General for Emergency Management, Transcript, 1596.
[28] Mr McArthur, Adelaide Hills Council, Transcript, 973.
[29] RCN.900.043.0141.
[30] SHC.503.001.0002.
[31] Ms Prendergast, Resilience NSW, Transcript, 1949.
[32] FES.003.001.0006; DEF.9003.0001.0001; Ms Prendergast, Resilience NSW, Transcript, 1950.
[33] DEF.9007.0001.0001.
[34] HAF.8001.0001.0180
[35] RCN.900.144.0862.
[36] RCN.900.144.0862.
[37] RCN.900.144.0972.
[38] DEF.9002.0001.0001.
[39] DEF.9002.0001.0001; DEF.8002.0001.0001.
[40] DEF.500.001.0001.
[41] SAF.203.004.0017.
[42] Commissioner Fitzsimmons, Resilience NSW, Transcript, 2555.
[43] Chief Officer Arnol, Tasmanian Department of Fire and Emergency Services, Transcript, 2102.
[44] Commissioner Whelan, ACT Emergency Services Agency, Transcript, 2032.
[45] QFS.002.001.0039.
[46] SAF.203.004.0017.
[47] FES.003.001.0006.
[48] Mr Pezzullo AO, Commonwealth Department of Home Affairs, Transcript, 2727.
[49] DEF.8001.0001.0001.
[50] DEF.9006.0001.0001
[51] DEF.9006.0001.0001
[52] Department of the Prime Minister and Cabinet, 'Legislation Handbook' (February 2017), <https://www.pmc.gov.au/sites/default/files/publications/legislation-handbook-2017.pdf>.
[53] DEF.501.001.0001.
[54] RCN.900.144.0862.
[55] Lieutenant General Bilton, Chief of Joint Operations, Australian Defence Force, Transcript 457.
[56] Lieutenant General Bilton, Chief of Joint Operations, Australian Defence Force, Transcript 457.
[57] Vice Admiral Johnston AO, Vice Chief of the Australian Defence Force, Transcript 457.
[58] QFS.002.001.0012; Ms Prendergast, Resilience NSW, Transcript, 1950.
[59] DEF.9003.0001.0001.
[60] Australian Law Reform Commission, *Traditional Rights and Freedoms - Encroachments by Commonwealth Laws: Final Report* (No 129, December 2015), <https://www.alrc.gov.au/publication/traditional-rights-and-freedoms-encroachments-by-commonwealth-laws-alrc-report-129/>.
[61] DEF.9006.0001.0001.
[62] Emergencies Act R.S.C. 1985 (Canada).
[63] DEF.9006.0001.0001.
[64] DEF.8001.0001.0001.

Chapter 8 National aerial firefighting capabilities and arrangements

[1] AFC.500.001.0001.
[2] AFC.502.001.0006.
[3] AFC.502.001.0006.
[4] AFC.502.001.0006.
[5] Some types of fixed-wing aircraft can land on water if equipped with floats.
[6] AFC.500.001.0001.
[7] AFC.500.001.0001.
[8] AFC.501.001.0001.
[9] RFS.002.001.0001.
[10] RFS.002.001.0001.
[11] RFS.002.001.0001.
[12] Image from National Aerial Firefighting Centre, 'Annual Report 2015' (2015) <http://nafc.org.au/wp-content/uploads/2017/01/NAFC-AR-2015-final-ebook.pdf>.
[13] AFC.500.001.0001.
[14] RFS.002.001.0001.

[15] Image from NSW Rural Fire Service, 'Annual Report 2015-16' (2016) <http://www.rfs.nsw.gov.au/__data/assets/pdf_file/0004/47353/Complete-NSW-RFS-Annual-Report-2015-16.pdf>.
[16] RFS.002.001.0001.
[17] RFS.002.001.0001.
[18] RFS.002.001.0001.
[19] AFC.502.001.0006.
[20] ESA.502.001.0117.
[21] ESA.502.001.0117.
[22] ESA.502.001.0117.
[23] Bushfire History Project contribution, Dylan Brandon, Bundanoon NSW.
[24] PHU.500.001.0001; JMC.500.001.0001; KAV.500.001.0001; RFS.002.001.0001.
[25] RFS.002.001.0001.
[26] JMC.500.001.0001.
[27] AFC.501.001.0001.
[28] QFS.002.001.0012.
[29] AFC.500.001.0001.
[30] National Aerial Firefighting Centre, 'Aerial Firefighting' <https://nafc.org.au/?page_id=113>.
[31] AFC.500.001.0001.
[32] RFS.002.001.0001.
[33] RFS.002.001.0001.
[34] Bushfire History Project contribution, Dylan Brandon, Bundanoon NSW.
[35] FRN.002.001.0001; DMC.002.001.0001.
[36] FRN.002.001.0001.
[37] FRN.002.001.0001.
[38] Dr Clothier, Australian Association for Unmanned Systems, Transcript 360.
[39] AFC.502.001.0264.
[40] Ms Ryan, Hancock Victorian Plantations, Transcript 347–353.
[41] AFC.500.001.0001.
[42] AFC.502.001.0264.
[43] AFC.500.001.0001; AFC.502.001.0006; RRY.500.001.0001.
[44] SAF.500.001.0005.
[45] RRY.500.001.0001.
[46] RFS.002.001.0001; QFS.002.001.0012; ESA.500.001.0074; ESA.502.001.0117; FES.003.001.0003; SAF.500.001.0005; SAF.203.004.0017.
[47] RFS.002.001.0001.
[48] RFS.002.001.0001.
[49] RFS.002.001.0001.
[50] RFS.002.001.0001.
[51] ESA.502.001.0117.
[52] ESA.502.001.0117.
[53] EMV.0007.0001.0001.
[54] ESA.502.001.0117.
[55] ESA.502.001.0117.
[56] FRN.003.001.0001.
[57] FRN.003.001.0001.
[58] FRN.003.001.0001.
[59] ESA.502.001.0117.
[60] ESA.502.001.0117.
[61] ESA.502.001.0117.
[62] AFC.500.001.0001.
[63] AFC.502.001.0264.
[64] SAF.203.004.0017.
[65] SAF.203.004.0017.
[66] AFC.500.001.0001; NND.600.00269.
[67] VIC.0009.0001.0001 – Victorian Inspector-General for Emergency Management, *Inquiry into the 2019-20 Victorian Fire Season, Phase 1: Community and Sector Preparedness for and Response to the 2019-20 Fire Season,* (2020).
[68] ESA.502.001.0117; SAF.203.004.0017; EMV.0007.0001.0001.
[69] AFC.500.001.0001.
[70] NND.001.00824.01.
[71] NND.001.00824.01.
[72] Mr Alder, National Aerial Firefighting Centre, Transcript 325.

[73] Mr Alder, National Aerial Firefighting Centre, Transcript 326, 334 and 338.
[74] Mr Alder, National Aerial Firefighting Centre, Transcript 326.
[75] NND.001.00824.01.
[76] NND.001.00824.01.
[77] AFC.502.001.0006.
[78] AFC.502.001.0006.
[79] AFC.500.001.0001.
[80] AFC.500.001.0001.
[81] AFC.502.001.0006.
[82] Mr Alder, National Aerial Firefighting Centre, Transcript 328-9; AFC.500.001.0001; AFC.502.001.1566; AFC.505.001.0055.
[83] HAF.9002.0001.0002.
[84] AFC.502.001.1566.
[85] AFC.511.001.0475; AFC.513.001.0097.
[86] AFC.505.001.0054; AFC.511.001.0477.
[87] AFC.502.001.1566.
[88] AFC.511.001.0539.
[89] AFC.511.001.0539.
[90] RCN.900.087.0001; HAF.9001.0001.0014.
[91] HAF.9001.0001.0014.
[92] HAF.501.001.0001.
[93] AFC.501.001.0001.
[94] AFC.501.001.0001.
[95] ESA.500.001.0074.
[96] RFS.002.001.0001.
[97] RFS.002.001.0001.
[98] AFC.502.001.1641; Mr Alder, National Aerial Firefighting Centre, Transcript 327–328.
[99] AFC.500.001.0001.
[100] AFC.500.001.0001; AFC.502.001.0006.
[101] AFC.500.001.0001.
[102] AFC.502.001.0006; AFC.502.001.1641.
[103] AFC.500.001.0001.
[104] AFC.502.001.0006.
[105] AFC.502.001.0006.
[106] AFC.502.001.0006.
[107] AFC.500.001.0001.
[108] AFC.502.001.0006.
[109] AFC.502.001.0006.
[110] PHU.500.001.0001 008.
[111] PHU.500.001.0001 008.
[112] KAV.500.001.0001; Mr Cronin, Kestrel Aviation, Transcript 368; Mr Hurst, Aerial Application Association of Australia, Transcript 367; Mr McDermott, McDermott Aviation, Transcript 369.
[113] Mr McDermott, McDermott Aviation, Transcript 369.
[114] PHU.500.001.0001.
[115] PHU.500.001.0001.
[116] Mr McDermott, McDermott Aviation, Transcript 369.
[117] Mr McDermott, McDermott Aviation, Transcript 369.
[118] Image from Department of Defence attributed to CPL Bill Solomou (2019) <https://images.defence.gov.au/assets/Home/Search?Query=20191109raaf8526959_108.jpg&Type=Filename>.
[119] DEF.9003.0001.0001.
[120] DEF.9003.0001.0001.
[121] DEF.9003.0001.0001.
[122] DEF.9003.0001.0001.
[123] DEF.9003.0001.0001.
[124] DEF.9003.0001.0001.
[125] DEF.9003.0001.0001.
[126] AFC.502.001.0006.
[127] DEF.9003.0001.0001.
[128] AFC.502.001.0006.
[129] AFC.502.001.0006.
[130] AFC.502.001.0006.

[131] AFC.502.001.0006.
[132] AFC.502.001.0006.
[133] AFC.500.001.0001; AFC.502.001.0006.
[134] AFC.502.001.0006.
[135] AFC.502.001.0006. See also NSW.006.001.0001.
[136] AFC.502.001.0006.
[137] AFC.502.001.0006.
[138] AFC.502.001.0006.
[139] AFC.500.001.0001; PHU.500.001.0001; Mr Cronin, Kestrel Aviation, Transcript 368
[140] AFC.502.001.0264.
[141] PHU.500.001.0001.
[142] RRY.500.001.0001.
[143] Mr Cronin, Kestrel Aviation, Transcript 368
[144] NSW.006.001.0001.
[145] AFC.502.001.0006.
[146] Mr Alder, National Aerial Firefighting Centre, Transcript 340.
[147] Mr Alder, National Aerial Firefighting Centre, Transcript 341.
[148] AFC.500.001.0001.
[149] AFC.502.001.0006; AFC.511.001.0452.
[150] NND.001.00824.01.
[151] SAF.500.001.0005.
[152] Mr Alder, National Aerial Firefighting Centre, Transcript, 338.
[153] RFS.002.001.0001.
[154] SAF.500.001.0005.
[155] SWA.003.001.0001.
[156] QFS.002.001.0012; EMV.0007.0001.0001.
[157] EMV.0007.0001.0001.
[158] EMV.0007.0001.0001.
[159] ESA.502.001.0117.
[160] SAF.203.004.0017.
[161] FES.003.001.0008.
[162] FES.003.001.0008.
[163] QFS.002.001.0039.
[164] AFC.502.001.0006.
[165] AFC.502.001.0006.
[166] AFC.500.001.0001.
[167] AFC.502.001.0006.
[168] FEC.360.001.0001.
[169] VIC.0009.0001.0001.
[170] Mr Ellis, Australasian Fire and Emergency Service Authorities Council, Transcript 307.
[171] AFC.500.001.0001.
[172] ENN.500.001.0032.
[173] ENN.500.001.0032.
[174] AFC.502.001.0006.
[175] AFC.502.001.0006.
[176] AFC.500.001.0001.
[177] AFC.502.001.0006.
[178] AFC.502.001.0006.
[179] ENN.500.001.0032.
[180] ASS.501.001.0001.
[181] AFC.500.001.0001.
[182] AFC.502.001.0006.
[183] AFC.502.001.0006.
[184] AFC.502.001.0006.
[185] AFC.502.001.0006.
[186] AFC.502.001.0006.
[187] NND.001.00824.01.
[188] AFC.500.001.0001; AFC.502.001.0006.
[189] HAF.9001.0001.0014.
[190] AFC.502.001.0006.
[191] AFC.502.001.0006.

[192] PHU.500.001.0001.
[193] ASS.501.001.000.
[194] ASS.501.001.000.
[195] ASS.501.001.000.
[196] ASS.501.001.000.
[197] NND.300.005.0004.
[198] NND.300.005.0004.
[199] NND.300.007.0006.

Chapter 9 Essential services

[1] NND.001.01336; NND.600.00212; NND.001.00807; Mr McArthur, Adelaide Hills Council, Transcript; NND.001.00603.
[2] Freight Australia, 'Supply Chains by the Numbers' (July 2019) < https://www.freightaustralia.gov.au/a-closer-look/supply-chains-by-the-numbers>.
[3] 'National Freight and Supply Chain Strategy' (Transport and Infrastructure Council, August 2019) < https://www.freightaustralia.gov.au/sites/default/files/documents/national-freight-and-supply-chain-strategy.pdf>.
[4] eg RFS.5002.0001.0941.
[5] VIC.0009.0001.0001 – Victorian Inspector-General for Emergency Management, *Inquiry into the 2019-20 Victorian Fire Season, Phase 1: Community and Sector Preparedness for and Response to the 2019-20 Fire Season* (2020).
[6] VIC.0009.0001.0001; NSW.006.001.0001 – NSW Government, *Final Report of the NSW Bushfire Inquiry* (31 July 2020).
[7] Figure from Duane Verner, Frederic Petit, and Kibaek Kim, 'Incorporating Prioritisation in Critical Infrastructure Security and Resilience Programs' (2017) *Homeland Security Affairs* 13(7) as cited in RFS.5002.0001.0941.
[8] NND.001.00452; NND.001.01062; NND.001.00484.
[9] NND.001.00324; NND.001.01062.
[10] NND.001.00441.
[11] NND.001.00484.
[12] NND.600.00265.
[13] Mr Hyde, Snowy Valley Council, Transcript 1008-1009.
[14] RFS.001.001.0001; TLS.003.001.0001.
[15] Mr Bascomb, Snowy Monaro Regional Council, Transcript 1010.
[16] RFS.001.001.0001.
[17] Mr Gatt, Transgrid, Transcript 1370. See also RCN.900.026.0005 (Transgrid Network Area Map); RCN.900.026.0001 (AusNet Services Network Area Map); RCN.900.026.0003 (Essential Energy Network Area Map); RCN.900.026.0002 (Endeavour Energy Network Area Map)
[18] HAF.8001.0001.0171. HAF.8001.0001.0079.
[19] EMO.503.001.0001.
[20] Mr Gatt, Transgrid, Transcript 1370.
[21] RCN.900.112.0415 – Deborah O'Connell et al, *Approach, Methods and Results for Co-Producing a Systems Understanding of Disaster: Technical Report Supporting the Development of the Australian Vulnerability Profile,* (CSIRO, October 2018).
[22] Dr Cainey, Energy Networks Australia, Transcript 1351; Mr Gatt, Transgrid, Transcript 1364
[23] See ENE.500.001.0001; ESE.002.001.0001; ANS.500.001.0018; AGR.501.001.0001.
[24] ANS.500.001.0018; ESE.002.001.0001; ENE.500.001.0001.
[25] ESE.002.001.0001.
[26] CMA.8001.0001.0023. Figures current as at April 2020. Note that the Australian Communications and Media Authority published an addendum updating the total number of telecommunications outages (see RNC.900.037.0001).
[27] CMA.8001.0001.0023.
[28] TLS.002.001.0053; OPT.500.001.0005; NBN.500.001.0001; VOD.500.001.0001. Mr Whitelaw, NBN Co, Mr Pickens, Vodafone, Mr Pesavento, Optus, and Mr Seneviratne, Telstra, Transcript 1306.
[29] EMV.0001.0003.0399; RCN.900.058.0001.
[30] RFS.5002.0001.0941.
[31] RFS.5002.0001.0941.
[32] RFS.5002.0001.0941.
[33] CMA.8001.0001.0001.
[34] AER.501.001.0002.
[35] HAF.503.001.0001.
[36] RFS.5002.0001.0941.

[37] RFS.5002.0001.0941; RCN.900.034.0092.
[38] Commissioner Halton, National COVID-19 Coordination Commission Advisory Board, Transcript 2600–2601.
[39] Department of Infrastructure, Regional Development and Cities, *Inquiry into National Freight and Supply Chain Priorities* (March 2018). <https://www.infrastructure.gov.au/transport/freight/freight-supply-chain-priorities/index.aspx>
[40] 'Implementation Plans' (22 November 2019) < https://www.freightaustralia.gov.au/what-are-we-doing/implementation-plans> Deakin University's Centre for Supply Chain and Logistics, which focuses research on freight logistics and value-added supply chains, worked with the former Department of Infrastructure, Regional Development and Cities, and industry partners, to undertake a two-year scenario planning project to develop the Strategy. They then examined the future-readiness of high-level action areas and long-term directions with industry partners for inclusion in the National Action Plan.
[41] Australian Government, 'National Freight and Supply Chain Strategy: 2019 Commonwealth Implementation Plan' (2019). <https://www.freightaustralia.gov.au/sites/default/files/documents/cwth_actions-for_website_0.pdf>
[42] Freight Australia, 'What Is the Strategy?' <https://www.freightaustralia.gov.au/what-is-the-strategy>
[43] Ms Barnes, Bega Valley Council, Transcript 1071.
[44] HAF.9002.0001.0001; NND.001.01173.01; NND.600.00365; HAF.8003.0001.0001; HAF.8004.0001.0001.
[45] NND.001.01339.
[46] HAF.9002.0001.0001.
[47] The National Medical Stockpile is a strategic cache of pharmaceuticals and medical equipment for use in a pandemic and other emergencies. Professor Murphy, Commonwealth Department of Health, Transcript 2586. See also HEA.9001.002.0001; HEA.0001.0001.0004.
[48] A community cache is a locally based resource stockpile that could be accessed by the local community during and after a natural disaster.
[49] Ms De Courteney, NSW Telco Authority, Transcript 1342.
[50] Mr Coyne, Australian Strategic Policy Institute, Transcript 2909.
[51] Commissioner Halton AO, National COVID-19 Coordination Commission Advisory Board, Transcript 2600.
[52] Mr Cameron OAM, Emergency Management Australia, Transcript 2649–2650.
[53] HAF.8003.0001.0001.
[54] Mr Pezzullo AO, Commonwealth Department of Home Affairs, Transcript 2738–2739.
[55] Mr Pezzullo AO, Commonwealth Department of Home Affairs, Transcript 2739.
[56] NSW.001.001.0001.
[57] Mr Dinan, NSW Department of Transport, Transcript 1294; Mr Staples, NSW Department of Transport, Transcript 1294.
[58] RTA.500.001.0001.
[59] Map adapted from <http://maps.infrastructure.gov.au/KeyFreightRoute/>
[60] Mr Staples, NSW Department of Transport, Transcript 1279.
[61] NTT.901.001.0001.
[62] RTA.500.001.0001.
[63] Mr Dumesny, Western Roads Federation, Transcript 1246.
[64] NSW.006.001.0001; Mr Staples, NSW Department of Transport, Transcript 1265.
[65] Freight Australia, 'National Freight and Supply Chain Strategy' <https://www.freightaustralia.gov.au/sites/default/files/documents/national-freight-and-supply-chain-strategy.pdf>
[66] NSW.006.001.0001
[67] Mr Northey, Victorian Department of Transport, Transcript 1264; Mr Lunson, Queensland Department of Transport and Main Roads, Transcript 1267; Mr Brown, South Australian Department of Planning, Transport and Infrastructure, Transcript 1268.; LIS.500.001.0001.
[68] Mr Shearer, South Australian Road and Transport Association, Transcript 1245–1246; Mr Dumesny, Western Roads Federation, Transcript 1246–1249; RTA.500.001.0001.
[69] NSW Department of Transport, RMS.001.001.0001; Victorian Government, Victorian State Response, EMV.0007.0001.0001.
[70] EMV.000.0001.0001; Mr Staples, NSW Department of Transport, Transcript 1271.
[71] RMS.001.001.000; NSW.006.001.0001; Mr Northey, Victorian Department of Transport, Transcript 1269; Mr Staples, NSW Department of Transport, Transcript 1270.
[72] NSW.010.001.0001
[73] LIS.500.001.0001
[74] RMS.001.001.0001; NSW Government, *Final Report of the NSW Bushfire Inquiry, NSW.006.001.0001* (31 July 2020) 363–364. Mr Northey, Victorian Department of Transport, Transcript 1264; Mr Staples, NSW Department of Transport, Transcript 1265.
[75] NSW.006.001.0001; RMS.001.001.0001; EMV.0007.0001.0001; Mr Staples, NSW Department of Transport, Transcript 1265–66.

