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Australian Disaster
Resilience Index

The Australian Disaster Resilience Index: a summary

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Publisher

Bushfire and Natural Hazards CRC

Report No. 588.2020

ISBN: 978-0-6482756-6-4

Citation: Parsons M, Reeve I, McGregor J, Marshall G, Stayner R, McNeill J, Hastings P, Glavac S & Morley P (2020) The Australian Disaster Resilience Index: a summary, Bushfire and Natural Hazards CRC.

Cover: Austockphoto



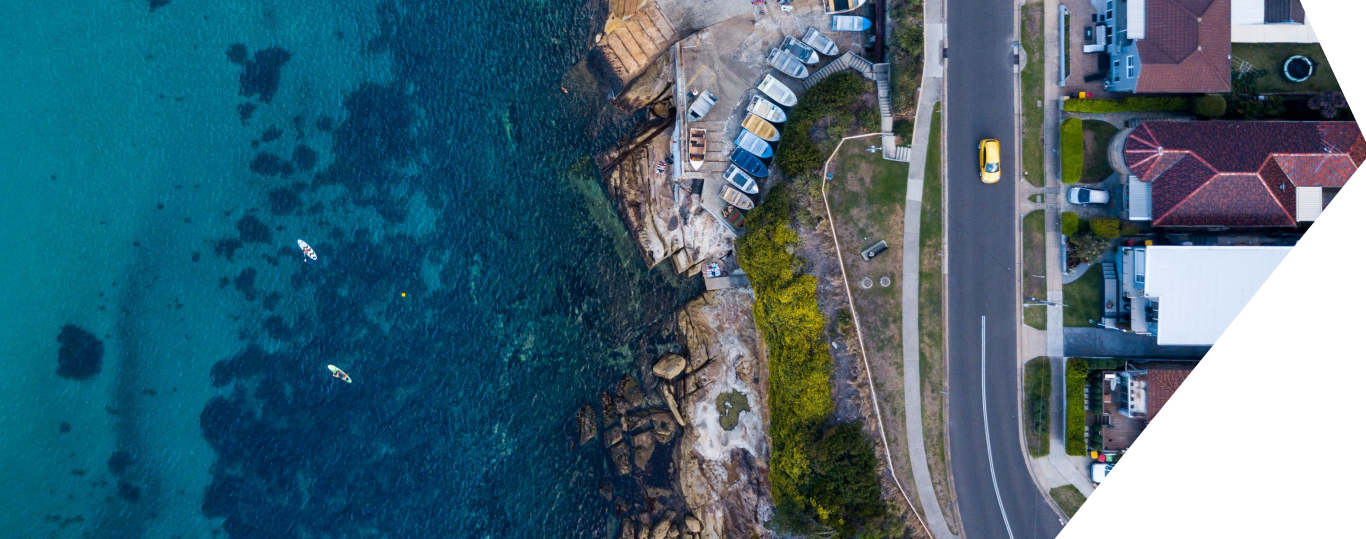
Australian Government
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Understanding disaster resilience

Introduction to disaster resilience in Australia

Natural hazards, such as bushfires, cyclones, floods, storms, heatwaves, earthquakes and tsunamis, have always occurred and will continue to occur in Australia. These natural hazards frequently intersect with human societies to create natural hazard emergencies that, in turn, cause disasters.

The effects of natural hazards on Australian communities are influenced by a unique combination of social, economic, natural environment, built environment, governance and geographical factors.

Australian communities face increasing losses and disruption from natural hazards, with the total economic cost of natural hazards in Australia averaging \$18.2 billion per year between 2006 and 2016 (Deloitte Access Economics, 2017). This is expected to almost double by 2030 and to average \$33 billion per year by 2050 (Deloitte Access Economics, 2016). The social impacts of disasters are also substantial. Costs associated with social impacts may persist over a person's lifetime and can be greater than the costs of tangible damages (Deloitte Access Economics, 2016).

Climate change is expected to increase the frequency and magnitude of some natural hazard types in Australia (BOM & CSIRO, 2018). An increasing population, demographic change, widening socio-economic disparity, expensive infrastructure and the location of

communities in areas of high natural hazard risk also contributes to the potential for increasing losses from natural hazards.

There are two prominent schools of thought about the influence of natural hazards in human societies:

- a vulnerability perspective, where distributional inequalities in physical, social, economic and environmental factors influence the susceptibility of people to harm and the