[76] Mr Staples, NSW Department of Transport, Transcript 1270.
[77] VIC.0009.0001.0001.
[78] EMV.0007.0001.0001.
[79] RTA.500.001.0001; WRF.500.001.0001.
[80] RTA.500.001.0001.
[81] Mr Shearer, South Australian Road and Transport Association, Transcript 1267; Mr Brown, South Australian Department of Planning, Transport and Infrastructure, Transcript 1268; Mr Staples, NSW Department of Transport, Transcript 1274.
[82] TAS.900.001.0003; NTT.901.001.0001; CLQ.003.001.0001; VIC.900.001.0001; SSA.900.001.0003
[83] Mr Dumesny, Western Roads Federation, Transcript 1249.
[84] Mr Marks, Australian Trucking Association, Transcript 1248.
[85] Australian Trucking Association, NND.001.00214.
[86] TLS.002.001.0053; OPT.500.001.0005; VOD.500.001.0001.
[87] ENE.500.001.0001.
[88] ESE.001.001.2365; ESE.001.001.1558.
[89] EAU.500.001.0711; Mr Jenner, Essential Energy, Transcript 1383; ESE.001.001.2365; EGX.500.007.0001; EGX.500.002.0178. See also Ms Crawford-Flett, AusNet, Transcript 1373.
[90] Mr Jenner, Essential Energy, Transcript 1377; ESE.002.001.0001.
[91] Mr Jenner, Essential Energy, Transcript 1377; Dr Cainey, Energy Networks Australia, Transcript 1357; EAU.500.001.0715.
[92] HAF.503.001.0001.
[93] HAF.503.001.0001.
[94] Mr Gatt, Transgrid, Transcript 1381.
[95] EMO.503.001.0001.
[96] Under the Emergency Management Act 2013 (Vic).
[97] Ms Phelps, Towong Shire Council, Transcript 1009.
[98] Mr Peterson, Moreton Bay Regional Council, Transcript 889.
[99] Ms Jones, Richmond Valley Council, Transcript 909.
[100] Ms Jones, Richmond Valley Council, Transcript 909.
[101] VOD.500.001.0001.
[102] HAF.503.001.0001.
[103] HAF.503.001.0001.
[104] RCN.900.042.0001; NBN.500.001.0001; TLS.003.001.0001; OPT.500.001.0005; OPT.501.001.0001.
[105] Ms Crawford-Flett, AusNet, Transcript 1365-1366; ESE.002.001.0001; TLS.003.001.0001. Mr Pesavento, Optus, Transcript 1323-1324.
[106] Submission NND.001.01184.
[107] Mr Pesavento, Optus, Transcript 1307; Mr Seneviratne, Telstra, Transcript 1308.
[108] ESE.002.001.0001.
[109] NBN.500.002.0001 (NBN Co. pilot program with Cross Dependency Initiative (XDI)).
[110] NND.001.01107; NND.001.00615; NND.600.00269.
[111] Mr Pesavento, Optus, Transcript 1312; Mr Seneviratne, Telstra, and Mr Pickens, Vodafone, Transcript 1313.
[112] NND.001.00037; NND.001.00135; NND.001.00227.
[113] TLS.003.001.0001.
[114] NND.001.01013 P 57; ESE.002.001.0001; CMA.8001.0001.0023.
[115] eg NND.001.01184; ENE.500.001.0001; ESE.002.001.0001.
[116] AEC.500.001.0434.
[117] TLS.003.001.0001; VOD.500.001.0001.
[118] NBN.500.001.0001; NBN.500.002.0001.
[119] The Hon Mark Coulton MP, Minister for Regional Health, Regional Communications and Local Government, 'Strengthening Telecommunications Emergency Resilience' (Media Release, 12 May 2020).
[120] VOD.500.001.0001; TLS.003.001.0001.
[121] TLS.002.001.0053.
[122] TLS.002.001.0053.
[123] OPT.501.001.0001.
[124] EAU.500.001.0711.
[125] EAU.500.001.0711. Mr Whitelaw, NBN Co, Transcript 1320-1321; NBN.500.002.0001.
[126] Mr Pickens, Vodafone Hutchison Australia, Transcript 1315-1317.
[127] Ms Scarlett, Telstra, Transcript 1315-1316.
[128] Mr Pickens, Vodafone Hutchison Australia, Transcript 1317; HAF.503.001.0001; NND.600.00118.
[129] HAF.8004.0001.0001.

[130] CTH.900.001.0001.
[131] Mr Ryan, Endeavour Energy, Transcript 1373-1374.
[132] eg ESE.002.001.0001.
[133] Mr Ryan, Endeavour Energy, Transcript 1373.
[134] VOD.500.001.0001.
[135] TLS.002.001.0053.
[136] VOD.500.001.0001; TLS.002.001.0053.
[137] NND.600.00118; TLS.002.001.0053.
[138] NND.600.00118; TLS.002.001.0053; OPT.500.001.0005.
[139] VOD.500.001.0001.
[140] TLS.002.001.0053; NND.600.00118.
[141] HAF.502.001.0001 001.
[142] VOD.500.001.0001; NND.600.00118.
[143] VOD.500.001.0001.

Chapter 10 Community education

[1] BOM.9002.0001.0064 – Australian Institute for Disaster Resilience, (*Australian Emergency Management Arrangements Handbook* 2019).
[2] BOM.9002.0001.0064.
[3] RCN.900.034.0092.
[4] NND.001.00126.
[5] NND.001.00311.
[6] Mary Hoodless, Community Witness, Transcript 6; RCN.500.001.2530.
[7] RCN.707.001.0014.
[8] NND.001.01080.
[9] NND.001.00843.
[10] Mr Robb, Community Witness, Transcript 3; RCN.500.001.2557.
[11] CLQ.003.001.0001.
[12] Western Australian Department of Fire and Emergency Services, 'Fire Chat: In a Bushfire Every Five Minutes Counts' <https://www.dfes.wa.gov.au/firechat/Pages/default.htm>.
[13] NSW.007.001.0001.
[14] TAS.900.001.0003.
[15] ACT.900.001.0001.
[16] Resilience NSW, 'Get Ready for Disasters Poster' <https://www.emergency.nsw.gov.au/Documents/get-ready/122018-get-ready-five-simple-steps-poster.pdf>.
[17] RCN.001.001.3820 – *2009 Victorian Bushfires Royal Commission: Final Report Summary,* (July 2010); NSW.006.001.0001 – NSW Government, *Final Report of the NSW Bushfire Inquiry* (31 July 2020); FEC.360.001.0001 – Michael Keelty et al, *Independent Review into South Australia's 2019-20 Bushfire Season,* (Government of South Australia, June 2020).

Chapter 11 Emergency planning

[1] Australian Institute for Disaster Resilience, 'Australian Disaster Resilience Handbook Collection: Emergency Planning' (2020) <https://www.aidr.org.au/media/8051/aidr_handbookcollection_emergencyplanning_2020-09-09_v10.pdf>.
[2] BOM.9002.0001.0064 – Australian Institute for Disaster Resilience, 'Australian Disaster Resilience Handbook Collection: Australian Emergency Management Arrangements Handbook'.
[3] Ibid.
[4] Australian Institute for Disaster Resilience, 'Australian Disaster Resilience Handbook Collection: Emergency Planning' (2020) <https://www.aidr.org.au/media/8051/aidr_handbookcollection_emergencyplanning_2020-09-09_v10.pdf>.
[5] NSW.011.001.0001.
[6] NSW.011.001.0001.
[7] NSW.011.001.0001
[8] Ms Tehan, Victorian Council of Social Services, Transcript 2238; Ms Evans, Legal Aid NSW, Transcript 2238; NND.001.00522.
[9] PBU.500.001.0047.
[10] NND.001.00522; NND.800.001.00054; NND.800.001.00073; NND.800.001.00081.

[11] RSP.500.001.0002; Dr Westcott, South Australian Veterinary Emergency Management, Transcript p 2280; WHA.500.001.0012.
[12] TLS.002.001.0053.
[13] NND.300.007.0070; NND.300.007.0020; NND.300.007.0034; NND.300.007.0021; NND.300.007.0051; NND.300.008.0018; NND.300.007.0053; NND.300.007.0067; NND.300.008.0011.
[14] BOM.9002.0001.0064 – Australian Institute for Disaster Resilience, 'Australian Disaster Resilience Handbook Collection: Australian Emergency Management Arrangements Handbook', 2019.
[15] 'Territory' as used in this section is in reference to the Northern Territory, as the only territory with local governments.
[16] Hearings on local government were conducted between 22 and 24 June 2020: Transcript 855-1132.
[17] BOM.9002.0001.0064 – Australian Institute for Disaster Resilience, 'Australian Disaster Resilience Handbook Collection: Australian Emergency Management Arrangements Handbook'; EMV.0001.0003.0399; LGN.500.001.0038.
[18] LGN.500.001.0038; BOM.9002.0001.0064 – Australian Institute for Disaster Resilience, 'Australian Disaster Resilience Handbook Collection: Australian Emergency Management Arrangements Handbook'.
[19] Mr Florence, Indigo Shire Council, Transcript 1055.
[20] VIC.0006.0001.0001.
[21] PCS.548.001.0001 001.
[22] CLQ.001.001.0635.
[23] SWA.005.001.0003.
[24] NSW.007.001.0001; TAS.505.001.0001; NTT.506.001.0246.
[25] NSW.007.001.0001.
[26] Ms Phelps, Towong Shire Council, Transcript 1015; Ms Pagan, Towong Shire Council, Transcript 1058.
[27] Mr Peterson, Moreton Bay Regional Council, Transcript 886; Moreton Bay Regional Council, 'Financial Statements for the Year Ended 30 June 2019' (2019) <https://www.moretonbay.qld.gov.au/files/assets/public/services/annual-report/annual-report-2018-19/annual-report-2018-19-financial-statements.pdf>.
[28] Mr Peterson, Moreton Bay Regional Council, Transcript 885.
[29] Mr Peterson, Moreton Bay Regional Council, Transcript 890.
[30] TSC.500.001.0005; Towong Shire, '*2018/19 Annual Report*' (2019) <https://www.towong.vic.gov.au/about-council/plans-budgets-reports/annual-reports/images/Towong%20Shire%20Council%20Annual%20Report%202018-19.pdf>.
[31] Ms Phelps, Towong Shire Council, Transcript 1007.
[32] Ms Phelps, Towong Shire Council, Transcript 1016.
[33] Ms Phelps, Towong Shire Council, Transcript 1015.
[34] Ms Phelps, Towong Shire Council, Transcript 1016.
[35] Images obtained from nationalmap.gov.au using data sourced from the Australian Bureau of Statistics.
[36] RCN.900.013.0001 – Victorian Department of Environment, Land, Water and Planning, *Councils and Emergencies: Capability and Capacity Evaluation Report* (December 2019).
[37] RCN.900.013.0001.
[38] VIC.0006.0001.0001.
[39] CLQ.003.001.0188.
[40] VIC.0009.0001.0001 – Victorian Inspector-General for Emergency Management, *Inquiry into the 2019-20 Victorian Fire Season, Phase 1: Community and Sector Preparedness for and Response to the 2019-20 Fire Season,* (2020); Mr Edwards, Municipal Association of Victoria, Transcript 1022; MAU.500.001.0012.
[41] VIC.0006.0001.0001.
[42] Ms Dench, Wollondilly Shire Council, Transcript 1074-1075.
[43] Ms Dench, Wollondilly Shire Council, Transcript 1075; NSW.007.001.0001.
[44] NSW.007.001.0001.
[45] CLQ.001.001.0635.
[46] Mr Lollback, Local Government Association of Queensland, Transcript 872; CLQ.001.001.0266 – Queensland Fire and Emergency Services, 'Queensland Prevention, Preparedness, Response and Recovery Disaster Management Guideline' (January 2018).
[47] NSW.900.001.0003; SSA.900.001.0003.
[48] VIC.900.001.0001.
[49] SWA.007.001.0002.

Chapter 12 Evacuation planning and shelters

[1] Australian Institute for Disaster Resilience, 'Australian Disaster Resilience Handbook 4: Evacuation Planning' (2017) <https://knowledge.aidr.org.au/media/5617/aidr-evacuation-planning-handbook.pdf>.

[2] SWA.006.001.0001; EMQ.001.001.0585.
[3] EMV.0007.0001.0001 667; CJN.002.001.0050 – NSW SEMC Evacuation Working Group, 'State Emergency Management Plan: Evacuation Management Guidelines' (March 2014); ESA.510.001.0002.
[4] The ACT indicated that it applies the guidance in the Australian Institute Disaster Resilience's Evacuation Planning Handbook.
[5] CLQ.001.001.0650; NTT.509.001.0050; TAS.507.001.0403; VIC.0011.0001.0001.
[6] ESA.510.001.0002; CLQ.001.001.0650; TAS.507.001.0403; VIC.0011.0001.0001; SWA.006.001.0001; NSW.009.002.0027.
[7] DMC.001.001.0972 – Queensland Fire and Emergency Services, 'Queensland Prevention, Preparedness, Response and Recovery Disaster Management Guideline,' (January 2018).
[8] VIC.0011.0001.0001.
[9] KIC.500.001.0002.
[10] Mr Lunson, Queensland Department of Transport and Main Roads, Transcript 1283.
[11] EGC.503.001.0001.
[12] Mr McTavish, NSW Cross Border Commissioner, Transcript, 1199.
[13] EMV.0007.0001.0001.
[14] NND.001.00324.01.
[15] NND.001.00784; SHC.503.001.0002.
[16] NND.001.00435.01.
[17] Bushfire History Project contribution, Peter Dunn, Conjola, NSW.
[18] NND.001.00324.01_0001.
[19] NSW.006.001.0001 – NSW Government, *Final Report of the NSW Bushfire Inquiry,* (31 July 2020); VIC.0009.0001.0001 – Victorian Inspector-General for Emergency Management, *Inquiry into the 2019-20 Victorian Fire Season, Phase 1: Community and Sector Preparedness for and Response to the 2019-20 Fire Season,* (2020).
[20] NSW.006.001.0001 – NSW Government, *Final Report of the NSW Bushfire Inquiry,* (31 July 2020).
[21] VIC.0009.0001.0001 – Victorian Inspector-General for Emergency Management, *Inquiry into the 2019-20 Victorian Fire Season, Phase 1: Community and Sector Preparedness for and Response to the 2019-20 Fire Season,* (2020).
[22] SHC.503.001.0002; EGC.503.001.0001; EGC.502.001.0044; BVC.500.001.0001.
[23] Mr Staples, Department of Transport, Transcript 1279; Mr Dinan, Transport for NSW, Transcript 1287-8.
[24] Mr McTavish, NSW Cross Border Commissioner, Transcript 1199-1200.
[25] BVC.500.001.0001.
[26] Australian Institute for Disaster Resilience, 'Australian Disaster Resilience Handbook 4: Evacuation Planning' (2017).
[27] FEC.360.001.0001 – Michael Keelty et al, *Independent Review into South Australia's 2019-20 Bushfire Season,* (Government of South Australia, June 2020).
[28] EGC.503.001.0001.
[29] EGC.503.001.0001.
[30] NSW.006.001.0001 – NSW Government, *Final Report of the NSW Bushfire Inquiry,* (31 July 2020).
[31] SHC.503.001.0002.
[32] SRC.500.001.0001.
[33] FEC.360.001.0001 – Michael Keelty et al, *Independent Review into South Australia's 2019-20 Bushfire Season,* (Government of South Australia, June 2020); DMC.001.001.0972 – Queensland Fire and Emergency Services, 'Queensland Prevention, Preparedness, Response and Recovery Disaster Management Guideline,' (January 2018).
[34] Mr Stephenson, Emergency Management Victoria, Transcript 1281.
[35] Mr Stephenson, Emergency Management Victoria, Transcript 1295; Mr Dinan, NSW Department of Transport, Transcript 1295.
[36] Mr Dinan, NSW Department of Transport, Transcript 1294; Mr Staples, NSW Department of Transport, Transcript 1294 and 1286.
[37] Mr McConnell, East Gippsland Shire Council, Transcript 914; Mr Stenton, City of Swan, Transcript 994; Mr Hyde, Snowy Valley Council, Transcript 1021.
[38] SVC.500.001.0001 at .0011.
[39] FSA.068.001.0014.
[40] Mr Fernandez, Kangaroo Island Council, Transcript 932–933.
[41] SSA.901.001.0003; CLQ.003.001.0001; SWA.007.001.0002; TAS.900.001.0003.
[42] Mr Slijepcevic, Country Fire Authority Victoria, Transcript 669.
[43] Mr Warren Sharpe, Eurobodalla Shire Council, Transcript 939; Mr Schroder, Clarence Valley, Transcript 965; Ms Martin, South Australian Department of Environment and Water, Transcript 1718.
[44] KIC.500.001.0002; NND.001.01092.02.
[45] FSA.068.001.0014.
[46] Mr Hyde, Snowy Valley Council, Transcript 1013.
[47] NSW.006.001.0001.

[48] Image from the Australian attributed to Peter Parks/AFP (3 January 2020) <https://www.theaustralian.com.au/nation/bushfires-firefighters-in-scramble-to-control-blazes-before-heat-soars-again/news-story/51adac0085924d7981025946e1db5e57>.
[49] NSW.006.001.0001.
[50] Ms Prendergast, Resilience NSW, Transcript 1920–1921; Mr Hine, Tasmania Police, Transcript 2098–2099.
[51] NSW Government, 'Evacuation Management Guidelines: COVID 19 Supplement, V2.0' (August 2020) < https://www.emergency.nsw.gov.au/Documents/publications/guidelines/Guideline_Evacuation-Management-Guidelines-COVID19-Supplement.pdf>.
[52] NND.001.00363.01.
[53] Major General Peter Dunn (Retd), ACT Emergency Services Authority, Transcript 1491–1492.
[54] NND.001.00363.01.
[55] Major General Peter Dunn (Retd), ACT Emergency Services Authority, Transcript 1491.
[56] DEF.0001.0002.0123.
[57] EGC.502.001.0001 19.
[58] KIC.500.001.0002 8.
[59] KIC.502.001.0012 7.
[60] KIC.502.001.0012 8.
[61] NSW.009.002.0041.
[62] SWA.006.001.0001; CLQ.001.001.0695; TAS.507.001.0403; TAS.507.001.0179.
[63] ESA.510.001.0002.
[64] NSW.009.002.0027; CLQ.001.001.0695; SSA.632.001.0068.
In South Australia responsibility for Bushfire Safer Places and Last Resort Refuges lies with the Bushfire Management Committee, assessed by assessments and evaluations conducted by the CFS.
[65] DMC.001.001.0664 – Queensland Fire and Emergency Services, 'Evacuation: Responsibilities, Arrangements and Management Manual.1.190' (18 September 2018) 6.4.3.
[66] DMC.001.001.0972 – Queensland Fire and Emergency Services, 'Queensland Prevention, Preparedness, Response and Recovery Disaster Management Guideline,' (January 2018); CJN.002.001.0050 – NSW SEMC Evacuation Working Group, 'State Emergency Management Plan: Evacuation Management Guidelines' (March 2014); FES.005.001.0023.
[67] EMV.0003.0003.0315 –Emergency Management Victoria, 'Bushfire Safety Policy Framework' (November 2018).
[68] RFS.001.001.0001.
[69] EMV.0009.0001.0001.
[70] TAS.507.001.0179.
[71] SAF.203.004.0017.
[72] SAF.203.004.0017.
[73] CLQ.001.001.0695; NTT.509.001.0064.
[74] DMC.001.001.0664
[75] CLQ.001.001.0695.
[76] CFA Victoria, 'Community Fire Refuges' (2020), <https://www.cfa.vic.gov.au/plan-prepare/community-fire-refuges/>.
[77] EMV.0001.0003.0020 – Emergency Management Victoria, *2018 South West Fires Community Report,* (December 2019).
[78] NSW.009.002.0027.
[79] Ms Hoodless, Community Witness, Transcript 1157.
[80] Mr Ierino, Indigo Shire Council, Transcript 1059; Mr Georgopoulos, Kangaroo Island Council, Transcript 934.
[81] KIC.502.001.0012.
[82] EMV.0001.0003.0020 – Emergency Management Victoria, *2018 South West Fires Community Report,* (December 2019).
[83] Indigo Shire Council, NND.001.01158 2.
[84] FEC.360.001.0001 – Michael Keelty et al, *Independent Review into South Australia's 2019-20 Bushfire Season,* (Government of South Australia, June 2020); EMQ.001.001.0711 – Queensland Inspector-General Emergency Management, *Queensland Bushfires Review: 2019-20,* (No 2, State of Queensland, 20 February 2020) 35.
[85] RCN.900.043.0001.
[86] RCN.900.043.0001; See also Ms Buck, Sunshine Coast Council, Transcript 993–994; RCN.900.043.0001.
[87] Mr McConnell, East Gippsland Shire Council, Transcript 925.
[88] NSW.009.002.0027.
[89] NND.001.00363.
[90] NND.600.00093; NND.001.01220; NND.001.01071; NND.001.00976; NND.001.00957; NND.001.00784; NND.001.00117; NND.600.00056; NND.001.00816; Mr Sharpe, Eurobodalla Shire Council, Transcript 948.
[91] RCN.707.001.0014; NND.001.01220; NND.001.01295; NND.001.00674.

[92] NND.001.00324; NND.001.00317; NND.600.00093; NND.001.01220; NND.001.01071; NND.001.00957; NND.001.00866; NND.001.00117; NND.001.01344; NND.001.01160; NND.001.00829; NND.001.00816; NND.001.00412.
[93] NND.600.00093; NND.001.00957; NND.001.00441.01.
[94] NND.001.00682; NND.001.00957; NND.001.01220; NND.600.00010; NND.600.00056; NND.001.01160; SHC.502.001.0002 16; EGC.502.001.0044; ESC.501.001.0002.
[95] NND.001.01220.
[96] NND.001.01295; NND.001.01201; NND.001.00976; NND.001.00772; SRC.500.001.0001.
[97] NND.001.00459.
[98] Image from ABC News attributed to Amber Rendell (2 January 2020) <https://www.abc.net.au/news/2020-01-02/fears-bushfires-in-north-east-victoria-could-merge/11837430>.
[99] TSC.500.001.0005.
[100] NND.001.00692.
[101] VIC.0011.0001.0001.
[102] NSW.006.001.0001, 381.
[103] NND.001.01162.01.
[104] NND.001.01201; NND.001.01054.
[105] Image from the Daily Telegraph attributed to Alex Coppell (22 January 2020) <https://www.dailytelegraph.com.au/bushfiresupport/terrifying-merciless-photos-from-the-bushfire-front-lines/news-story/cce8766b4f16034cd05c9742d513d060>.
[106] NND.001.00135.
[107] NND.001.00607; NND.001.01054; NND.001.00664.
[108] NSW.009.002.0027; TAS.507.001.0403; NTT.509.001.0050; FEC.219.001.0404; FEC.219.001.0440; FES.005.001.0008; CJN.002.001.0156; SCC.501.001.0280.
[109] CLQ.001.001.0650.
[110] NSW.009.002.0027; SWA.006.001.0001; NTT.509.001.0050; SSA.632.001.0062.
[111] VIC.0011.0001.0001.
[112] NSW.009.002.0027; SWA.006.001.0001; TAS.507.001.0403; DMC.001.001.0664.
[113] SSA.632.001.0062.
[114] NSW.009.002.0027.
[115] NSW.006.001.0001 – NSW Government, *Final Report of the NSW Bushfire Inquiry,* (31 July 2020).
[116] Mr Staples, NSW Department of Transport, Transcript 1282.
[117] Mr Bascomb, Snowy Monaro Regional Council, Transcript 1022.
[118] Mr Staples, NSW Department of Transport, Transcript 1282; Mr Stephenson, Emergency Management Victoria, Transcript 1282.
[119] CLQ.001.001.0650; SWA.006.001.0001; NTT.509.001.0050.
[120] EGC.503.001.0001.
[121] JPR.001.002.0001.
[122] CLQ.001.001.0650.
[123] Mr McTavish, NSW Cross Border Commissioner, Transcript 1198-1199.
[124] VIC.0009.0001.0001 – Victorian Inspector-General for Emergency Management, *Inquiry into the 2019-20 Victorian Fire Season, Phase 1: Community and Sector Preparedness for and Response to the 2019-20 Fire Season,* (2020).
[125] NSW.009.002.0027.
[126] NND.001.00777.
[127] NND.001.01095 1; NND.600.00146 _0004; NND.001.00777; FEC.360.001.0001 – Michael Keelty et al, *Independent Review into South Australia's 2019-20 Bushfire Season,* (Government of South Australia, June 2020).; WOL.500.001.0001 22.
[128] NSW.009.002.0027; SWA.006.001.0001; SSA.632.001.0062.
[129] VIC.0011.0001.0001; NSW.009.002.0027; SWA.006.001.0001; TAS.507.001.0403.
[130] VIC.0011.0001.0001; NSW.009.002.0027; SWA.006.001.0001; TAS.507.001.0403; CLQ.001.001.0650; NTT.509.001.0050; SSA.632.001.0062.

Chapter 13 Emergency information and warnings

[1] FES.005.001.0001.
[2] HAF.501.001.0001.
[3] RFS.001.001.0001; RFS.5002.0004.0009.
[4] FES.005.001.0001.
[5] PAM.500.001.0115 – Professor McFarlane AO.

[6] PAM.500.001.0115.
[7] RCN.900.107.0017 – Joshua Whittaker, Mel Taylor and Christopher Bearman, 'Why Don't Bushfire Warnings Work as Intended? Responses to Official Warnings during Bushfires in NSW, Australia' (2020) 45 *International Journal Of Disaster Risk Reduction* 2.
[8] EMV.0007.0001.0001.
[9] DMC.001.001.1192; RFS.5002.0004.0009; RCN.900.107.0017.
[10] PAM.500.001.0115; Stuart Ellis, Peter Kanowski and Whelan Rob, National Inquiry on Bushfire Mitigation and Management (Council of Australian Governments, 31 March 2004) <https://www.dfes.wa.gov.au/publications/GeneralReports/FESA_Report-NationalInquiryonBushfireMitigationandManagement.pdf>; FEC.360.001.0001; NSW.006.001.0001.
[11] HAF.9002.0001.0002.
[12] *State Emergency and Rescue Management Act 1989* (NSW); *Emergency Management Act 1986* (Vic); *Disaster Management Act 2003* (Qld); *Emergency Management Act 2005* (WA); *Emergency Management Act 2004* (SA); *Emergency Management Act 2006* (Tas); *Emergencies Act 2004* (ACT); *Northern Territory Disasters Act 1979*; RCN.900.116.0023 – Commonwealth Attorney-General's Department, 'Australia's Emergency Warning Arrangements' (April 2013).
[13] *State Emergency and Rescue Management Act 1989* (NSW); *Emergency Management Act 1986* (Vic); *Disaster Management Act 2003* (Qld); *Emergency Management Act 2005* (WA); *Emergency Management Act 2004* (SA); *Emergency Management Act 2006* (Tas); *Emergencies Act 2004* (ACT); *Northern Territory Disasters Act 1979*; RCN.900.116.0023; Ms Carson, Geoscience Australia, Transcript 42.
[14] BOM.9002.0001.0012; Mr Maguire, Bureau of Meteorology, Transcript 563.
[15] Figure from Attorney-General's Department, RCN.900.116.0023.
[16] Mr Maguire, Bureau of Meteorology, Transcript 568, 577–578; RCN.900.116.0023; HAF.9002.0001.0002; *Meteorology* Act *1955* (Cth). RCN.900.022.0001.
[17] Mr Maguire, Bureau of Meteorology, Transcript 577; RCN.900.022.0001; BOM.9002.0001.0012.
[18] RCN.900.118.0105.
[19] RCN.900.034.0092; RCN.900.116.0023.
[20] Bushfire History Project contribution, Rolfe Poole NSW.
[21] RFS.5002.0004.1074; EMV.0007.0001.0001; RFS.5002.0004.0009; EMV.0005.0001.0068.
[22] BOM.9002.0003.0003.
[23] BOM.9004.0001.0001.
[24] HAF.8001.0001.0001; PMC.0003.0001.0001; AFC.502.001.0998; AFC.503.001.0003; AFC.507.001.0113; AFC.505.001.0343; EMV.0003.0003.0798.
[25] AFC.503.001.0003; AFC.505.001.0317; AFC.502.001.0998; CSI.508.001.0027.
[26] AFC.503.001.0003; BOM.9002.0003.0003; PMC.0003.0001.0001.
[27] CSI.508.001.0027.
[28] RCN.900.153.0001.
[29] CSI.508.001.0027.
[30] Figure from Metrix Consulting presentation, MEG.500.001.0362.
[31] EMV.0007.0001.0001.
[32] RCN.900.001.0059 – P O'Donohue and F Dunstan, 'Australian Fire Danger Rating System - Changing How We Describe and Use Fire Danger Ratings'.
[33] Participant response to the community research, MEG.500.001.0616.
[34] RCN.900.001.0059.
[35] RCN.900.001.0059; RCN.900.107.0001 – Joshua Whittaker, 'Ten Years after the Black Saturday Fires, What Have We Learnt from Post-Fire Research,' (2019) 34(2) *Australian Journal of Emergency Management*.
[36] MEG.500.001.0362. Research was also undertaken at the state and territory government level: MEG.500.002.0374; MEG.500.002.0280; MEG.500.002.0187; MEG.500.002.0001; MEG.500.002.0094; MEG.500.001.0822; MEG.500.001.0729; MEG.500.001.0636.
[37] AFC.503.001.0003.
[38] Appendix 18: Overview of Bushfire Warning System includes the recommended action under each alert level, which varies across states and territories.
[39] Mr Lollback, Local Government Association of Queensland, Transcript 878.
[40] Mr Clark, NSW Rural Fire Service, Transcript 1214–1216; Mr Wiebusch, Victoria State Emergency Service, Transcript 2521; Mr Arnol, Tasmanian Department of Fire and Emergency Services, Transcript 2488–2489; Mr Scott, ACT Rural Fire Service, Transcript 2498–2499; Ms Bremner, Bushfires NT, Transcript 2442.
[41] NND.001.00832.
[42] Ms Buck, Sunshine Coast Council, Transcript 991.
[43] Mr Lollback, Local Government Association of Queensland, Transcript 877.
[44] RCN.001.001.0489. Mr Clark, NSW Rural Fire Service, Transcript 1217–1218.
[45] Mr Clark, NSW Rural Fire Service, Transcript 1228. AFC.503.001.0003; HAF.0005.0007.0287; HAF.0005.0007.0287.

[46] AFC.503.001.0003.
[47] AFC.503.001.0003; AFC.502.001.0998.
[48] AFC.503.001.0003; EMV.0003.0003.0798.
[49] AFC.510.001.0001; HAF.0005.0007.0287.
[50] AFC.503.001.0003; See also AFC.510.001.0001; HAF.0005.0007.0006.
[51] HAF.0005.0007.0006; AFC.510.001.0001.
[52] HAF.0005.0001.0013; HAF.0005.0007.0006; MEG.500.001.0616.
[53] See AFC.503.001.0003; AFC.502.001.0998; EMV.0003.0003.0798.
[54] HAF.0005.0007.0006; HAF.0005.0001.0013; AFC.503.001.0003.
[55] SAF.203.002.3525.
[56] HAF.0005.0007.0287; HAF.0005.0007.0368.
[57] AFC.510.001.0001. See also HAF.0005.0007.0287; HAF.0005.0007.0360; AFC.510.001.0001.
[58] AFC.513.001.0128.
[59] AFC.512.001.0001; AFC.513.001.0130.
[60] AFC.513.001.0130.
[61] RCN.900.116.0023.
[62] EMV.0001.0003.0399; RFS.5002.0004.0009.
[63] Mr McTavish, NSW Cross Border Commissioner, Transcript 1188-1190; NCB.001.001.0001.
[64] Mr Wilson, Victorian Cross Border Commissioner, Transcript 1188; JPR.001.002.0011.
[65] HAF.0003.0001.0584.
[66] HAF.0003.0001.0584; HAF.9002.0001.0002.
[67] HAF.8001.0001.0001. See also EMV.0007.0001.0001.
[68] Mr Darby, K2S Consulting, Transcript 2693–2695; QFS.501.001.0001.
[69] Mr Darby, K2S Consulting, Transcript 2693–2695; QFS.501.001.0001.
[70] NSW.011.001.0001; QFS.501.001.0001.
[71] QFS.501.001.0001.
[72] Mr Darby, K2S Consulting, Transcript 2693–2695; HAF.9003.0001.0001; HAF.9002.0001.0002; QFS.501.001.0001; HAF.0003.0001.0584.
[73] HAF.9002.0001.0002; Mr Dawson, Queensland Inspector-General for Emergency Management, Transcript 1598; Mr Darby, K2S Consulting, Transcript 2695; Mr Dawson, Queensland Inspector-General for Emergency Management, Transcript 1598. HAF.0003.0001.0584.
[74] Mr Darby, K2S Consulting, Transcript 2693–2695. In the interim, the current Emergency Alert System (EAP3) was extended for 12 months to ensure continuity of national emergency alert beyond June 2020, see: HAF.0005.0006.0011.
[75] HAF.0003.0001.0584.
[76] HAF.9005.0001.0002.
[77] ACT, relied on the NSW Fire Near Me app, each state and territory had versions of the app. Queensland SES operates an app for floods and storms, but uses a website feed for fire information from the QLDFES.
[78] EMV.0010.0001.0001.
[79] Mr Clark, NSW Rural Fire Service, Transcript 1221; Ms Fitzgerald, Emergency Management Victoria, Transcript 1220; EMV.0010.0001.0001.
[80] Ms Fitzgerald, Emergency Management Victoria, Transcript 1220; NND.001.00609.
[81] Mr Morris, Bushfire.Io, Transcript 2365; Ms Fitzgerald, Emergency Management Victoria, Transcript 1235.
[82] SAF.203.004.0017; BFI.501.001.0001; Mr Morris, Bushfire.Io, Transcript 2364.
[83] Ms Fitzgerald, Emergency Management Victoria, EMV.0010.0001.0001; Mr Clark, NSW Rural Fire Service, Transcript 1223–1225; BFI.501.001.0001.
[84] Bushfire History Project contribution, Dylan Brandon NSW.
[85] Bushfire History Project contribution, Kristen Pearce VIC.
[86] NND.600.00282; NND.600.00348; NND.001.00039; NND.001.01153; FEC.360.001.0001; NND.600.00011. NND.600.00011.
[87] EMV.0010.0001.0001; NND.600.00348; NND.001.00258; NND.001.00169; NND.001.00071; NND.600.00011.
[88] Mr Bascomb, Snowy Monaro Regional Council, Transcript 1021.
[89] NND.001.00182.
[90] Mr Clark, NSW Rural Fire Service, Transcript 1223–1225; BFI.501.001.0001; Submission NND.600.00391; NND.001.00506; Mr Bascomb, Snowy Monaro Regional Council, Transcript 1026.
[91] Mr Hyde, Snowy Valley Council, Transcript 1020.
[92] Commissioner Rogers, NSW Rural Fire Service, Transcript 1221.
[93] Mr Hyde, Snowy Valley Council, Transcript 1020; EMV.0007.0001.0001.
[94] EMV.0010.0001.0001; ESA.505.001.3659; NSW.006.001.0001.
[95] Mr Clark, NSW Rural Fire Service, Transcript 1238–39; HAF.9005.0001.0002.
[96] RFS.003.001.0001.

[97] RFS.003.001.0001; BFI.501.001.0001; Mr Morris, Bushfire.Io, Transcript 2364.
[98] Mr Morris, Bushfire.Io, Transcript 2364; NND.600.00011.
[99] SSA.900.001.0003.
[100] Commissioner Rogers, NSW Rural Fire Service, Transcript 1224.
[101] NSW.900.001.0003.
[102] Ms Fitzgerald, Emergency Management Victoria, Transcript 1225.
[103] ESA.502.001.0117.
[104] For example, NSW Government, NSW.006.001.0001 –*Final Report of the NSW Bushfire Inquiry* (31 July 2020); ESA.505.001.3659.
[105] CMA.8001.0001.0001.
[106] NND.001.00282; NND.001.00570; Major General Peter Dunn (Retd), ACT Emergency Services Authority, Transcript 1494.
[107] ABC.500.001.0041. Despite being designed to withstand temperatures of 800 degrees Celsius and being elevated 70 metres from the ground, the cables depicted were still overwhelmed by the heat of the bushfire.
[108] Mr Fisher, Australian Broadcasting Corporation, Transcript 2348–2358.
[109] ABC.500.001.0041.
[110] ABC.500.001.0041.
[111] NND.001.01143.
[112] ABC.500.001.0041.
[113] ABC.500.001.0041.
[114] Mr Windebank, Community Witness, Transcript 1173.
[115] Major General Peter Dunn (Retd), ACT Emergency Services Authority, Transcript (n 99) 1494.
[116] NND.600.00266.
[117] NND.600.00266.
[118] ABC.500.001.0041.
[119] AFC.505.001.0317; NND.001.01143.
[120] ABC.500.001.0041.
[121] VIC.900.001.0001; TAS.900.001.0003.
[122] TAS.900.001.0003; SSA.900.001.0003; CLQ.003.001.0001.
[123] CTH.900.001.0001.
[124] VIC.900.001.0001; TAS.900.001.0003; SSA.900.001.0003; CLQ.003.001.0001; ACT.900.001.0001; SWA.007.001.0002. Victorian and Queensland Government Responses to Propositions did not support the Proposition but supported improved engagement. WA, SA, ACT, NSW and Tasmania supported the proposition in principle.

Chapter 14 Air quality

[1] RCN.900.131.0018; DFJ.501.001.0001.
[2] RCN.900.131.0018; RCN.900.003.0348; CSI.508.001.0027; DFJ.502.001.0001.
[3] ENH.500.001.0008.
[4] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[5] DFJ.502.001.0001; DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research; RCN.900.131.0018; ENH.500.001.0008.
[6] United States Environmental Protection Agency, 'Particular Matter (PM) Pollution' (1 October 2020) <https://www.epa.gov/pm-pollution/particulate-matter-pm-basics>.
[7] DFJ.502.001.0001; DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[8] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research; RCN.900.131.0018; ENH.500.001.0008.
[9] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research; RCN.900.131.0018; DFJ.502.001.0001; NND.001.00284.
[10] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[11] Figure from the National Aeronautics and Space Administration (NASA) Worldview, RCN.900.118.0075.
[12] Associate Professor Johnston, Menzies Institute for Medical Research, Transcript 101.
[13] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research; Associate Professor Johnston, Menzies Institute for Medical Research, Transcript 103; RCN.900.154.0001.
[14] AAU.500.001.0039 – Ms Goldman, Asthma Australia; AAU.500.001.0033.
[15] NND.800.200.00067.
[16] Coroners Court of Victoria, *Findings*, <https://www.coronerscourt.vic.gov.au/inquests-findings/findings?combine=thunderstorm+asthma>.

[17] Victorian Chief Health Officer, *The November 2016 Victorian Epidemic Thunderstorm Asthma Event: An Assessment of the Health Impacts*, April 2017, <https://www2.health.vic.gov.au/Api/downloadmedia/%7B459A8B36-7C70-4C0E-861E-C648BBF4C818%7D>.
[18] Inspector-General Emergency Management Victoria, *Review of Response to the Thunderstorm Asthma Event of 21-22 November 2016 - Final Report,* April 2017, <https://www.igem.vic.gov.au/our-work/evaluation-and-review/review-of-the-thunderstorm-asthma-emergency-response>.
[19] NND.800.001.00087.01.
[20] RCN.900.075.0231.
[21] NND.800.200.00043.
[22] National Environment Protection (Ambient Air Quality) Measure - Schedule 2.
[23] WEW.001.001.0004; PIN.002.002.0001; National Environment Protection (Ambient Air Quality) Measure Schedule 3.
[24] EPV.0001.0001.0001.
[25] EPV.0001.0001.0001.
[26] EPV.0001.0001.0001.
[27] NND.001.01122.
[28] PIN.002.002.0001; EPS.388.001.0001; ESQ.002.001.0050.
[29] National Environment Protection (Ambient Air Quality) Measure Schedule 2.
[30] AHD.500.001.0001.
[31] EPV.0001.0001.0001.
[32] ESQ.002.001.0050.
[33] EPS.388.001.0001.
[34] TAS.507.001.0403.
[35] RCN.900.118.0020.
[36] National Environment Protection Council, 'Variation to the Ambient Air Quality NEPM - Particles Standards' (2015) <http://www.nepc.gov.au/resource/variation-ambient-air-quality-nepm-%E2%80%93-particles-standards>.
[37] CTH.900.001.0001
[38] National Environment Protection Council, 'Proposed Variation to the National Environment Protection (Ambient Air Quality) Measure Standards for Ozone, Nitrogen Dioxide and Sulfur Dioxide' <http://www.nepc.gov.au/nepms/ambient-air-quality/proposed-variation/consultation-2019>.
[39] CTH.900.001.0001.
[40] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[41] NND.800.001.00087.01; NND.001.00436.
[42] PIN.002.002.0035.
[43] PIN.002.002.0035; TAS.507.001.0403.
[44] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[45] AHD.500.001.0001.
[46] EPS.388.001.0001. The trigger levels in the figure are presented in µg/m^3. However, some jurisdictions express this as an Air Quality Index in public reporting. Ratings for 'ACT (24HR)' is based on *Health Advice for Smoky Air*, <https://www.health.act.gov.au/about-our-health-system/population-health/environmental-monitoring/monitoring-and-regulating-air-0>. Ratings for 'VIC (24HR) is based on *Standard for Smoke, Air Quality and Community Health (Version 2.0) 2019* and trigger advice from Chief Health Officer for temporary relocations if $PM_{2.5}$ are predicted or are >250 µg/m^3 for two consecutive days.
[47] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[48] NND.800.001.00087.01; DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[49] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[50] PIN.002.002.0001, PIN.002.002.0035, PIN.002.002.0032; DHN.500.001.0237.
[51] EPS.388.001.0001; DHW.455.011.0001; PIN.002.002.0035
[52] NND.800.200.00067; EPV.0001.0001.0001; PIN.002.002.0035.
[53] EPV.0001.0001.0001; TAS.507.001.0403.
[54] NND.800.001.00087.01.
[55] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[56] NND.800.200.00063; WEW.001.001.0004.
[57] EPS.388.001.0001.
[58] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research; ENH.500.001.0011.
[59] EPS.388.001.0001; ENH.500.001.0011.
[60] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[61] RCN.900.118.0076.
[62] AHD.500.001.0001; PIN.002.002.0001.

[63] ENH.500.001.0011. The timing for consideration of the one hour reporting framework for $PM_{2.5}$, by the AHPPC is yet to be determined.
[64] PIN.002.002.0035.
[65] NTH.500.001.0001; WAH.001.001.0001; DHQ.001.001.0005; DHN.500.001.0237; DHW.455.011.0001.
[66] PIN.002.002.0001.
[67] DHQ.001.001.0404.
[68] AHD.500.001.0001.
[69] PMC.0003.0001.0001; NND.800.001.00082.01; NND.800.001.00109.
[70] NND.800.001.00084.01; NND.800.200.00063; NND.800.200.00067.
[71] AHD.500.001.0001; NND.800.200.00067; NND.800.001.00087.01; DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[72] ESQ.002.001.0050.
[73] WAH.001.001.0001.
[74] Image from ABC News attributed to Lukas Coch (25 May 2020) <https://www.abc.net.au/news/2020-05-25/canberra-hospitals-wards-filled-with-toxic-smoke-this-summer/12279384?nw=0>.
[75] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[76] DHW.455.011.0001; DHQ.001.001.0005; NTH.500.001.0001; DHHS.0002.0001.0021; DHN.500.001.0237..
[77] PIN.002.002.0017.
[78] RCN.900.075.0212 2016.
[79] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[80] NND.800.001.00082.01; Commissioner Rogers, NSW Rural Fire Service, Transcript 730.
[81] NND.800.001.00082.01.
[82] RMIT ABC Fact Check, Are Hazard Reduction Burns Effective in Managing Bushfires? The Answer Is Complicated, *ABC News*, 20 December 2019, <https://www.abc.net.au/news/2019-12-20/hazard-reduction-burns-bushfires/11817336> (Picture: Ian Dicker).
[83] Associate Professor Johnston, Menzies Institute for Medical Research, Transcript 104; NND.800.001.00082.01.
[84] NND.800.001.00085.01; NND.800.001.00082.01; DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[85] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research; Associate Professor Johnston, Menzies Institute for Medical Research, Transcript 106.
[86] NND.800.200.00064.
[87] CTH.900.001.0001; NSW.900.001.0003; SSA.900.001.0003; CLQ.003.001.0001; SWA.007.001.0002; TAS.900.001.0003; NTT.900.001.0003; ACT.900.001.0001.
[88] Susan Stone et al, *Wildfire Smoke: A Guide for Public Health Officials,* California Office of Environmental Health Hazard Assessment; U.S. Center for Disease Control and Prevention; U.S. Forest Service and U.S. Environmental Protection Agency, August 2019, <https://www.airnow.gov/publications/wildfire-smoke-guide/wildfire-smoke-a-guide-for-public-health-officials/>.
[89] NND.800.200.00063.
[90] NND.800.200.00067.
[91] NND.800.200.00064.
[92] NND.800.001.00084.01; DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research.
[93] DHQ.001.001.0005.
[94] PIN.002.002.0001.
[95] EPV.0001.0001.0001.
[96] PIN.002.002.0001; ESQ.002.001.0050; WEW.001.001.0004; AHD.500.001.0001.
[97] PIN.002.002.0001; EPV.0001.0001.0001; EPS.388.001.0001.
[98] DFJ.501.001.0001 – Associate Professor Johnston, Menzies Institute for Medical Research; NND.800.001.00079.
[99] PIN.002.002.0001; EPV.0001.0001.0001; ESQ.002.001.0050; NEP.500.001.0012; EPS.388.001.0001.
[100] NND.800.200.00063; NND.800.001.00079; PIN.002.002.0001.
[101] ESQ.002.001.0050.
[102] ESQ.002.001.0050.
[103] NND.800.001.00079.
[104] EPV.0001.0001.0001; NEP.500.001.0012.
[105] NND.800.001.00085.01; NND.800.001.00082.01.
[106] PMC.0003.0001.0001.
[107] Dr Metcalfe, Commonwealth Scientific and Industrial Research Organisation, Transcript 545-546.
[108] EPV.0001.0001.0001.
[109] CSI.508.001.0027.
[110] NND.300.003.0003; VIC.900.001.0001.
[111] CSI.501.001.0001; BOM.9003.0001.0001.

[112] SSA.900.001.0003; VIC.900.001.0001; NND.300.004.0004; NND.300.005.0019; NND.300.003.0003; BOM.9003.0001.0001.
[113] Sophie Schmidt, Air Quality: How We're Minimising Smoke Impact, *CSIROscope*, 14 January 2020, <https://blog.csiro.au/air-quality-how-were-minimising-smoke-impact/>.
[114] RCN.900.131.0018; NND.800.001.00085.01; AAU.500.001.0039 – Ms Goldman, Asthma Australia; DFJ.501.001.0001; NND.800.001.00082.01; NND.800.200.00045; NND.800.200.00043.
[115] NND.800.001.00087.01; NND.800.200.00064; NND.800.001.0008.
[116] PIN.002.002.0001.
[117] PIN.002.002.0001.
[118] PIN.002.002.0127; PIN.002.002.0001.
[119] PIN.002.002.0001.
[120] PIN.002.002.0001.
[121] PIN.002.002.0127.
[122] NSW Department of Planning, Industry and Environment, Air Quality Forecast: Sydney Metropolitan Region, 2 January 2020, <https://web.archive.org/web/20200123033345/https:/www.dpie.nsw.gov.au/air-quality/sydney-forecast> (screenshot from the NSW Department of Planning, Industry and Environment website).
[123] HEA.9002.0001.0001; HEA.9001.0002.0001.

Chapter 15 Health

[1] PBU.500.001.0047 – Dr Burns, General Practitioner.
[2] NND.600.00090; Australian Academy of Health and Medical Sciences, *The Australian Bushfires: Impacts on Health - the Evidence* (April 2020) <https://aahms.org/wp-content/uploads/2020/04/The-Australian-Bushfires-and-the-impact-on-health_evidence-doc.pdf>.
[3] NND.800.001.00073.01, RCN.900.131.0018.
[4] DFJ.501.001.0001.0006 – Associate Professor Johnston, Menzies Institute for Medical Research; Associate Professor Johnston, Menzies Institute for Medical Research, Transcript 100-104.
[5] Katarzyna Alderman, Lyle Turner and Shilu Tong, 'Assessment of the Health Impacts of the 2011 Summer Floods in Brisbane' (2013) 7(4) *Disaster Med Public Health Prep.* 380–386, <https://www.researchgate.net/publication/258525799_Assessment_of_the_Health_Impacts_of_the_2011_Summer_Floods_in_Brisbane>; Dr Burns, Transcript 96.
[6] PBU.500.001.0047 – Dr Burns, General Practitioner.
[7] NND.001.01013.05.
[8] RCN.900.075.0001.
[9] NND.800.001.00073.01; NND.001.01013.05.
[10] AHH.500.001.0001.
[11] PBU.500.001.0047 – Dr Burns, General Practitioner.
[12] Commonwealth Department of Health, 'The Australian Health System' <https://www.health.gov.au/about-us/the-australian-health-system>.
[13] Local Hospital Networks are state and territory authorities set up to manage public hospital services and funding. The names for Local Hospital Networks vary across state and territory governments. For example, Local Hospital Networks are known as Local Health Districts in NSW and Hospital and Health Services in Queensland.
[14] RCN.900.076.0024.
[15] HEA.9001.0002.0001.
[16] WAH.001.001.0008.
[17] HEA.9001.0002.0001.
[18] Professor Murphy, Department of Health, Transcript 2583; HEA.9001.0002.0001.
[19] HEA.9001.0002.0001.
[20] DHN.500.001.0237; DHHS.0002.0001.0001.
[21] Kate McIlwain, Health authorities to issue coronavirus update as NSW cases increase, 5 March 2020, <https://www.illawarramercury.com.au/story/6662385/health-authorities-to-issue-coronavirus-update-as-nsw-cases-increase/> (Picture: Sitthixay Ditthavong).
[22] Professor Murphy, Commonwealth Department of Health, Transcript 2583.
[23] Professor Murphy, Commonwealth Department of Health, Transcript 2589-2590; HEA.9001.0002.0001.
On 21 January 2020, the Biosecurity (Listed Human Diseases) Amendment Determination 2020 was made by Professor Murphy, as the Director of Human Biosecurity under the Biosecurity Act, adding the human coronavirus with pandemic potential to the listed human diseases: RCN.900.105.0007. On 18 March 2020, a Biosecurity (Human Biosecurity Emergency) (Human Coronavirus with Pandemic Potential) Declaration was made: RCN.900.105.0001.
[24] HEA.9001.0002.0001.
[25] HEA.0001.0001.0004.

[26] Professor Murphy, Commonwealth Department of Health, Transcript 2584.
[27] Professor Murphy, Commonwealth Department of Health, Transcript 2584.
[28] HAF.8001.0001.0001.
[29] WAH.001.001.0008.
[30] HEA.9001.0002.0001; NCC.500.001.0001.
[31] Professor Murphy, Commonwealth Department of Health, Transcript 2583.
[32] MDH.502.001.0001.
[33] Professor Murphy, Commonwealth Department of Health, Transcript 2595.
[34] HEA.0001.0001.0007; HEA.0001.0001.0004; HEA.0001.0001.0001.
[35] NND.800.200.00045.
[36] NND.800.200.00067.
[37] SSA.901.001.0054.
[38] SSA.901.001.0047.
[39] PMC.8003.0001.0003.
[40] HEA.9001.0002.0001.
[41] HEA.9001.0002.0001.
[42] NND.800.200.00064; NND.800.001.00082.01; NND.800.200.00042.01.
[43] HEA.9001.0002.0001.
[44] NCC.500.001.0001.
[45] HEA.9001.0002.0001.
[46] HEA.9001.0002.0001; NCC.500.001.0001.
[47] NCC.500.001.0001.
[48] HEA.9001.0002.0001.
[49] NCC.500.001.0001.
[50] NCC.500.001.0001.
[51] NCC.500.001.0001.
[52] NCC.500.001.0001.
[53] NCC.500.001.0001.
[54] Image from ABC News (7 September 2019) <https://www.abc.net.au/cm/rimage/11489190-16x9-xlarge.jpg?v=2>.
[55] HEA.9001.0002.0001; NCC.500.001.0001; NND.800.200.00067.
[56] National Critical Care and Trauma Response Centre Facebook page, 10 January 2020.
[57] National Critical Care and Trauma Response Centre Facebook page, 8 January 2020.
[58] NCC.500.001.0001.
[59] NCC.500.001.0001.
[60] EMV.0007.0001.0001.
[61] NCC.500.001.0001.
[62] NCC.500.001.0001.
[63] NCC.500.001.0001.
[64] NCC.500.001.0001.
[65] SSA.901.001.0047.
[66] NSW.900.001.0003; SSA.900.001.0003; CLQ.003.001.0001; VIC.900.001.0001; TAS.900.001.0003; NTT.900.001.0003; ACT.900.001.0001; SWA.007.001.0002.
[67] AHD.500.001.0001; DHN.500.001.0237; DHQ.001.001.0005; DHW.455.011.0001; WAH.001.001.0001; DHHS.0002.0001.0001; NTH.500.001.0001.
[68] DHN.500.001.0237; DHQ.001.001.0005; DHW.455.011.0001.
[69] DHQ.001.001.0005; DHN.500.001.0237.
[70] DHW.455.011.0001.
[71] Australian Institute of Health and Welfare, *Australia's Health 2018: In Brief* <https://www.aihw.gov.au/reports/australias-health/australias-health-2018-in-brief/contents/about>
[72] HEA.9001.0002.0001; NND.800.001.00108.01; NND.800.001.00062.01.
[73] NND.800.001.00081.01.
[74] MDH.502.001.0001.
[75] RCN.900.076.0001'.
[76] Dr Burns, General Practitioner, Transcript 97.
[77] NND.800.001.00108.01; HEA.9001.0002.0001.
[78] NND.800.001.00062.01; PBU.500.001.0047.
[79] NND.800.001.00009.
[80] NND.800.200.00042.01.
[81] NND.001.00522.
[82] NND.800.200.00067; HEA.9001.0002.0001; NND.800.200.00043.

[83] NND.001.00522.
[84] Dr Burns, General Practitioner, Transcript 96.
[85] PBU.500.001.0047 – Dr Burns, General Practitioner.
[86] NND.800.001.00054; NND.001.00522; NND.800.001.00073.01; NND.800.001.00081.01.
[87] NND.800.001.00069.01; NND.800.001.00108.01.
[88] PBU.500.001.0047 – Dr Burns, General Practitioner.
[89] PBU.500.001.0047 – Dr Burns, General Practitioner.
[90] DHN.500.001.0237.
[91] HEA.9001.0002.0001; DHQ.001.001.0005; NND.800.200.00045; DHN.500.001.0237; NND.800.200.00067.
[92] NND.800.001.00065; NND.800.001.00072; NND.800.001.00108.01; NND.800.001.00109; NND.800.001.00081.
[93] NND.800.200.00067; DHW.455.011.0001.
[94] AHD.500.001.0001.
[95] NND.800.200.00064; NND.800.001.00074.01.
[96] HEA.9001.0002.0001.
[97] DHHS.0002.0001.0001.
[98] AHD.500.001.0001.
[99] NND.800.200.00045.
[100] NND.800.001.00084.01; NND.800.001.00062.01; NND.800.001.00073.01; NND.800.001.00081.01.
[101] VIC.900.001.0001.
[102] VIC.900.001.0001.
[103] PBU.500.001.0047 – Dr Burns, General Practitioner.
[104] NND.800.200.00064; NND.800.001.00074.01.
[105] NND.800.001.00077; DHQ.001.001.0005.
[106] HEA.9001.0002.0001; DHN.500.001.0237.
[107] AHH.500.001.0001; NND.800.001.00082.01; NND.800.001.00109; NND.001.00695.
[108] NND.800.001.00064; NND.800.001.00073.01; NND.800.001.00109; NND.800.200.00042.01.
[109] HEA.9001.0002.0001.
[110] National Health (Continued Dispensing - Emergency Measures) Determination 2020.
[111] HEA.9001.0002.0001.
[112] Commonwealth Department of Health, 'Expansion of Pharmaceutical Benefits Scheme Continued Dispensing Arrangements Covid-19', *The Pharmaceutical Benefits Scheme* (March 2020) <https://www.pbs.gov.au/pbs/news/2020/03/continued-dispensing-arrangements-covid-19>.
[113] Therapeutic Goods Administration, 'No Shortage of Salbutamol Asthma Inhalers' (Media Release, 10 January 2020) <https://www.Tga.Gov.Au/Media-Release/No-Shortage-Salbutamol-Asthma-Inhalers>.
[114] HEA.9001.0002.0001.
[115] NND.600.00090.
[116] Ms Rishniw, Department of Health, Transcript 2591.
[117] HEA.9001.0002.0001.
[118] Commonwealth Department of Health, 'Additional COVID-19 mental health support for people subjected to further restrictions' (2 August 2020) <https://www.health.gov.au/news/additional-covid-19-mental-health-support-for-people-subjected-to-further-restrictions>
[119] The Hon Greg Hunt MP, 'Budget 2020-21: Record health and aged care investment under Australia's COVID-19 pandemic plan' (Media release, 6 October 2020) <https://www.health.gov.au/ministers/the-hon-greg-hunt-mp/media/budget-2020-21-record-health-and-aged-care-investment-under-australias-covid-19-pandemic-plan>
[120] Services Australia, About Medicare Provider Numbers, 13 March 2019, <https://www.servicesaustralia.gov.au/organisations/health-professionals/services/medicare/medicare-benefits-health-professionals/apply-medicare-provider-number/about-medicare-provider-numbers>.
[121] HEA.9001.0002.0001.
[122] NND.800.001.00054; NND.800.001.00081.01; NND.800.200.00063.
[123] AHH.500.001.0001.
[124] NND.800.200.00061.01.
[125] NND.800.001.00082.01.
[126] NND.800.001.00082.01.
[127] Katarzyna Alderman, Lyle Turner and Shilu Tong, 'Assessment of the Health Impacts of the 2011 Summer Floods in Brisbane' (2013) 7(4) *Disaster Med Public Health Prep.* 380–386, <https://www.researchgate.net/publication/258525799_Assessment_of_the_Health_Impacts_of_the_2011_Summer_Floods_in_Brisbane>
[128] Lyle Turner et al, 'Impact of the 2011 Queensland Floods on the Use of Tobacco, Alcohol and Medication' (2013) 37(4) *Australian and New Zealand Journal of Public Health*. <https://onlinelibrary.wiley.com/doi/full/10.1111/1753-6405.12093>
[129] MDH.500.001.0027.

[130] MDH.500.001.0060.
[131] The Royal Australian and New Zealand College of Psychiatrists, 'Addressing the Mental Health Impacts of Natural Disasters and Climate Change-Related Weather Events' (January 2020) <https://www.ranzcp.org/news-policy/policy-and-advocacy/position-statements/addressing-the-mental-health-impacts-of-natural-di>.
[132] PAM.500.001.0115 – Professor McFarlane AO, The University of Adelaide.
[133] RCN.702.000.0003; Ms Paterson, Community Witness, Transcript 233, RCN.500.001.2316.
[134] PAM.500.001.0115 – Professor McFarlane AO, The University of Adelaide.
[135] Professor Gibbs, University of Melbourne, Transcript 90.
[136] PAM.500.001.0115 – Professor McFarlane AO, The University of Adelaide.
[137] AAU.500.001.0033; AAU.500.001.0039.
[138] NND.600.00090.
[139] PAM.500.001.0115 – Professor McFarlane AO, The University of Adelaide.
[140] RCN.900.075.0077.
[141] Rebekah Doley, Ryan Bell and Bruce Watt, 'An Investigation Into the Relationship Between Long-Term Posttraumatic Stress Disorder Symptoms and Coping in Australian Volunteer Firefighters' (2016) 204(7) *J Nerve Ment Dis.* 530-536, <https://research.bond.edu.au/en/publications/an-investigation-into-the-relationship-between-long-term-posttrau>
[142] NND.001.00325.01.
[143] Richard Bryant et al, 'Psychological Outcomes Following the Victorian Black Saturday Bushfires' (2014) 48(7) *Australian and New Zealand Journal of Psychiatry*. <https://journals.sagepub.com/doi/full/10.1177/0004867414534476>
[144] MDH.500.001.0060.
[145] PAM.500.001.0115 – Professor McFarlane AO, The University of Adelaide.
[146] PAM.500.001.0115 – Professor McFarlane AO, The University of Adelaide.
[147] DHN.500.001.0237.
[148] NND.800.200.00061.01.
[149] AHD.500.001.0001.
[150] World Health Organization, Mental Health in Emergencies, 11 June 2019, <https://www.who.int/news-room/fact-sheets/detail/mental-health-in-emergencies>; Black Dog Institute, *Mental Health Interventions Following Disasters,* February 2020, <https://www.blackdoginstitute.org.au/wp-content/uploads/2020/04/mental-health-interventions-following-disasters-black-dog-institute-february-2020.pdf?sfvrsn=0>.
[151] Professor Murphy, Department of Health, Transcript 2592
[152] Ms Rishniw, Department of Health, Transcript 2591.
[153] NND.800.200.00061.01.
[154] PAM.500.001.0115 – Professor McFarlane AO, The University of Adelaide.
[155] DHN.500.001.0237.
[156] PAM.500.001.0115 – Professor McFarlane AO, The University of Adelaide.
[157] NND.800.200.00067.
[158] PAM.500.001.0115 – Professor McFarlane AO, The University of Adelaide.
[159] MDH.500.001.0027.
[160] DHW.455.011.0001.
[161] HEA.9001.0002.0001; PAM.500.001.0115 – Professor McFarlane AO, The University of Adelaide.
[162] Professor Gibbs, University of Melbourne, Transcript 99.
[163] Black Dog Institute, *Mental Health Interventions Following Disasters,* February 2020, <https://www.blackdoginstitute.org.au/wp-content/uploads/2020/04/mental-health-interventions-following-disasters-black-dog-institute-february-2020.pdf?sfvrsn=0>.
[164] DHW.455.011.0001.
[165] DHW.455.011.0001.
[166] PAM.500.001.0115 – Professor McFarlane AO, The University of Adelaide.
[167] DHW.455.011.0001.
[168] DHW.455.011.0001.
[169] DHW.455.011.0001.
[170] DHW.455.011.0001.
[171] NND.800.200.00067.
[172] PAM.500.001.0115 – Professor McFarlane AO, The University of Adelaide; Suzanna Rose et al, 'Psychological Debriefing for Preventing Post Traumatic Stress Disorder (PTSD)' [2002] (2) *John Wiley & Sons*.<https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD000560/full>
[173] Victorian Departments of Health and Human Services, DHHS.0002.0001.0001; 'South Australian Department of Health, DHW.455.011.0001.
[174] NSW Department of Health, DHN.500.001.0237.

[175] Black Dog Institute, *Mental Health Interventions Following Disasters,* February 2020, <https://www.blackdoginstitute.org.au/wp-content/uploads/2020/04/mental-health-interventions-following-disasters-black-dog-institute-february-2020.pdf?sfvrsn=0>.
[176] Professor Gibbs, University of Melbourne, Transcript 93.
[177] MDH.500.001.0001 – Professor Gibbs, University of Melbourne.
[178] NND.800.200.00067.
[179] DHW.455.011.0001.
[180] Black Dog Institute, *Mental Health Interventions Following Disasters,* February 2020, <https://www.blackdoginstitute.org.au/wp-content/uploads/2020/04/mental-health-interventions-following-disasters-black-dog-institute-february-2020.pdf?sfvrsn=0>.
[181] DHQ.001.001.0005.
[182] NSW.009.002.0043.
[183] DHHS.0002.0001.0001.
[184] PMC.8001.0001.0449; NND.800.200.00061.01.
[185] DHHS.0002.0001.0001.
[186] PAM.500.001.0115 – Professor McFarlane AO, The University of Adelaide.
[187] NND.800.200.00067.
[188] VIC.900.001.0001.
[189] AHH.500.001.0001.
[190] AHH.500.001.0001.
[191] NND.800.001.00054.
[192] NND.800.200.00045.
[193] NND.600.00090; AHH.500.001.0001.
[194] AHH.500.001.0001; NND.800.200.00045.
[195] NSW.900.001.0003; SSA.900.001.0003; CLQ.003.001.0001; VIC.900.001.0001; TAS.900.001.0003; NTT.900.001.0003; ACT.900.001.0001; SWA.007.001.0002; CTH.900.001.0001
[196] Image from ABC News attributed to Tynan King (9 January 2020) <https://www.abc.net.au/news/2020-01-09/doctor-practices-from-caravan-after-losing-surgery-in-bushfire/11855806>.

Chapter 16 Wildlife and heritage

[1] DSB.501.001.0001.
[2] Steffen W, Burbidge A, Hughes L, Kitching R, Lindenmayer D, Musgrave W, Stafford Smith M, Werner P. *Australia's biodiversity and climate change*. Canberra: Australian Government Department of Climate Change, 2009.
[3] PCD.500.001.0001; Dr Box, Threatened Species Commissioners, Transcript 177.
[4] Ian Cresswell and Helen Murphy, *Australia State of the Environment 2016: Biodiversity* (Department of the Environment and Energy, 2017).
[5] Dr Box, Threatened Species Commissioner, Transcript 175–76; Ian Cresswell and Helen Murphy, *Australia State of the Environment 2016: Biodiversity* (Department of the Environment and Energy, 2017).
[6] PCD.500.001.0001; Ian Cresswell and Helen Murphy, *Australia State of the Environment 2016: Biodiversity* (Department of the Environment and Energy, 2017).
[7] Commonwealth of Australia, 2018. 'Protection of Australia's Commemorative Places and Monuments'. <https://www.environment.gov.au/system/files/resources/4474fb91-bd90-4424-b671-9e2ab9c39cca/files/protection-australia-commemorative-places-monuments.pdf>
[8] DSB.501.001.0049.
[9] PCD.500.001.0001.
[10] AWE.9001.0001.0001.
[11] Known as 'Ramsar Wetlands', these are wetlands that have been identified as ecologically significant under the 1971 Convention on Wetlands of International Importance ('Ramsar Convention').
[12] Professor Possingham, University of Queensland, PHP.500.001.0001.
[13] Professor Dickman, University of Sydney, PCD.500.001.0001; AWE.8001.0001.0001.
[14] Dr Box, Threatened Species Commissioner, Transcript 184.
[15] PCD.500.001.0001.
[16] PCD.500.001.0001; PHP.500.001.0001.
[17] Copyright Gunditj Mirring Traditional Owners (image pre-fires)
[18] DELW.501.001.0004
[19] Image sourced from ABC News attributed to Craig Allen (2015) <https://www.abc.net.au/news/2015-03-15/namadgi-endangered-northern-corroboree-frogs-bouncing-back/6291648>
[20] Image from ABC News attributed to Alison Branley (2017) <https://www.abc.net.au/news/2017-01-08/sphagnum-bog/8141878>

[21] RSP.500.001.0002.
[22] Dr Westcott, South Australian Veterinary Emergency Management, Transcript 2280.
[23] WHA.500.001.0012.
[24] PIN.501.001.0211.
[25] EPA.500.001.0002 001.
[26] EPA.500.001.1096
[27] EPA.500.001.0904.
[28] EPA.500.001.1096
[29] EPA.500.001.1096
[30] WHA.500.001.0012.
[31] WHA.500.001.0012.
[32] WHA.500.001.0012.
[33] Dr Westcott, South Australian Veterinary Emergency Management, Transcript 2282.
[34] Ms Taylor, NSW Wildlife Information, Rescue and Education Service, Transcript 2284.
[35] WPA.500.001.0001
[36] Dr Westcott, South Australian Veterinary Emergency Management, Transcript 2282.
[37] Ms Taylor, NSW Wildlife Information, Rescue and Education Service, Transcript 2284.
[38] WPA.500.001.0001
[39] AWE.502.001.0006.
[40] AWE.502.001.0006.
[41] DSB.501.001.0049.
[42] DSB.501.001.0049.
[43] DSB.501.001.0049.
[44] DSB.501.001.0001 – Dr Box, Threatened Species Commissioner.
[45] DSB.501.001.0049.
[46] DSB.501.001.0049.
[47] DSB.501.001.0001.
[48] AWE.502.001.0006.
[49] Graeme Samuel, *Independent Review of the EPBC Act - Interim Report* (Department Agriculture, Water and the Environment, June 2020).
[50] AWE.502.001.0006.
[51] Graeme Samuel, *Independent Review of the EPBC Act - Interim Report* (Department Agriculture, Water and the Environment, June 2020).
[52] PHP.500.001.0001.
[53] Environment Protection and Biodiversity Regulations 2000, 7.01
[54] Graeme Samuel, *Independent Review of the EPBC Act - Interim Report* (Department Agriculture, Water and the Environment, June 2020).
[55] Ms Campbell, Commonwealth Department of Agriculture, Water and the Environment, Transcript 164.
[56] Ms Campbell, Commonwealth Department of Agriculture, Water and the Environment, Transcript 169.
[57] Graeme Samuel, *Independent Review of the EPBC Act - Interim Report* (Department Agriculture, Water and the Environment, June 2020) 20-21
[58] AWE.502.001.0006.
[59] Ms Campbell, Commonwealth Department of Agriculture, Water and the Environment, Transcript 165
[60] Australian Government Department of the Environment and Energy, 2018 assessment priorities for threatened species, ecological communities and key threatening processes <https://www.environment.gov.au/system/files/181015.pdf>; Ms Campbell, Commonwealth Department of Agriculture, Water and the Environment, Transcript 165.

Chapter 17 Public and private land management

[1] Geoscience Australia, Dimensions <https://www.ga.gov.au/scientific-topics/national-location-information/dimensions> note: includes mainland and island Australia
[2] Australian Bureau of Agricultural and Resource Economics and Sciences, Australia's Forests at a Glance 2019: With Data to 2017-18, 2019 <https://www.agriculture.gov.au/sites/default/files/documents/Forests_at_glance_2019.pdf>.
[3] Geoscience Australia, Deserts <https://www.ga.gov.au/scientific-topics/national-location-information/landforms/deserts>.
[4] Ian Cresswell and Helen Murphy, *Australia State of the Environment 2016* (Department of the Environment and Energy, 2017) <https://soe.environment.gov.au/theme/land>

[5] Map from <https://www.climateworksaustralia.org/land-use-futures/australias-land-use/>. The map uses data courtesy of CSIRO. 'Other' includes defence land, stock routes, residual native cover, mining and waste areas, water bodies and land under rehabilitation.
[6] Ian Cresswell and Helen Murphy, *Australia State of the Environment 2016* (Department of the Environment and Energy, 2017) <https://soe.environment.gov.au/theme/land>
[7] NND.001.01335.
[8] NND.001.01335.
[9] See, eg NND.001.01335. Mr Choveaux, Rural Fire Brigades Association Queensland, Transcript 1433.
[10] RCN.900.153.0162; RCN.900.153.0008.
[11] See, eg RCN.900.142.0383 – Rosemary Hill et al, *Indigenous Land Management in Australia: Extent, Scope, Diversity, Barriers and Success Factors* (CSIRO Ecosystem Sciences); Ian Cresswell and Helen Murphy, *Australia State of the Environment 2016* (Department of the Environment and Energy, 2017) <https://soe.environment.gov.au/theme/land>
[12] Ian Cresswell and Helen Murphy, *Australia State of the Environment 2016* (Department of the Environment and Energy, 2017) <https://soe.environment.gov.au/theme/land>
[13] Ms Campbell, Commonwealth Department of Agriculture, Water and the Environment, Transcript 160; National parks are Booderee, Christmas Island, Kakadu, Norfolk Island, Pulu Keeling, Uluru-Kata Tjuta.
[14] Mr Baulch, Bushfires NT, Transcript 737.
[15] Climate Change in Australia, <https://www.climatechangeinaustralia.gov.au/en/>
[16] Map from Western Australian Land Information Authority, BCA.502.001.0001. Map produced using the Western Australian Land Information Authority archive of NOAA/AVHRR Fire Burnt Area (FBA) satellite data mapped at 1km resolution for period January 1988 to September 2020). Ian Cresswell and Helen Murphy, *Australia State of the Environment 2016* (Department of the Environment and Energy, 2017) <https://soe.environment.gov.au/theme/land>.
[17] Based on National Forest Inventory classifications for 'multiple-use public forest' and 'nature conservation reserve'.
[18] Based on National Forest Inventory classifications for 'private forest' and 'leasehold forest'.
[19] Based on National Forest Inventory classifications for 'other crown land' and 'unresolved tenure'.
[20] Chart created using ABARES data, AWE.9003.0001.0001.
[21] Associate Professor Tolhurst, University of Melbourne, Transcript 621, 623.
[22] See, eg Professor Bowman, University of Tasmania, Transcript 640; Associate Professor Tolhurst, University of Melbourne, Transcript 625, 640, 642; Professor Bradstock, Centre for Environmental Risk Management of Bushfire, University of Wollongong, Transcript 623, 625, 640.
[23] See, eg EMV.0005.0001.0068; RFS.002.001.0001; ENN.500.001.0032. Mr Hardman, Forest Fire Management Victoria, Transcript 668; Commissioner Rogers, NSW Rural Fire Service, Transcript 706; Mr Cooper, ACT Parks and Conservations Service, Transcript 710; Mr De Haan, Western Australian Department of Biodiversity, Conservation and Attractions, Transcript 711, 722; Mr Baulch, Bushfires NT, Transcript 724; Mr Vea, Northern Territory Department of Tourism, Sport and Culture, Transcript 726; Deputy Commissioner Wassing, Queensland Fire and Emergency Services, Transcript 663; Mr Harris, Queensland Parks and Wildlife Service, Transcript 664; NTT.509.001.0082; BCA.003.001.0003; EPA.500.001.0002.
[24] See, eg Deputy Commissioner Wassing, Queensland Fire and Emergency Services, Transcript 663.
[25] See, eg The Office of the Royal Commission, Background Paper: Land management – hazard reduction: a literature review < https://naturaldisaster.royalcommission.gov.au/publications/background-paper-land-management-hazard-reduction-literature-review>
[26] See, eg, Professor Bradstock, Centre for Environmental Risk Management of Bushfire, University of Wollongong, Transcript 626; Professor Bowman, University of Tasmania, Transcript 625, 627, 629; Mr Webb, Victorian Department of Environment, Land, Water and Planning, Transcript 683, 689.
[27] See, eg Professor Bradstock, Centre for Environmental Risk Management of Bushfire, University of Wollongong, Transcript 638; PJS.500.001.0001.
[28] Professor Sharples, PJS.500.001.0001.
[29] PJS.500.001.0001
[30] See, eg Mr Hardman, Forest Fire Management Victoria, Transcript 661; Mr Slijepcevic, Country Fire Authority Victoria, Transcript 661; Mr Loughlin, South Australian Country Fire Service, Transcript 696.
[31] Mr Loughlin, South Australian Country Fire Service, Transcript; 696.
[32] See, eg Professor Bradstock, Centre for Environmental Risk Management of Bushfire, University of Wollongong, Transcript 626; Professor Bowman, University of Tasmania, Transcript 625, 627, 629, 636; Mr Slijepcevic, Country Fire Authority Victoria, Transcript 674; Mr Loughlin, South Australian Country Fire Service, Transcript 701; Mr De Haan, Western Australian Department of Biodiversity, Conservation and Attractions, Transcript 736; Mr Webb, Victorian Department of Environment, Land, Water and Planning, Transcript 683; Deputy Commissioner Wassing, Queensland Fire and Emergency Services, Transcript 700.
[33] Professor Sharples, PJS.500.001.0001.

[34] See, eg Dr Kitchin, ACT NoWaste, Transcript 204; Mr Cooper, ACT Parks and Conservations Service, Transcript 710, 732; Mr Vea, Northern Territory Department of Tourism, Sport and Culture, Transcript 725; Commissioner Whelan, ACT Emergency Services Agency, Transcript 727; Mr Walker, ACT Environment, Planning and Sustainable Development Directorate, Transcript 206; Mr Webb, Victorian Department of Environment, Land, Water and Planning, Transcript 682; Commissioner Rogers, NSW Rural Fire Service, Transcript 706; Mr De Haan, Western Australian Department of Biodiversity, Conservation and Attractions, Transcript 711, 722.
[35] See, eg EPA.500.001.0002_UR; NTT.509.001.0082; Commissioner Rogers, NSW Rural Fire Service, Transcript 730; Mr Cooper, ACT Parks and Conservations Service, Transcript 728.
[36] See, eg Mr Walker, ACT Environment, Planning and Sustainable Development Directorate, Transcript 204; Mr Loughlin, South Australian Country Fire Service, Transcript 672; Deputy Commissioner Wassing, Queensland Fire and Emergency Services, Transcript 699; CLQ.001.001.0650; Mr Baulch, Bushfires NT, Transcript 721, 737; NTT.509.001.0082; Commissioner Rogers, NSW Rural Fire Service, Transcript 706.
[37] NTT.509.001.0082.
[38] Commissioner Rogers, NSW Rural Fire Service, Transcript, 730.
[39] CLQ.001.001.0650.
[40] Commissioner Rogers, NSW Rural Fire Service, Transcript 730.
[41] See, eg EMV.0005.0001.0068; Mr Hardman, Forest Fire Management Victoria, Transcript 651; Mr Webb, Victorian Department of Environment, Land, Water and Planning, Transcript 682; Deputy Commissioner Wassing, Queensland Fire and Emergency Services, Transcript 663; Mr Loughlin, South Australian Country Fire Service, Transcript 654.
[42] See, eg Mr Walker, ACT Environment, Planning and Sustainable Development Directorate, Transcript 203; Deputy Commissioner Wassing, Queensland Fire and Emergency Services, Transcript 649; Mr Hardman, Forest Fire Management Victoria, Transcript 650; Mr Webb, Victorian Department of Environment, Land, Water and Planning, Transcript 681; Mr Slijepcevic, Country Fire Authority Victoria, Transcript 653; Mr Harris, Queensland Parks and Wildlife Service, Transcript 664; Commissioner Rogers, NSW Rural Fire Service, Transcript 706; Commissioner Whelan, ACT Emergency Services Agency, Transcript 709; Mr De Haan, Western Australian Department of Biodiversity, Conservation and Attractions, Transcript 710.
[43] See, eg Deputy Commissioner Wassing, Queensland Fire and Emergency Services, Transcript 650; Mr Walker, ACT Environment, Planning and Sustainable Development Directorate, Transcript 203; Commissioner Whelan, ACT Emergency Services Agency, Transcript 709; Commissioner Rogers, NSW Rural Fire Service, Transcript 706.
[44] See, eg Mr Williams, South Australian Department for Environment and Water, Transcript 685.
[45] Mr De Haan, Western Australian Department of Biodiversity, Conservation and Attractions, Transcript 711.
[46] Ms Stephens, NSW National Parks and Wildlife Service, Transcript 754.
[47] Mr Harris, Queensland Parks and Wildlife Service, Transcript 687.
[48] Mr Loughlin, South Australian Country Fire Service, Transcript 659.
[49] See, eg Mr Harris, Queensland Parks and Wildlife Service, Transcript 644; Mr Baulch, Bushfires NT, Transcript 713; Mr De Haan, Western Australian Department of Biodiversity, Conservation and Attractions, Transcript 711.
[50] See, eg Mr Williams, South Australian Department for Environment and Water, Transcript 694.
[51] Mr Cooper, ACT Parks and Conservations Service, Transcript 710.
[52] FSA.068.001.0014.
[53] NSW.009.001.0001.
[54] Forestry SA, FSA.068.001.035
[55] Mr Hardman, Forest Fire Management Victoria, Transcript 657; EMV.0005.0001.0068.
[56] CLQ.001.001.0650.
[57] See, eg, FSA.068.001.0014.
[58] See, eg, NTT.509.001.0082.
[59] See, eg, CLQ.001.001.0650 ESA.509.001.0002_UR; SWA.006.001.0001.
[60] See, eg, CLQ.001.001.0650.
[61] ESA.509.001.0002_UR.
[62] See, eg. SSA.632.001.0081; SWA.006.001.0001.
[63] NSW.009.001.0001.
[64] NSW.009.001.0001; NSW Local Land Services 'Supporting our Neighbours – Public Land Boundary Fencing Program' <https://www.lls.nsw.gov.au/what-we-do/our-major-projects/supporting-our-neighbours-public-land-boundary-fencing-program>.
[65] Ms Ryan, Hancock Victorian Plantations, Transcript 783.
[66] EMV.0005.0001.0068.
[67] See, eg FEC.360.001.0001 – Michael Keelty et al, *Independent Review into South Australia's 2019-20 Bushfire Season,* (Government of South Australia, June 2020).
[68] See, eg DELW.507.001.0001; PLH.500.001.0001; CLQ.001.001.0047; ENN.501.001.0001; EPA.502.001.0001; SAF.399.001.0001.
[69] See, eg SAF.399.001.0001; DELW.507.001.0001; PLH.500.001.0001; CLQ.001.001.0047; ENN.501.001.0001; EPA.502.001.0001; DPC.501.001.0002; RFS.501.001.0003

[70] Ms Campbell, Department of Agriculture, Water and the Environment, Transcript 615
[71] NND.600.00500.02; NND.600.00500.01; Image from Willinga Park, NND.600.0050.0002.02.
[72] Ms Campbell, Department of Agriculture, Water and the Environment, Transcript 615
[73] See, eg FEC.360.001.0001.
[74] See, eg Ms Ryan, Hancock Victorian Plantations, Transcript 783
[75] See, eg FSA.068.001.0014; FEC.360.001.0001; NSW.900.001.0003.
[76] FSA.068.001.0014.
[77] FEC.360.001.0001.
[78] Figure from NSW Rural Fire Service, *10/50 vegetation clearing*, <https://www.rfs.nsw.gov.au/plan-and-prepare/1050-vegetation-clearing>.
[79] See, eg Mr Webb, Victorian Department of Environment, Land, Water and Planning, Transcript 681; Ms Stephens, NSW National Parks and Wildlife Service, Transcript' 742; Mr Cooper, ACT Parks and Conservations Service, Transcript 728; Mr De Haan, Western Australian Department of Biodiversity, Conservation and Attractions, Transcript 743; Mr Vea, Northern Territory Department of Tourism, Sport and Culture, Transcript 746.
[80] Mr Cooper, ACT Parks and Conservations Service, Transcript 728.
[81] See, eg Mr Webb, Victorian Department of Environment, Land, Water and Planning, Transcript' 681; Mr De Haan, Western Australian Department of Biodiversity, Conservation and Attractions, Transcript 735, 743; Commissioner Whelan, ACT Emergency Services Agency, Transcript 740; Mr Cooper, ACT Parks and Conservations Service, Transcript 741; Ms Stephens, NSW National Parks and Wildlife Service, Transcript 743; Mr De Haan, Western Australian Department of Biodiversity, Conservation and Attractions, Transcript 743; Mr Cooper, ACT Parks and Conservations Service, Transcript 741; Mr Slijepcevic, Country Fire Authority Victoria, Transcript 674; EMV.0005.0001.0068; Mr Baulch, Bushfires NT, Transcript 737; Mr Vea, Northern Territory Department of Tourism, Sport and Culture, Transcript 738.
[82] Mr De Haan, Western Australian Department of Biodiversity, Conservation and Attractions, Transcript 743.
[83] Mr Baulch, Bushfires NT, Transcript 745.
[84] See, eg ENN.500.001.0032; EMV.0005.0001.0068; Mr Webb, Victorian Department of Environment, Land, Water and Planning, Transcript 702; Mr Slijepcevic, Country Fire Authority Victoria, Transcript 675; Dr Metcalfe, Commonwealth Scientific and Industrial Research Organisation, Transcript 558; EPA.500.001.0002.
[85] See, eg Associate Professor Tolhurst, University of Melbourne, Transcript 628; Professor Bradstock, Centre for Environmental Risk Management of Bushfire, University of Wollongong, Transcript 636.
[86] See, eg Mr Cameron OAM, Emergency Management Australia, Transcript 442; AFC.512.001.0001; EMV.0005.0001.0068; AWE.9001.0001.0001.
[87] AFC.512.001.0001.
[88] EMV.0005.0001.0068.
[89] See, eg CLQ.003.001.0001
[90] NSW.006.001.0001 – NSW Government, Final Report of the NSW Bushfire Inquiry, (31 July 2020).
[91] AFC.512.001.0001; CSI.500.001.0001. This built on earlier work by the CSIRO.
[92] AFC.512.001.0001.
[93] AFC.512.001.0001.
[94] AFC.512.001.0001.
[95] AFC.512.001.0001.

Chapter 18 Indigenous land and fire management

[1] See, eg R Hill et al, *Indigenous Land Management in Australia: Extent, Scope, Diversity, Barriers and Success Factors* (CSIRO Ecosystem Sciences); Mr Eckford-Williamson, The Australian National University, Transcript 798
[2] See, eg NND.001.00988.01. EMV.0005.0001.0068; Mr Eckford-Williamson, The Australian National University, Transcript 798; NND.001.01091; NND.001.01281; DELW.0001.0001.0586; EMV.0005.0001.0068; NND.001.01091.
[3] See, eg NND.300.008.0005.
[4] See, eg Mr Eckford-Williamson, The Australian National University, Transcript 798; Mr Ansell, Warddeken Land Management Ltd, Transcript 833; ESQ.002.001.0012
[5] Mr Ansell, Warddeken Land Management Ltd, Transcript 833; SWA.007.001.0002
[6] SWA.007.001.0002.
[7] Figure from ABC News attributed to Lucy Robinson (4 June 2020) <https://www.abc.net.au/news/2020-06-04/more-cultural-burning-queensland-bushfire-victor-steffensen/12317196>.
[8] See, eg ENN.500.001.0032; NND.001.01091
[9] See, eg Mr Eckford-Williamson, The Australian National University, Transcript 797; NND.001.01091
[10] Dr Neale, Deakin University, Transcript 810
[11] CSI.900.002.0003.
[12] See, eg VIC.900.001.0001.

[13] See eg, ENN.500.001.0032.
[14] See, eg Mr Garstone, Kimberley Land Council, Transcript 832.
[15] See, eg NND.001.01281; ENN.500.001.0032.
[16] See, eg ENN.500.001.0032.
[17] See, eg *A National Framework to Report on the Benefits of Indigenous Cultural Fire Management - Final Report* (Commonwealth Scientific and Industrial Research Organisation, 2018).
[18] See, eg N McNamara, 'Australian Aboriginal Land Management: Constraints or Opportunities?' (2017) 21 *James Cook University Law Review*.
[19] See, eg J Ansell et al, 'Contemporary Aboriginal Savanna Burning Projects in Arnhem Land: A Regional Description and Analysis of the Fire Management Aspirations of Traditional Owners' (2019) 29 *International Journal of Wildland Fire*; ESQ.002.001.0012
[20] See, eg MOR.500.001.0001; NND.001.00969
[21] See ,eg VTO.500.001.0001; Mr Steffensen, Firesticks Alliance Indigenous Corporation, Transcript 834
[22] Ms Stephens, NSW National Parks and Wildlife Service, Transcript 818.
[23] See, eg NND.001.01281; L Kelly and L Brotons, 'Using Fire to Promote Biodiversity' (2017) 355(6331) *Science*; Rebecca Bird et al, 'Aboriginal Burning Promotes Fine-Scale Pyrodiversity and Native Predators in Australia's Western Desert' (2018) 219 *Biological Conservation*; DELW.0001.0001.0586; NND.001.01281; J Fitzsimons et al, 'Insights into the Biodiversity and Social Benchmarking Components of the Northern Australian Fire Management and Carbon Abatement Programmes' (2012) 13(1) *Ecological Management and Restoration*; NND.001.01091.
[24] See, eg EMV.0005.0001.0068; ESQ.002.001.0012
[25] See, eg EMV.0005.0001.0068; ESA.500.001.0074; ESQ.002.001.0012; ICI.500.001.0008; EPA.500.001.0002.
[26] See, eg ESQ.002.001.0012; EMV.0005.0001.0068; TCS.500.001.0002.
[27] ACT.900.001.0001.
[28] ESQ.002.001.0012
[29] EMV.0005.0001.0068.
[30] ICI.500.001.0008.
[31] SWA.007.001.0002.
[32] CLQ.003.001.0001.
[33] NND.001.00928.
[34] Mr Steffensen, Firesticks Alliance Indigenous Corporation, Transcript 834-835.
[35] See, eg Mr Miller, Gunaikurnai Land and Waters Aboriginal Corporation, Transcript 843.
[36] See, eg Dr Neale, Deakin University, Transcript 809; NND.001.01281; NND.001.00969.01
[37] DELW.0001.0001.0586 CSIRO, 'Our Knowledge, Our Way Guidelines: Downloadable Resources' <https://www.csiro.au/en/Research/LWF/Areas/Pathways/Sustainable-Indigenous/Our-Knowledge-Our-Way/OKOW-resources>.
[38] See, eg ESQ.002.001.0012.
[39] See, eg DELW.0001.0001.0586. NND.001.00928. Mr Eckford-Williamson, The Australian National University, Transcript 798; NND.001.01091.
[40] Mr Steffensen, Firesticks Alliance Indigenous Corporation, Transcript 834.
[41] DELW.0001.0001.0586; CSIRO, 'Our Knowledge, Our Way Guidelines: Downloadable Resources' <https://www.csiro.au/en/Research/LWF/Areas/Pathways/Sustainable-Indigenous/Our-Knowledge-Our-Way/OKOW-resources>.
[42] Figure from DELW.0001.0001.0586 CSIRO, 'Our Knowledge, Our Way Guidelines: Downloadable Resources' <https://www.csiro.au/en/Research/LWF/Areas/Pathways/Sustainable-Indigenous/Our-Knowledge-Our-Way/OKOW-resources>.
[43] See, eg IAA.500.002.0006; ESA.500.001.0074; ESQ.002.001.0012; ENN.500.001.0032.
[44] See, eg ENN.500.001.0032; NND.001.01309; ESQ.002.001.0012; TCS.500.001.0002.
[45] See, eg Department of Agriculture, Water and the Environment, 'Indigenous Protected Areas' https://www.environment.gov.au/land/indigenous-protected-areas; ESQ.002.001.0012.
[46] See, eg EMV.0005.0001.0068.
[47] ESQ.002.001.0012.
[48] Mr Garstone, Kimberley Land Council, Transcript 832.
[49] NSW Bushfire Enquiry
[50] EMV.0005.0001.0068.
[51] ESA.500.001.0074.
[52] Mr Rose, Gunditj Mirring Traditional Owners Corporation, Transcript 272.
[53] DELW.0001.0001.0586; EMV.0005.0001.0068.
[54] See, eg Forest Fire Management Group, *National Bushfire Management: Policy Statement for Forests and Rangelands* (Council of Australian Governments, 2014) <https://knowledge.aidr.org.au/media/4935/nationalbushfiremanagementpolicy_2014.pdf> ; Australasian Fire and

Emergency Service Authorities Council, *National Position on Prescribed Burning* (AFAC, 2016) <https://knowledge.aidr.org.au/media/4869/national-position-on-prescribed-burning.pdf>.
[55] See, eg Dr Neale, Deakin University, Transcript 811; NND.001.01281.
[56] See, eg C Burgess et al, 'Healthy County, Healthy People: The Relationship between Indigenous Health Status and "Caring for Country"'(2009) 190(10) *Medical Journal of Australia*; D Green and D Martin, 'Maintaining the Healthy Country-Healthy People Nexus through Sociocultural and Environmental Transformations: Challenges for the Wik Aboriginal People of Aurukun, Australia' (2016) 48(3) *Taylor & Francis Online*; Mr Garstone, Kimberley Land Council, Transcript 832; NND.001.00928.
[57] See, eg Mr Garstone, Kimberley Land Council, Transcript 832; Mr Munuggullumurr Yibarbuk, Warddeken Land Management Ltd, Transcript 833; Mr Steffensen, Firesticks Alliance Indigenous Corporation, Transcript 834.
[58] Mr Munuggullumurr Yibarbuk, Warddeken Land Management Ltd, Transcript 833.
[59] Ms Cavanagh, University of Wollongong, Transcript 807.
[60] See, eg NND.001.01309; ESQ.002.001.0012; ENN.500.001.0032; TCS.500.001.0002; NND.001.00928.
[61] See, eg ENN.500.001.0032; NND.001.01309; ESQ.002.001.0012; Ansell et al; TCS.500.001.0002.
[62] Mr Miller, Gunaikurnai Land and Waters Aboriginal Corporation, Transcript; Mr Mullet, Gunaikurnai Land and Waters Aboriginal Corporation, Transcript; Gunaikurnai Land and Waters Aboriginal Corporation, NND.001.01091

Chapter 19 Land-use planning and building regulation

[1] PMC.9005.0001.0001.
[2] RCN.001.001.3091 – CE Holmes, *Queensland Floods Commission of Inquiry - Final Report Volume 1* (March 2012).
[3] Stuart Ellis, Peter Kanowski and Whelan Rob, *National Inquiry on Bushfire Mitigation and Management* (Council of Australian Governments, 31 March 2004) <https://www.dfes.wa.gov.au/publications/GeneralReports/FESA_Report-NationalInquiryonBushfireMitigationandManagement.pdf>; RCN.001.001.2304 – Productivity Commission, *Natural Disaster Funding Arrangements,* (Inquiry Report No 74, 17 December 2014).
[4] RCN.001.001.2304; RCN.900.054.0013 – Planning Institute Australia and Attorney-General's Department, 'National Land Use Planning Guidelines for Disaster Resilient Communities'.
[5] Professor March, Melbourne Sustainable Society Institute and Melbourne School of Design, University of Melbourne, Transcript 1623.
[6] Construction of public infrastructure is treated differently – see Chapter 9: Essential services.
[7] ACB.500.001.0001.
[8] ACB.500.001.0001.
[9] ACB.500.001.0001.
[10] STA.501.001.0001.
[11] National Association of Steel-Framed Housing Inc,'NASH Standards'. <https://www.nash.asn.au/nash/publications/nash-standards>
[12] NND.600.00192; NND.001.00825; NND.001.01389; NND.001.01141; Ms Cotter, Bushfire Building Council, Transcript 1650; Professor March, Melbourne Sustainable Society Institute and Melbourne School of Design, University of Melbourne, Transcript 1630.
[13] NND.001.01141.
[14] NSW.006.001.0001 – NSW Government, *Final Report of the NSW Bushfire Inquiry,* (31 July 2020); EMQ.001.001.0807.
[15] NND.001.01087; EGC.502.001.0044; ESC.500.001.0001; NND.001.00825; NND.001.00789; NND.001.01360.02 – Menzies Research Centre, 'Strengthening Resilience: Managing National Disasters after the 2019-20 Bushfire Season,' (April 2020).
[16] Mr Crosweller, Ethical Intelligence, Transcript 2891.
[17] Council of Australian Governments, 'Meeting of the Council of Australian Governments: Communique' (13 March 2020).
[18] Department of Home Affairs, *National Disaster Risk Reduction Framework* (Department of Home Affairs, 2018).
[19] NND.001.01368.
[20] Figure from Cross Dependency Initiative, NND.001.01368.
[21] ICA.501.001.0001.
[22] BBC.500.001.0002.
[23] GEO.502.001.0002.
[24] GEO.502.001.0002.
[25] NND.300.004.0003; Mr Hamden, Cross Dependency Initiative, Transcript 1661–1662. See also Chapter 4: Supporting better decisions.
[26] RCN.001.001.2304; SAS.500.001.0003; EMV.0005.0001.0068; NND.001.01062; SHP.500.001.0002; PMC.0003.0001.0001; GEO.502.001.0002; NND.001.01360.02; AWE.9001.0001.0001; EPA.500.001.1491.
[27] PMC.0003.0001.0001.

[28] Professor March, Melbourne Sustainable Society Institute and Melbourne School of Design, University of Melbourne, Transcript 1626; Mr Bell, Australian Institute of Architects, Transcript 1647; NND.001.01013; NND.001.01360.02.
[29] See Chapter 4: Supporting better decisions.
[30] Mr Crosweller, Ethical Intelligence, Transcript 2696; GEO.502.001.0002; SHP.500.001.0002; RCN.001.001.2304; PMC.0003.0001.0001; RCN.900.054.0013.
[31] CTH.900.001.0001.
[32] RCN.001.001.2304.
[33] RCN.001.001.2304; RCN.900.005.0425; EPA.500.001.1491.
[34] RCN.001.001.1256 – Productivity Commission, *Barriers to Effective Climate Change Adaptation,* (Inquiry Report No 59, 19 September 2012); TAS.900.001.0003; SSA.900.001.0003.
[35] RCN.900.005.0425; RCN.001.001.2304; RCN.900.034.0001 – Australia-New Zealand Emergency Management Committee, 'Australian Disaster Preparedness Framework: A Guideline to Develop the Capabilities Required to Manage Severe to Catastrophic Disasters' (October 2018); BNH.500.001.0001.
[36] Inspector-General Emergency Management Queensland, *Standard for Disaster Management in Queensland* (June 2019) <https://www.igem.qld.gov.au/sites/default/files/2019-12/NEW%20Standard%20for%20Disaster%20Management%20in%20Queensland%20v2.0.pdf>
[37] Inspector-General Emergency Management Victoria, 'Evaluation and Review' (21 September 2020) <https://www.igem.vic.gov.au/our-work/evaluation-and-review>; Victorian Government, 'Safer Together Approach' (2020). <https://www.safertogether.vic.gov.au/background>.
[38] VIC.0009.0001.0001.
[39] NND.300.005.0035; NND.300.005.0033; NND.300.005.0001; NND.300.008.0002; NND.300.007.0020; NND.300.008.0012; NSW.900.001.0003; CLQ.003.001.0001; SSA.900.001.0003; TAS.900.001.0003; VIC.900.001.0001; SWA.007.001.0002; ACT.900.001.0001; NTT.900.001.0003.
[40] SWA.007.001.0002. Which in its view requires a whole of government response addressing matters such as planning, water supply, electricity supply, infrastructure, telecommunications, road and transport networks and emergency management.
[41] NND.300.005.0035; NND.300.005.0007.
[42] NSW.900.001.0003.
[43] Commissioner Rogers, NSW Rural Fire Service, Transcript 1682; Mr Lesh, NT Department of Infrastructure, Planning and Logistics, Transcript 1712; Mr Kaucz, ACT Environment, Planning and Sustainable Development Directorate, Transcript 1711; Ms McGowan, WA Department of Planning, Lands and Heritage, Transcript 1711; Ms Allen, SA Department of Planning, Transport and Infrastructure, Transcript 1712; Mr Lyngcoln, Victorian Department of Environment, Land, Water and Planning, Transcript 1677.
[44] Ms Cotter, Bushfire Building Council, Transcript 1643; NND.001.01360.02.
[45] HAF.9004.0001.0001; HAF.9004.0003.0001.
[46] NND.600.00277; ESC.500.001.0001; BMC.500.001.0003; EGC.502.001.0044; NND.001.01241; NND.600.00192; EMV.0005.0001.0068; NND.001.01264.
[47] in this example: wood piled against the house, vegetation allowed to grow too close, and an extension that is not compliant with the relevant building standard
[48] CLQ.003.001.0001.
[49] NND.001.01087; EGC.502.001.0044; ESC.500.001.0001; NND.001.01360.02; NND.001.00825; NND.001.01354 33; NND.001.00789.
[50] NND.300.004.0003. This may also raise concerns, because as noted in Chapter 4: Supporting better decisions, national consistency can come with both benefits, such as creating a shared understanding, enabling comparability, and reducing duplication, and costs such as those in aligning data and systems.
[51] RCN.001.005.8779 – Australian Competition and Consumer Commission, *Northern Australia Insurance Inquiry: Second Interim Report* (November 2019).
[52] NND.001.00789; NND.001.01087; NND.001.01368; BBC.500.001.0002.
[53] Three recent Commonwealth examples are: Australian Government Behavioural Economics Team, 'Effective Use of SMS: Improving Government Confirmation Processes' (December 2017); Australian Government Behavioural Economics Team, 'Effective Use of SMS: Timely Reminders to Report on Time' (December 2017); Australian Government Behavioural Economics Team, 'Energy Labels That Make Cents: Testing Energy Rating Labels on Appliances Sold Online' (March 2018).
[54] RCN.001.001.2304; 2009 Victorian Bushfires Royal Commission, *Final Report* (2010) <http://royalcommission.vic.gov.au/Commission-Reports/Final-Report.html>; RCN.900.005.0425; EPA.500.001.1491.
[55] TAS.900.001.0003; VIC.900.001.0001; NSW.900.001.0003; ACT.900.001.0001; CLQ.003.001.0001; NTT.900.001.0003; SWA.007.001.0002; SSA.900.001.0003. NSW emphasised that such a proposal must not undermine state responsibilities.

[56] LGA.500.001.0001; FES.003.001.0003; QFS.002.001.0012; NND.600.00214; NND.600.00248; NND.001.01141; Mr Crosweller, Ethical Intelligence, Transcript 1688; RCN.001.001.2304; RCN.001.001.1920; 2009 Victorian Bushfires Royal Commission, *Final Report* (2010) <http://royalcommission.vic.gov.au/Commission-Reports/Final-Report.html>.
[57] RCN.001.001.2304; NND.001.01013; Dr Finkel, Australia's Chief Scientist, Transcript 2316; NND.600.00192; PMC.0003.0001.0001.
[58] PMC.0003.0001.0001.
[59] ICA.501.001.0001; Mr Sullivan, Insurance Council of Australia, Transcript 1665.
[60] Jandowae Floods 11 February 2020, Queensland Fire and Emergency Services.
[61] NND.001.00825; ICA.501.001.0001; 2009 Victorian Bushfires Royal Commission, *Final Report* (2010) <http://royalcommission.vic.gov.au/Commission-Reports/Final-Report.html>; ACB.500.001.0001.
[62] See Chapter 17: Public and private land management.
[63] ICA.501.001.0001; BBC.500.001.0002.
[64] NND.600.00285.
[65] NND.600.00285; BBC.500.001.0002.
[66] ACB.500.001.0001.
[67] BBC.500.001.0002; ICA.501.001.0001; NND.001.00354; NND.001.00825; NND.001.01087.
[68] NND.001.00825; NND.600.00285; RCN.001.001.2304.
[69] Mr Lyngcoln, Victorian Department of Environment, Land, Water and Planning, Transcript 1676; Commissioner Rogers, NSW Rural Fire Service, Transcript 1680; Mr Doss, Queensland Treasury, Transcript 1686; Mr Lesh, NT Department of Infrastructure, Planning and Logistics, Transcript 1708; Mr Kaucz, ACT Environment, Planning and Sustainable Development Directorate, Transcript 1707; Ms McGowan, WA Department of Planning, Lands and Heritage, Transcript 1710; Ms Allen, SA Department of Planning, Transport and Infrastructure, Transcript 1709.
[70] CLQ.001.001.0047; RFS.502.001.0001; SAF.399.001.0001; DELW.507.001.0001.
[71] NND.300.005.0033; NND.001.01087; NND.300.007.0046; NND.600.00192; NND.300.005.0035.
[72] RCN.001.005.8779.
[73] SDQ.001.001.0001.
[74] CLQ.001.001.0071.
[75] NND.001.00354; NND.001.01190; RCN.001.005.8779; NND.600.00192. See Chapter 20: Insurance for more information about insurance.
[76] NND.001.00825.
[77] NND.001.00825; RCN.001.005.8779.
[78] ICA.501.001.0001.
[79] RCN.001.005.8779; RCN.001.001.2304.
[80] ICA.501.001.0001; Mr Sullivan, Insurance Council of Australia, Transcript 1668. Improvements to risk data and information would naturally support greater recognition of risk mitigation.
[81] NND.300.005.0035; NND.001.01360.02.
[82] RCN.001.005.8779; NSW.006.001.0001. ACCC recommendations 14 (on public mitigation works), 27 (on clearly stated mitigation discounts), and 28 (on information on mitigation works that could reduce premiums) in the second interim report relate to this matter. Recommendation 28 in the Final Report of the NSW Bushfire Inquiry encouraged the NSW government to work with the ICA to create incentives for property owners to undertake mitigation.
[83] NND.300.005.0017; NND.300.005.0033; NND.300.007.0046; NND.300.005.0035; TAS.900.001.0003; VIC.900.001.0001; NSW.900.001.0003; ACT.900.001.0001; CLQ.003.001.0001; NTT.900.001.0003; SWA.007.001.0002; SSA.900.001.0003.
[84] Professor March, Melbourne Sustainable Society Institute and Melbourne School of Design, University of Melbourne, Transcript 1630.
[85] NND.001.00789; NND.001.01255; NND.001.01360; NND.600.00192; NND.001.00866; NND.001.00135; BMC.500.001.0003; NND.600.00269; NND.001.00824.01 15; 'Property Council of Australia, NND.001.01141; Professor March, Melbourne Sustainable Society Institute and Melbourne School of Design, University of Melbourne, Transcript 4.
[86] EPA.502.001.0001; DELW.507.001.0001; CLQ.001.001.0047; RFS.502.001.0001; ENN.501.001.0001; SAF.399.001.0001; PLH.500.001.0001; Ms Allen, SA Department of Planning, Transport and Infrastructure, Transcript 1704–1705; Ms McGowan, WA Department of Planning, Lands and Heritage, Transcript 1706; Mr Kaucz, ACT Environment, Planning and Sustainable Development Directorate, Transcript 1707; Mr Lesh, NT Department of Infrastructure, Planning and Logistics, Transcript 1708; Mr Lyngcoln, Victorian Department of Environment, Land, Water and Planning, Transcript 1672; Mr Doss, Queensland Treasury, Transcript 1685.
[87] NND.001.00135; NND.001.00824.01; NND.001.01255; NND.600.00269; NND.001.00866; NND.001.01141; NND.001.01154.
[88] LJO.500.001.0001.
[89] NND.600.00192.

[90] NND.600.00189; NND.001.01360.02; NND.001.00354; BMC.500.001.0003; NND.600.00277; NND.001.00866; NND.600.00146; STA.501.001.0001; NND.001.01141; NND.600.00381; NND.001.01013.
[91] NND.600.00192; NND.001.00825; NND.001.01360.02; NND.001.00157.01; Ms Erhart, Local Government Association of Queensland, Transcript 872–873; Ms Dench, Wollondilly Shire Council, Transcript 1074; NND.001.01354; NND.001.01141; NND.001.01255; NND.001.01368; Ms Ryland, Planning Institute of Australia, Transcript 1647; Professor March, Melbourne Sustainable Society Institute and Melbourne School of Design, University of Melbourne, Transcript 1647.
[92] RCN.900.055.0001 – Commonwealth Department of Transport and Regional Services, *Natural Disasters in Australia: Reforming Mitigation, Relief and Recovery Arrangements,* (Council of Australian Governments, 2004) ('*Natural Disasters in Australia*'); RCN.001.001.1920; RCN.900.034.0092; EPA.500.001.1491; RCN.001.001.1177; RCN.001.001.2304; RCN.900.034.0092.
[93] Stuart Ellis, Peter Kanowski and Whelan Rob, *National Inquiry on Bushfire Mitigation and Management* (Council of Australian Governments, 31 March 2004) <https://www.dfes.wa.gov.au/publications/GeneralReports/FESA_Report-NationalInquiryonBushfireMitigationandManagement.pdf>.
[94] NND.600.00381; VIC.900.001.0001; NSW.900.001.0003; ACT.900.001.0001; CLQ.003.001.0001; NTT.900.001.0003; SWA.007.001.0002; SSA.900.001.0003.
[95] NND.001.01013.
[96] CSI.508.001.0027.
[97] Ms Cotter, Bushfire Building Council, Transcript 1649–1650; Mr Bell, Australian Institute of Architects, Transcript 1644; Mr Stingemore, Standards Australia, Transcript 1669; SHP.500.001.0002; NND.001.01013; NND.001.00825; SDQ.001.001.0001.
[98] Mr Leonard, Commonwealth Scientific and Industrial Research Organisation, Transcript 2398; NND.001.00729.
[99] STA.501.001.0001.
[100] Mr Leonard, Commonwealth Scientific and Industrial Research Organisation, Transcript 2401. See Chapter 4: Supporting better decisions.
[101] RYC.500.001.0001; NND.001.01255.
[102] STA.501.001.0001; ACB.500.001.0001; EWS.500.001.0003.
[103] CSI.900.002.0003.
[104] Mr Leonard, Commonwealth Scientific and Industrial Research Organisation, Transcript 2401–2402.
[105] CSI.900.002.0003 900.
[106] Mr Stingemore, Standards Australia, Transcript 1657.
[107] NND.001.00824.01; NND.600.00285; Mr Bell, Australian Institute of Architects, Transcript 1644; NND.001.00729; NND.001.01354; NND.001.00945.
[108] NND.600.00285; PTS.030.006.1352 17; NND.001.01354.
[109] NND.001.01354; PTS.030.006.1352.
[110] Mr Bell, Australian Institute of Architects, Transcript 1644.
[111] Mr Bell, Australian Institute of Architects, Transcript 1643–1644.
[112] Council of Australian Governments (n 20) <https://www.coag.gov.au/sites/default/files/communique/communique-13-march2020.pdf>.
[113] ACB.500.001.0001.
[114] ACB.500.001.0001; PTS.030.006.0003.
[115] Mr Sullivan, Insurance Council of Australia, Transcript 1669. See also NND.001.00354; NND.600.00192; NND.001.00825; NND.001.00227; NND.001.01013.
[116] NND.600.00192.
[117] ACB.500.001.0001.
[118] ACB.500.001.0001.
[119] NND.600.00192.
[120] NND.600.00285; NND.001.00275; NND.001.00825.
[121] NND.001.00263.
[122] STA.501.001.0001; ACB.500.001.0001.
[123] STA.501.001.0001; ACB.500.001.0001.
[124] ACB.500.001.0001; STA.501.001.0001.
[125] RCN.001.001.1177.
[126] RCN.001.005.8779.
[127] TAS.900.001.0003; VIC.900.001.0001; NSW.900.001.0003; ACT.900.001.0001; CLQ.003.001.0001; NTT.900.001.0003; SWA.007.001.0002; SSA.900.001.0003; NND.300.005.0035. While South Australia gave in principle support, it also stated that it considers that the extent of the work currently underway to review AS 3959:2018 is sufficient
[128] SSA.900.001.0003; CLQ.003.001.0001.

Chapter 20 Insurance

[1] NND.001.00354; RCN.001.005.8779.
[2] RCN.900.074.0217.
[3] The Treasury, Background Paper 20: Natural Disaster Insurance, Background Paper (2018) <https://financialservices.royalcommission.gov.au/publications/Documents/natural-disaster-insurance-background-paper-20.pdf>.
[4] Insurance Council of Australia, '$3.85 Billion Already Paid in Natural Disaster Claims as Insurers Overcome Pandemic Upheaval' (Media Release, 27 August 2020), <https://www.insurancecouncil.com.au/media_release/plain/588>.
[5] RCN.900.074.0217.
[6] IAG.500.001.0001.
[7] The Treasury, Background Paper 20: Natural Disaster Insurance, Background Paper (2018) <https://financialservices.royalcommission.gov.au/publications/Documents/natural-disaster-insurance-background-paper-20.pdf>.
[8] HAF.8001.0001.0049.
[9] Insurance premiums are the cost paid by the insured to the insurer for an insurance policy. They are set to reflect risk, other costs and considerations insurers take into account, and can be increased by taxes including duties and levies.
[10] NND.001.01087; NND.001.00324; CAL.500.001.0001; NND.600.00192; RCN.001.005.8779; NND.001.01360.02. Dr Cainey, Energy Networks Australia, Transcript 1354.
[11] NND.600.00192.
[12] NSW.507.001.0001.
[13] NSW.507.001.0001.
[14] Productivity Commission, *Natural Disaster Funding Arrangements* (Inquiry Report No 74, 17 December 2014) <https://www.pc.gov.au/inquiries/completed/disaster-funding/report>.
[15] Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry, *Final Report* (2019) <https://treasury.gov.au/publication/p2019-fsrc-final-report>.
[16] The Treasury, Restoring Trust in Australia's Financial System, Financial Services Royal Commission Implementation Roadmap (2019) <https://treasury.gov.au/sites/default/files/2019-08/399667_Implementation_Roadmap_final.pdf>.
[17] ACCC, *Northern Australia Insurance Inquiry: First Interim Report* (November 2018) <https://www.accc.gov.au/focus-areas/inquiries-ongoing/northern-australia-insurance-inquiry/first-interim-report>.
[18] RCN.001.005.8779.
[19] ACCC, *Northern Australia Insurance Inquiry: First Interim Report* (November 2018) <https://www.accc.gov.au/focus-areas/inquiries-ongoing/northern-australia-insurance-inquiry/first-interim-report>; RCN.001.005.8779.
[20] RCN.900.074.0223.
[21] TRE.9001.0001.0001.
[22] Ms Douglas, Community Witness, Transcript 2269.
[23] RCN.001.005.8779.
[24] CAL.500.001.0001; NND.001.01087; NND.600.00342.02.
[25] CAL.500.001.0001; NND.001.01087; NND.600.00342.02.
[26] CAL.500.001.0001; NND.001.01087.
[27] ICA.500.001.0001; NND.001.00825; NND.001.00354; CAL.500.001.0001; RCN.001.005.8779; RCN.900.074.0217; NND.001.01141; IAG.500.001.0001.
[28] NND.600.00192 25; NND.001.01379; NND.600.00342.02.
[29] SHP.500.001.0002; LEP.500.001.0013; Productivity Commission, Natural Disaster Funding Arrangements (Inquiry Report No 74, 17 December 2014) <https://www.pc.gov.au/inquiries/completed/disaster-funding/report>; Mr Sullivan, Insurance Council of Australia, Transcript 1664; RCN.001.001.1715_E.
[30] RCN.001.005.8779.
[31] Mr Sullivan, Insurance Council of Australia, Transcript 1658; LEP.500.001.0013; RCN.900.074.0217.
[32] IAG.500.001.0001; SHP.500.001.0002; LEP.500.001.0013.
[33] NND.001.00354; NND.001.01090; NND.600.00192; RCN.001.005.8779.
[34] RCN.001.005.8779; RCN.001.001.2199; NND.001.01013; NND.001.01141.
[35] NND.600.00192.
[36] NND.001.01087; CAL.500.001.0001; NND.600.00259; Mr Price, Australian Financial Complaints Authority, Transcript 131; ICA.501.001.0001.

[37] RCN.900.077.0001 – Justin Malbon and Harman Oppewal, *(In)Effective Disclosure: An Experimental Study of Consumers Purchasing Home Contents Insurance* (Monash University, September 2018).
[38] RCN.900.074.0223; CAL.500.001.0001; FCA.500.001.0001; NND.001.01087; RCN.001.005.8779.
[39] CAL.500.001.0001; FCA.500.001.0001; NND.001.01087; RCN.001.005.8779.
[40] CAL.500.001.0001; FCA.500.001.0001; NND.001.01087.
[41] The Treasury, Background Paper 20: Natural Disaster Insurance, Background Paper (2018) <https://financialservices.royalcommission.gov.au/publications/Documents/natural-disaster-insurance-background-paper-20.pdf>; RCN.900.074.0223; NND.001.01087.
[42] ICA.501.001.0001; NND.001.01087; CAL.500.001.0001; NND.600.00259; Mr Price, Australian Financial Complaints Authority, Transcript 131.
[43] NND.001.00789; NND.001.01087; NND.001.01368; BBC.500.001.0002.
[44] NND.600.00275.
[45] FCA.500.001.0001; NND.001.01087.
[46] FCA.500.001.0001.
[47] NND.300.006.0142.
[48] Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry, Final Report (2019) <https://treasury.gov.au/publication/p2019-fsrc-final-report>.
[49] The Hon Josh Frydenberg MP, Treasurer, 'Update on the Implementation of the Banking, Superannuation and Financial Services Royal Commission' (Media Release, 8 May 2020) <https://ministers.treasury.gov.au/ministers/josh-frydenberg-2018/media-releases/update-implementation-banking-superannuation-and>; Department of the Treasury, Financial Sector Reform (Hayne Royal Commission Response-Protecting Consumers (2020 Measures)) Bill 2020: Exposure Draft Explanatory Materials.
[50] Mr Price, Australian Financial Complaints Authority, Transcript 129–130.
[51] NND.300.005.0017; NND.300.007.0046; NND.600.00275; Ms Evans, Legal Aid NSW, Transcript 2240–2241.
[52] The Treasury, *Australia's Future Tax System*, Report to the Treasurer (2009) <https://treasury.gov.au/review/the-australias-future-tax-system-review/final-report>; RCN.001.005.8779; Productivity Commission, Natural Disaster Funding Arrangements (Inquiry Report No 74, 17 December 2014) <https://www.pc.gov.au/inquiries/completed/disaster-funding/report>; NSW Government, *NSW Review of Federal Financial Relations*, Draft report (July 2020) <https://www.treasury.nsw.gov.au/sites/default/files/2020-06/FFR%20Review%20Draft%20Report%20.pdf>.
[53] ICA.500.001.0001.
[54] ACT Revenue Office, 'Tax Reform' (11 October 2017) <https://www.revenue.act.gov.au/tax-reform>.
[55] NND.600.00192.
[56] Table from Insurance Australia Group, NND.600.00192.
[57] NND.001.00825; ICA.500.001.0001; NND.001.00324.
[58] NSW Government, *NSW Review of Federal Financial Relations*, Draft report (July 2020) <https://www.treasury.nsw.gov.au/sites/default/files/2020-06/FFR%20Review%20Draft%20Report%20.pdf>.
[59] ACCC, Northern Australia Insurance Inquiry: First Interim Report (November 2018) <https://www.accc.gov.au/focus-areas/inquiries-ongoing/northern-australia-insurance-inquiry/first-interim-report>; RCN.001.005.8779.
[60] Productivity Commission, Natural Disaster Funding Arrangements (Inquiry Report No 74, 17 December 2014) <https://www.pc.gov.au/inquiries/completed/disaster-funding/report>.
[61] The Treasury, Australia's Future Tax System, Report to the Treasurer (2009) <https://treasury.gov.au/review/the-australias-future-tax-system-review/final-report>;.
[62] 2009 Victorian Bushfires Royal Commission, *Final Report* (2010) <http://royalcommission.vic.gov.au/Commission-Reports/Final-Report.html>.
[63] NSW.900.001.0003; CLQ.003.001.0001; SSA.900.001.0003; TAS.900.001.0003; VIC.900.001.0001; SWA.007.001.0002; ACT.900.001.0001; NTT.900.001.0003 001.
[64] NND.600.00275; NND.001.00825; NND.001.00135; NND.001.01153; NND.001.01286.
[65] FCA.500.001.0001; NND.001.00825.
[66] NND.001.0082529.
[67] NND.300.007.0053; NND.300.005.0033; NND.300.005.0017; ACT.900.001.0001; NSW.900.001.0003; CLQ.003.001.0001; SSA.900.001.0003; TAS.900.001.0003; VIC.900.001.0001; SWA.007.001.0002. Western Australia told us it did not support such a proposal at this stage, pending the finding of a Working Group it has already established to consider matters including this issue. South Australia indicated its support would depend upon funding arrangements with the Australian Government being agreed in advance.
[68] NND.300.007.0053.
[69] NND.300.005.0017.

Chapter 21 Coordinating relief and recovery

[1] Ms Giles, Community Witness, Transcript 1778
[2] NND.001.01013.05.
[3] Ms Hargreaves, Community Witness, Transcript 12; RCN.500.001.1874.
[4] United Nations Office for Disaster Risk Reduction, "Terminology: Recovery." <https://www.undrr.org/terminology/recovery>
[5] NND.001.00433.
[6] NND.001.00408.01.
[7] PMC.8001.0001.0362.
[8] Figure developed by the Office of the Royal Commission into National Natural Disaster Arrangements.
[9] Australian Institute for Disaster Resilience, Australian Disaster Resilience Handbook 2: Community Recovery, 2018, <https://knowledge.aidr.org.au/media/5634/community-recovery-handbook.pdf>.
[10] PMC.502.001.0299.
[11] NSW.503.001.0058; EMV.0015.0001.0001; CLQ.001.001.0071; FES.007.001.0002; SSA.468.056.0001; TAS.500.001.0452; NTT.500.001.0060.
[12] PMC.8001.0001.0362; LGA.500.001.0001; LGN.500.001.0038.
[13] Australian Institute for Disaster Resilience, Australian Disaster Resilience Handbook 2: Community Recovery, 2018, <https://knowledge.aidr.org.au/media/5634/community-recovery-handbook.pdf>.
[14] EGC.502.001.0044; LGN.500.001.0038.
[15] LGN.500.001.0038.
[16] Bushfire History Project contribution, Robert Newnham, Walwa, Victoria.
[17] ESC.503.001.0001; ESC.503.001.0005.
[18] Bushfire History Project contribution, Jennifer Pearson, Bingie, NSW.
[19] ESC.501.001.0005.
[20] Image from Eurobodalla Shire Council (Youth Services), ESC.503.001.0005.
[21] EMV.0015.0001.0001; TAS.500.001.0001.
[22] HAF.9002.0001.0002.
[23] HAF.0003.0001.0734.
[24] HAF.8001.0001.0001.
[25] FIN.9001.0001.0002.
[26] PMC.502.001.0299.
[27] VDP.500.001.0001; ARC.500.001.0001; TSA.501.001.0001.
[28] BUC.500.002.0026.
[29] Australian Red Cross, Our Response to the Bushfires, 24 January 2020, <https://www.redcross.org.au/news-and-media/news/bushfire-response-24-jan-2020>
[30] BUC.500.001.0001; BUC.500.002.0026.
[31] Images from the Business Council of Australia, BUC.500.001.0001 and BUC.500.002.0026.
[32] LGA.501.001.0001.
[33] Mr Beresford-Wylie, Australian Local Government Association, Transcript 1111.
[34] NND.800.001.00020; NND.800.001.00037.01.
[35] NND.800.001.00021; NND.800.200.00033.
[36] Mr Florence, Indigo Shire Council, Transcript 1057; Ms Pagan, Towong Shire Council, Transcript 1056 and 1058; NND.800.001.00024.
[37] Mr Ierino, Indigo Shire Council, Transcript 1063.
[38] Ms Dench, Wollondilly Shire Council, Transcript 1075.
[39] Ms Lake, Municipal Association of Victoria, Transcript 1124 and 1130; Ms Kwan, Local Government NSW, Transcript 1128.
[40] Australian Institute for Disaster Resilience, Australian Disaster Resilience Handbook 2: Community Recovery, 2018, <https://knowledge.aidr.org.au/media/5634/community-recovery-handbook.pdf>
[41] HAF.8001.0001.0073; HAF.9002.0001.0002.
[42] HAF.8001.0001.0001.
[43] HAF.8001.0001.0001.
[44] PMC.502.001.0299.
[45] ADC.500.001.0945
[46] Australian Institute for Disaster Resilience, Australian Disaster Resilience Handbook 2: Community Recovery, 2018, <https://knowledge.aidr.org.au/media/5634/community-recovery-handbook.pdf>
[47] ACT.500.001.0001; CLQ.001.001.0071.
[48] CJN.002.001.0603.
[49] VPD.500.001.0001.

[50] EMV.0015.0001.0001; NSW.001.001.0001.
[51] BVC.500.001.0001.
[52] SRC.500.001.0001; NND.800.200.00024.
[53] LCC.500.001.0010; BMC.503.001.0002.
[54] ESC.501.001.0002.
[55] Australian Institute for Disaster Resilience, Australian Disaster Resilience Handbook 2: Community Recovery, 2018, <https://knowledge.aidr.org.au/media/5634/community-recovery-handbook.pdf>
[56] PMC.502.001.0299.
[57] EMV.0015.0001.0001.
[58] Bushfire History Project contribution, Cindy Blackall, Colo Heights, NSW.
[59] AGD.9001.0001.0001.
[60] RCN.900.108.0001 – Mullins, Bradshaw, and Pearce, Australian Bushfire and Climate Plan: Final Report of the National Bushfire and Climate Summit 2020.
[61] NND.001.01379.01.
[62] NND.001.01379.01.
[63] NND.600.00203.
[64] NND.600.00203.
[65] NND.600.00320.01.
[66] RCN.900.149.0001.
[67] NND.600.00320.01.
[68] Bushfire History Project contribution, Robert Newham, Walwa, Victoria.
[69] Ms Dench, Wollondilly Shire Council, Transcript 1077; TSA.501.001.0001.
[70] Mr Magnussen, Southern Downs Regional Council, Transcript 1077–78.
[71] RCN.900.150.0001.
[72] NND.001.00408.01.
[73] Michelle Brown, Plea for people to stop donating goods directly to 'overwhelmed' fire-affected communities, 7 January 2020, <https://www.abc.net.au/news/2020-01-07/unsolicited-donations-spark-problems-in-nsw-fire-affected-areas/11848180>
[74] Alex Murray, Andrews Asks the Public to Donate Cash to Bushfire Appeals, Not Food and Clothing, 5 January 2020, <https://www.news.com.au/national/andrews-asks-the-public-to-donate-cash-to-bushfire-appeals-not-food-and-clothing/video/3e9f1d70dd3629dd9f1ac635321ea13c>
[75] FON.500.001.0001.
[76] RCN.900.150.0001; FON.500.001.0001.
[77] GIV.500.001.0001.
[78] RCN.900.150.0001.
[79] GIV.500.001.0001; FON.500.001.0001.
[80] GIV.500.001.0001.
[81] ACT.500.001.0001.
[82] QRA.002.001.0003.
[83] SSA.468.056.0001.
[84] GIV.500.001.0001; FON.500.001.0001.
[85] ARC.501.001.0001 – Mr Clement, Australian Red Cross.
[86] WIR.501.001.0001.
[87] TSA.501.001.0001.
[88] VDP.500.002.0001.
[89] DSS.9001.0001.0001.
[90] David Crowe and Rob Harris, Research Reveals Concerns with Charities over Bushfire Appeals, 4 February 2020, <https://www.smh.com.au/politics/federal/research-reveals-concerns-with-charities-over-bushfire-appeals-20200203-p53xcx.html#:~:text=Focus%20group%20work%20by%20research,slow%20to%20distribute%20the%20money.&text=%22They%20were%20anxious%20that%20those,funds%2C%22%20the%20company%20said>; Julia Holman, Charities Collecting Bushfire Donations Facing Criticism, 23 January 2020, <https://www.abc.net.au/radio/programs/pm/charities-collecting-bushfire-donations-facing-criticism/11894886>; Australian Charities and Not-for-profits Commission, Bushfires Generosity Will Not Be Betrayed by Charities, 29 January 2020, <https://www.acnc.gov.au/media/news/bushfires-generosity-will-not-be-betrayed-charities>; Luke Henriques-Gomes, Australian Red Cross Defends Spending 10% of Bushfire Donations on Office Costs, 24 January 2020, <https://www.theguardian.com/australia-news/2020/jan/24/australian-red-cross-defends-spending-10-of-bushfire-donations-on-office-costs>
[91] Image from ABC News attributed to Selby Stewart (25 May 2020) <https://www.abc.net.au/news/2020-05-25/celeste-barber-bushfire-fundraiser-money-only-for-rfs/12282016>.
[92] PMC.8001.0001.0297 – Mr Colvin APM OAM, National Bushfire Recovery Agency.

[93] NND.001.00311.
[94] Australian Red Cross, Australian Bushfires Report: January-June 2020, <https://www.redcross.org.au/getmedia/9fe279c7-94af-48e5-b10a-2c3b15f812e5/Report-6mth-FINAL-200708-WEB_4.pdf.aspx>
[95] Mr Clement, Australian Red Cross, Evidence to Royal Commission, Hearing on 26 May 2020, Transcript 151.
[96] ARC.500.001.0001.
[97] ACC.500.001.0001.
[98] RRR.500.001.0009.
[99] Department of the Treasury, Strengthening for Purpose: Australian Charities and Not-for-Profits Commission - Legislation Review 2018, August 2018, <https://treasury.gov.au/publication/p2018-t318031>
[100] ARC.500.001.0001.
[101] NSW Rural Fire Service & Brigades Donations Fund; Application of Macdonald & Or [2020] NSWSC 604
[102] NND.001.00827.01.
[103] TRE.9001.0001.0001.
[104] TRE.9001.0001.0001.
[105] TRE.9001.0001.0001.
[106] NND.300.006.0114.
[107] Department of the Treasury, Strengthening for Purpose: Australian Charities and Not-for-Profits Commission - Legislation Review 2018, August 2018, <https://treasury.gov.au/publication/p2018-t318031>
[108] NND.600.00202.
[109] NND.001.00827; Australian Competition and Consumer Commission, Bushfires and Scams, 6 January 2020, <https://www.accc.gov.au/update/bushfires-and-scams>
[110] Emma Elsworthy, Hundreds of Bushfire Donation Scams Circulating - How to Tell If You've Been Duped, 8 February 2020, <https://www.abc.net.au/news/2020-02-07/australia-fires-sees-spike-in-fraudster-behaviour/11923174>
[111] Australian Competition and Consumer Commission, ACCC Warns of Possible Bushfire Charity Scams, 9 February 2009, <https://www.accc.gov.au/media-release/accc-warns-of-possible-bushfire-charity-scams>
[112] NND.001.00827.01.
[113] NND.600.00202.02.
[114] SSA.468.056.0001; CLQ.001.001.0071.
[115] NND.300.006.0115.
[116] SSA.468.001.0257; NND.001.00038; NND.001.00218; NND.001.00233.
[117] NND.001.00776; NND.001.01366.
[118] Image from National Bushfire Recovery Agency attributed to Sean Davey <https://www.bushfirerecovery.gov.au/sites/default/files/photo-gallery/20200110001441406317.jpg>.
[119] RCN.900.112.0859 – Australia-New Zealand Emergency Management Committee, Spontaneous Volunteer Strategy: Coordination of Volunteer Effort in the Immediate Post Disaster Stage.
[120] Resilience NSW, Community Recovery Toolkit: Planning for Spontaneous Volunteers, <https://www.emergency.nsw.gov.au/Documents/toolkit/Community-Recovery-Toolkit-Spontaneous-Volunteers.pdf>
[121] SSA.468.001.0257.
[122] NND.001.01261.
[123] CLQ.001.001.0071.
[124] NND.001.01261.01.
[125] NSW.001.001.0001.
[126] NND.001.01261.
[127] NND.001.00776; NND.001.01261.
[128] RedR Australia is an international humanitarian response agency that selects, trains and deploys technical specialists. RedR Australia has partnered with the Australian Government's Department of Foreign Affairs and Trade to manage the Australia Assists Program.
[129] RRA.500.001.0001.
[130] NND.001.01366.01; NND.001.01261.01.
[131] NND.001.01366.01; NND.001.00776.
[132] NND.001.01261.
[133] NSW.001.001.0001.
[134] NND.001.00776; NND.001.01261.
[135] NND.300.006.0114.
[136] CLQ.001.001.0071; NND.001.01261.
[137] National Voluntary Organizations Active in Disaster, About Us, 2020, <https://www.nvoad.org/about-us/>
[138] HAF.0003.0001.0001.

[139] The SRRG consists of a representative from each of state and territory governments, the Australian Government Department of Human Services, Emergency Management Australia, and the Australian Red Cross, as well as a representative from New Zealand.
[140] Australian Institute for Disaster Resilience, Social Recovery Reference Group, <https://knowledge.aidr.org.au/resources/social-recovery-reference-group/>
[141] HAF.0009.0001.0214.
[142] HAF.9003.0001.0001.
[143] PMC.0002.0001.0047.
[144] PMC.0002.0001.0003.
[145] PMC.8001.0001.0297 – Mr Colvin APM OAM, National Bushfire Recovery Agency.
[146] FON.500.001.0001.
[147] NND.300.008.0013.
[148] NND.300.008.0018.
[149] NSW.001.001.0001.
[150] HAF.8001.0001.0049.
[151] RCN.900.034.0001.
[152] HAF.0003.0001.0519.
[153] RCN.900.034.0092.
[154] SSA.900.001.0003.
[155] RCN.900.034.0033.
[156] SSA.468.056.0001; HAF.9003.0001.0001.
[157] HAF.9003.0001.0001.
[158] SSA.468.056.0001.
[159] SSA.468.056.0001; NTT.500.001.0060.
[160] DHHS.0001.0001.0460; NTT.500.001.0060.
[161] HAF.8001.0001.0001.
[162] DHHS.0001.0001.0460.
[163] SSA.468.005.0036.
[164] ACT.500.001.0001.
[165] Mr Miezis, Bushfire Recovery Victoria, Transcript 1841–42.
[166] HAF.0009.0001.0214; HAF.9003.0001.0001.
[167] FES.007.001.0002.
[168] Australian Institute for Disaster Resilience, Australian Disaster Resilience Handbook 2: Community Recovery, 2018, <https://knowledge.aidr.org.au/media/5634/community-recovery-handbook.pdf>
[169] SSA.632.001.0012.
[170] SWA.006.001.0001.
[171] CLQ.001.001.0650; NTT.509.001.0033.
[172] NTT.509.001.0033.
[173] TAS.507.001.0403.
[174] SSA.632.001.0012; CLQ.001.001.0650.
[175] SSA.632.001.0012.
[176] NND.800.001.00024; LGC.500.001.0001.
[177] Image from ABC News attributed to Ian Cutmore (12 July 2020) <https://www.abc.net.au/news/2020-07-12/stranded-foreigners-rebuilding-bushfire-ravaged-communities/12445898>.

Chapter 22 Delivery of recovery services and financial assistance

[1] NND.001.01013.05.
[2] Productivity Commission, Natural Disaster Funding, Volume 1, 2015, <https://www.pc.gov.au/inquiries/completed/disaster-funding/report/disaster-funding-volume1.pdf>.
[3] Images from: Bushfire History Project contribution, Robert Newham, Walwa, Victoria (left); NND.600.00279 (top right); Manning River Times, Mobile Service Centre to Assist with Bushfire Recovery on Mid Coast, 19 November 2019, <https://www.manningrivertimes.com.au/story/6498970/mobile-service-centre-to-assist-with-bushfire-recovery-on-mid-coast/> (bottom right).
[4] NND.001.01013.06.
[5] NND.001.01013.06.
[6] Productivity Commission, Natural Disaster Funding, Volume 1, 2015, <https://www.pc.gov.au/inquiries/completed/disaster-funding/report/disaster-funding-volume1.pdf>.
[7] RCN.900.034.0092.
[8] DMC.001.001.0921.

[9] HAF.8001.0001.0049.
[10] DMC.001.001.0921
[11] CLQ.001.001.0071; LGA.500.001.0001; LGN.500.001.0038.
[12] QRA.001.001.2389; QRA.001.001.2337.
[13] EMV.0003.0003.0910.
[14] Commissioner Fitzsimmons, Resilience NSW, Transcript 1980.
[15] Figure developed by the Office of the Royal Commission into National Natural Disaster Arrangements. See Appendix 24: Recovery supports.
[16] SER.9001.0001.0001.
[17] SER.500.001.0002 – Ms Lees, Services Australia.
[18] SER.9001.0001.0001.
[19] PMC.9005.0001.0001.
[20] SER.500.001.0002 – Ms Lees, Services Australia.
[21] SER.9001.0001.0001; DSS.9001.0001.0001.
[22] SSA.632.001.0005.
[23] ARC.500.001.0001; ARC.501.001.0001 – Mr Clement, Australian Red Cross; TSA.500.001.0017; TSA.501.001.0001; VDP.500.001.0001.
[24] TSA.500.001.0017.
[25] DSS.9001.0001.0001.
[26] ARC.500.001.0001; ARC.501.001.0001 – Mr Clement, Australian Red Cross.
[27] BUC.500.002.0026.
[28] BUC.500.002.0001.
[29] Mr Miezis, Bushfire Recovery Victoria, Transcript, 1841–42; SER.500.001.0002 – Ms Lees, Services Australia; PMC.502.001.0299.
[30] NND.001.01379.01; PMC.502.001.0299. We heard of the difficulties in navigating the recovery processes of Australia, state and territory government agencies. For example, Mr and Ms Giles told us: We had to jump hoops like you wouldn't believe. (RCN.711.000.0001 and RCN.500.001.2594 Mr and Ms Giles, Community Witness, Transcript 10).
[31] TOW.500.001.0001.
[32] SER.9001.0001.0001.
[33] NTT.507.001.0001.
[34] TSA.500.001.0017.
[35] FES.007.001.0002; CLQ.001.001.0071.
[36] NND.300.005.0007; NND.300.005.0042; NND.300.006.0134.
[37] Western Australia supports the current review of the DRFA but argued that its actions in supporting recovery should not be constrained by arrangements that may not be appropriate in other jurisdictions but which are necessary in the Western Australian context.
[38] SSA.468.056.0001; HAF.9002.0001.0002.
[39] Ms Westacott, Business Council of Australia, Transcript 2216.
[40] Ms Robb, Community Witness, Transcript 1894.
[41] Australian Institute for Disaster Resilience, Australian Disaster Resilience Handbook 2: Community Recovery, 2018, <https://knowledge.aidr.org.au/media/5634/community-recovery-handbook.pdf>.
[42] NSW.001.001.0001; EMV.0015.0001.0001; CLQ.001.001.0071; FES.007.001.0002; SSA.468.056.0001; TAS.500.001.0452; ACT.500.001.0001; NTT.500.001.0060.
[43] VDP.500.001.0001.
[44] TSA.501.001.0001.
[45] SHC.502.001.0002.
[46] Mr Cashmore, Community Witness, Transcript 21; RCN.500.001.2188–.
[47] VDP.500.001.0001.
[48] NND.001.00782; NND.001.00324.01.
[49] NND.001.00782.
[50] SHC.503.001.0002.
[51] SER.9002.0001.0002.
[52] NND.600.00330; NND.001.00324.01.
[53] SER.9002.0001.0002; SER.9002.0001.0022.
[54] NND.001.01256.
[55] PMC.8001.0001.0297 – Mr Colvin APM OAM, National Bushfire Recovery Agency; ARC.500.001.0001.
[56] NND.001.00873.01.
[57] NSW.001.001.0001; SSA.468.056.0001; EMV.0015.0001.0001.
[58] NSW.001.001.0001.
[59] ARC.500.001.0001; VDP.500.001.0001.

[60] ARC.500.001.0001.
[61] NND.001.01286.
[62] Mr Weinert, Community Witness, Transcript 1164; WIE.500.001.0001 – Mr Weinert.
[63] NND.001.00363.
[64] RCN.900.112.0859.
[65] RCN.900.112.0859.
[66] Mr Weinert, Community Witness, Transcript 1160.
[67] Image from the Canberra Times attributed to Dion Georgopoulos (8 January 2020) <https://www.canberratimes.com.au/story/6570478/how-cobargo-pulled-together-after-a-firestorm-on-two-fronts/>
[68] NND.001.00666
[69] Ms Robb, Community Witness, Transcript 1893; Ms Giles, Community Witness, Transcript, 1780; NND.001.00161; TOW.500.001.0001 – Ms Townsend.
[70] Captain Glover, The Salvation Army, Transcript 2249; NSW.006.001.0001.
[71] NND.800.001.00036.
[72] ESC.500.001.0001.
[73] VIC.0009.0001.0001.
[74] AGD.9001.0001.0001.
[75] AGD.9001.0001.0001.
[76] NSW.001.001.0001; Mr Di Pietro, Shoalhaven City Council, Transcript 1107; ARC.500.001.0001; Mr Leplastrier, Insurance Australia Group, Transcript, 78; VDP.500.001.0001; FES.007.001.0002.
[77] Mr Colvin, National Bushfire Recovery Agency, Transcript 527.
[78] Mr Pearce, Victorian Inspector-General for Emergency Management, Transcript, 1578–79; NND.800.001.00038.
[79] AGD.9001.0001.0001.
[80] AGD.9001.0001.0001.
[81] AGD.9001.0001.0001.
[82] Ms Lees, Services Australia, Transcript, 503; Mr Colvin, National Bushfire Recovery Agency, Transcript 527.
[83] Mr Colvin, National Bushfire Recovery Agency, Transcript 527.
[84] AGD.9001.0001.0001.
[85] AGD.9001.0001.0001.
[86] AGD.9001.0001.0001.
[87] Captain Glover, The Salvation Army, Transcript 2261–62; Mr O'Connor, St Vincent de Paul Society, Transcript 2262–63; Mr Clement, Australian Red Cross, Transcript 2263.
[88] AGD.9001.0001.0001.
[89] PMC.8001.0001.0297 – Mr Colvin APM OAM, National Bushfire Recovery Agency.
[90] NND.600.00330; NND.001.01379.
[91] Ms Prendergast, Resilience NSW, Transcript 1934.
[92] Ms Evans, Legal Aid NSW, Transcript 2240.
[93] Captain Glover, The Salvation Army, Transcript 2251.
[94] SSA.468.056.0001; SHC.502.001.0002.
[95] ARC.500.001.0001.
[96] Ms Prendergast, Resilience NSW, Transcript 1934, 1953–54; ARC.500.001.0001; NSW.001.001.0001; CLQ.001.001.0071; Captain Glover, The Salvation Army, Transcript 2262.
[97] PMC.9002.0001.0001.
[98] The ACT told us that it was likely this was unachievable, and several state and territory governments noted significant potential cost implications, and Tasmania and Victoria suggested that significant work was required at a state level before national coordination would be possible. The Consumer Action Law Centre and Legal Aid noted that it would be important to ensure that the sharing of information did not have adverse consequences for individuals.
[99] SER.9001.0001.0001.
[100] DSS.9002.0001.0001.
[101] DSS.9002.0001.0001.
[102] HAF.0003.0001.0639.
[103] Mr Colvin, National Bushfire Recovery Agency, Transcript 2951.
[104] HAF.0003.0001.0639.
[105] HAF.9003.0001.0001.
[106] HAF.8001.0001.0001.
[107] HAF.0003.0001.0639.
[108] SSA.468.001.0539.
[109] HAF.9002.0001.0002.
[110] HAF.9002.0001.0002.

[111] HAF.9002.0001.0002.
[112] HAF.9002.0001.0002.
[113] PMC.0001.0002.0446.
[114] HAF.9003.0001.0001.
[115] Images from: ABC News attributed to David Foote (20 January 2020) <https://www.abc.net.au/news/2020-01-20/hail-storm-in-canberra-damages-cars-smashes-windows/11882472> (top and bottom right); Photo contribution, Craig Furness, Canberra, ACT (bottom left).
[116] Figure developed by the Office of the Royal Commission into National Natural Disaster Arrangements.
[117] HAF.9003.0002.0001.
[118] HAF.9007.0002.0001.
[119] Data from HAF.9003.0002.0001.2019-2020 estimates are as of February 2020. Complete estimates for 2019-2020 are not yet available as state and territory governments have 24 months to submit claims under the DRFA to the Australian Government.
[120] DUN.500.001.0029.
[121] FES.005.001.0147.
[122] Mr Cronstedt AFSM, Western Australian Department of Fire and Emergency Services, Transcript 1871–72.
[123] Mr Fitchat, Shire of Dundas, Transcript 1046
[124] ACT.500.001.0001.
[125] BNT.501.001.0065.
[126] SSA.468.056.0001.
[127] LGC.500.001.0020.
[128] HAF.9003.0001.0001.
[129] QRA.001.001.2853.
[130] EMV.0015.0001.0001.
[131] PMC.9002.0001.0001.
[132] HAF.9003.0001.0001.
[133] Ms Pagan, Towong Shire Council, Transcript 1061.
[134] ACT.500.001.0001.
[135] ACT.500.001.0001; HAF.9002.0001.0002.
[136] Image from ABC News attributed to Kira Lowe (31 March 2017) <https://www.abc.net.au/news/2017-03-31/cyclone-debbie-bom-warnings-logan-jambin-evacuation/8403360?nw=0>
[137] NSW.009.002.0043.
[138] VIC.0011.0001.0042.
[139] CLQ.001.001.0699.
[140] SWA.006.001.0004.
[141] SSA.632.001.0005.
[142] TAS.507.001.0181.
[143] ESA.510.001.0033.
[144] NTT.507.001.0001.
[145] We heard from Western Australia and Queensland that they do not support an approach which would seek to ensure consistency of recovery support across different states, territories and local government areas. However, such an approach was supported by the Australian Government and the other state and territory governments. We note that the ACT, South Australia, Tasmania and Victoria also noted similar issues, while giving their in principle support for greater consistency.
[146] SWA.007.001.0002; CLQ.003.001.0001.
[147] PMC.9002.0001.0001.
[148] HAF.0003.0001.0639.
[149] Mr Miezis, Bushfire Recovery Victoria, Transcript 1839
[150] HAF.9002.0001.0002.
[151] NND.800.001.00044.
[152] NND.800.001.00043; SHC.502.001.0002.
[153] CLQ.001.001.0071.
[154] EMV.0007.0001.0001.
[155] PMC.502.001.0299.
[156] PMC.9002.0001.0001; HAF.9003.0001.0001. South Australia, Queensland and Western Australia emphasised that it is important for the states to nonetheless retain flexibility to tailor recovery programs.
[157] HAF.9003.0001.0001.
[158] PMC.9002.0001.0001.
[159] AGD.9001.0001.0001, .0017.

[160] Anonymous quote, Hayley Gleeson, 'A new bushfire crisis is emerging as experts brace for an imminent surge in domestic violence' *Australian Broadcasting Corporation* (online, 24 February 2020) <https://www.abc.net.au/news/2020-02-24/domestic-violence-anticipated-spike-bushfires-crisis/11980112>.
[161] Debra Frances Parkinson, 'Women's Experience of Violence in the Aftermath of the Black Saturday Bushfires' (PhD Thesis, Monash University, 2017).
[162] NND.001.01013.05.
[163] MDH.500.001.0093; MDH.500.001.0001.
[164] Dr Debra Parkinson, as quoted in Hayley Gleeson, 'A new bushfire crisis is emerging as experts brace for an imminent surge in domestic violence' *Australian Broadcasting Corporation* (online, 24 February 2020) <https://www.abc.net.au/news/2020-02-24/domestic-violence-anticipated-spike-bushfires-crisis/11980112>.
[165] NND.001.01204.01.
[166] NSW Bureau of Crime Statistics and Research, *Domestic violence statistics for NSW* (2019) <https://www.bocsar.nsw.gov.au/Pages/bocsar_pages/Domestic-Violence.aspx>
[167] MDH.500.001.0093; Debra Parkinson and Claire Zara, "The hidden disaster: domestic violence in the aftermath of natural disasters' (2013) 28(2) *Australian Journal of Emergency Management* 28-35.
[168] NND.001.01379.01; NND.001.01377.01.
[169] Debra Frances Parkinson, 'Women's Experience of Violence in the Aftermath of the Black Saturday Bushfires' (PhD Thesis, Monash University, 2017).
[170] Debra Parkinson and Claire Zara, "The hidden disaster: domestic violence in the aftermath of natural disasters' (2013) 28(2) *Australian Journal of Emergency Management* 28-35.; NND.001.01173.01.
[171] DMC.001.001.0921.
[172] HAF.9003.0001.0001.
[173] HAF.9003.0001.0001; Mr Beckett, Local Government Association of Queensland, Transcript 881.
[174] HAF.0003.0001.0639.
[175] HAF.9003.0001.0001.
[176] HAF.8003.0001.0001 – Mr Cameron OAM, Department of Home Affairs.
[177] EMV.0015.0001.0001.
[178] HAF.9003.0001.0001.
[179] HAF.8001.0001.0001.
[180] CLQ.001.001.0071.
[181] Mr Beckett, Local Government Association of Queensland, Transcript 881.
[182] TAS.500.001.0452.
[183] CLQ.001.001.0071.
[184] LGA.500.001.0001.
[185] HAF.9003.0001.0001.
[186] LGA.501.001.0001; Mr Darragh, Northern Territory Department of the Chief Minister, Transcript 1813; Mr Presland, Resilience NSW and Office of Emergency Management, Transcript 1940.
[187] Mr Presland, Resilience NSW and Office of Emergency Management, Transcript 1940.
[188] TAS.500.001.0452.
[189] HAF.9003.0001.0001.
[190] Mr Colvin, National Bushfire Recovery Agency, Transcript 2951.
[191] HAF.0003.0001.0639.
[192] HAF.0003.0001.0639.
[193] PMC.502.001.0299.
[194] HAF.9003.0001.0001.
[195] HAF.9003.0001.0001.
[196] Mr Colvin, National Bushfire Recovery Agency, Transcript 522.
[197] HAF.9002.0001.0002.
[198] HAF.9003.0001.0001.
[199] Mr Limkin, Tasmanian Department of Premier and Cabinet, Transcript 1765.
[200] HAF.9003.0001.0021.
[201] CLQ.001.001.0071.
[202] Ms Pagan, Towong Shire Council, Transcript 1061.
[203] HAF.9003.0001.0001.
[204] EMV.0007.0001.0001.
[205] HAF.9003.0003.0001.
[206] SSA.468.056.0001.
[207] Mr Presland, Resilience NSW and Office of Emergency Management, Transcript 1939; Mr Limkin, Tasmanian Department of Premier and Cabinet, Transcript 1758; NND.800.001.00048; NND.800.200.00025.01; EMV.0007.0001.0001; TAS.500.001.0452.

[208] Australian National Audit Office, *Administration of the Natural Disaster Relief and Recovery Arrangements by Emergency Management Australia* (30 April 2015) <https://www.anao.gov.au/work/performance-audit/administration-natural-disaster-relief-and-recovery-arrangements-emergency>.
[209] LGA.501.001.0007.
[210] HAF.9003.0001.0001.
[211] HAF.9003.0001.0001.
[212] NND.600.00381; ACT.500.001.0001.
[213] HAF.0003.0001.0639.
[214] HAF.8003.0001.0001 – Mr Cameron OAM, Department of Home Affairs; HAF.0003.0001.0639.
[215] HAF.8003.0001.0001 – Mr Cameron OAM, Department of Home Affairs.
[216] Bushfire History Project contribution, Kirstin Pearce, Buchan Victoria.

Chapter 23 National research and emerging technology

[1] RCN.900.078.0001.
[2] CSIRO, Spark: Predicting bushfire spread, <https://data61.csiro.au/en/Our-Research/Our-Work/Safety-and-Security/Disaster-Management/Spark>.
[3] National Environmental Science Programme, Earth Systems and Climate Change Hub, <http://nespclimate.com.au/>.
[4] GEO.502.001.0002.
[5] GEO.502.001.0002.
[6] ANT.9001.0001.0001.
[7] Mr Murfett, Australian Space Agency, Transcript 2322.
[8] IND.0003.0001.0001.
[9] Department of Industry, Science, Energy and Resources, Cooperative research centres, <https://www.industry.gov.au/funding-and-incentives/cooperative-research-centres>.
[10] RCN.900.078.0001.
[11] Professor Koronios, SmartSat CRC, Transcript 2330; SCR.500.001.0001.
[12] Bushfire and Natural Hazards CRC, Hazards culture and Indigenous communities, <https://www.bnhcrc.com.au/research/indigenouscommunities>.
[13] HAF.8003.0001.0001.
[14] HAF.8003.0001.0001.
[15] HAF.8003.0001.0001.
[16] RCN.900.078.0001.
[17] NND.001.01367.01.
[18] NND.001.01167.
[19] CSI.508.001.0001.
[20] Australian Business Roundtable for Disaster Resilience & Safer Communities, <http://australianbusinessroundtable.com.au/>.
[21] Ibid; ARC.501.001.0031.
[22] Australian Business Roundtable for Disaster Resilience & Safer Communities, Our Research, <http://australianbusinessroundtable.com.au/our-research>.
[23] IAG.001.001.0046.
[24] Mr Leplastrier, Insurance Australia Group, Transcript 54.
[25] James Cook University Australia, The Cyclone Testing Station, <https://www.jcu.edu.au/cyclone-testing-station>.
[26] Minderoo Foundation, Reducing Harm Caused by Fire and Flood, <https://www.minderoo.org/fire-and-flood-resilience/>.
[27] HAF.8001.0001.0001.
[28] Australian Institute for Disaster Resilience, Centre of Excellence for Prescribed Burning, <https://www.aidr.org.au/programs/centre-of-excellence-for-prescribed-burning/>.
[29] AID.500.001.0106.
[30] Mr Ehrlich, Day 27, Transcript Page 2336 and 2337
[31] Mr McKenna, Day 27, Transcript Page 2342
[32] ATT.500.001.0001.
[33] SMT.500.001.0001.
[34] BFI.501.001.0001; Mr Morris, Bushfire.Io, Transcript 2363.
[35] BFI.501.001.0001.
[36] Mr Newman, Red Helmet Technology, Transcript 2360.
[37] LiDAR (*Light Detection and Ranging*) is a remote sensing method that can generate precise, three-dimensional information about the shape of the Earth and its surface characteristics using light in the form of a pulsed laser.

[38] HAF.0009.0001.0308.
[39] HAF.0009.0001.0308. First National Action Plan under the National Disaster Risk Reduction Framework to identify any additional existing research funding programs and initiatives.
[40] HAF.0009.0001.0308.
[41] EMV.0005.0001.0068.
[42] CLQ.003.001.0001.
[43] SSA.900.001.0003.

Chapter 24 Assurance and accountability

[1] RCN.900.144.0195 – UN Office for Disaster Risk Reduction, *Accountability in the Context of Disaster Risk Governance* (2019) 'Accountability in disaster risk governance is a cross-cutting and complex governance issue for which each state has the primary responsibility to ensure that the public are safe and aware of risks, and to prevent and reduce disaster risks… This also requires political and legal commitment, public understanding, scientific knowledge, careful development planning, responsible enforcement of policies and legislation, national risk assessment, disaster loss data, people-centered early warning systems, and effective disaster preparedness and response mechanisms.'
[2] Royal Commission, *Background Paper: Australian Inquiries and Reports Concerning Natural Disasters* (Royal Commission into National Natural Disaster Arrangements, 15 May 2020).
[3] Chart produced using a combination of data sources, including from the Bushfire and Natural Hazards CRC Disaster Inquiries Database, as well as research by the Commission into previous and concurrent inquiries.
[4] For example, NATCATDISPLAN states it will be reviewed by the Australian, state and territory governments, in consultation with the Australian Local Government Association, after three years or earlier as agreed. The current version, version 2.2, was published in December 2017.
[5] HAF.0001.0001.0049.
[6] HAF.0009.0001.0308.
[7] Figure from the First National Action Plan to Implement the National Disaster Risk Reduction Framework, HAF.0009.0001.0308.
[8] HAF.0009.0001.0308
[9] HAF.9008.0001.0001.
[10] Commissioner Leach, Queensland Fire and Emergency Services, Transcript 2505.
[11] See for example: <https://www.aidr.org.au/resources/2019-lessons-management-forum/>.
[12] Associate Professor Owen, University of Tasmania, Transcript 2675.
[13] Mr Pearce, Victorian Inspector-General for Emergency Management, Transcript 1548-1612; EMV.0014.0001.0697.
[14] Mr Dawson, Queensland Inspector-General Emergency Management, Transcript 1548-1612; EMQ.003.001.0034.
[15] Mr Pearce and Mr Dawson, Transcript 1555.
[16] Associate Professor Owen, University of Tasmania, Transcript 2676.

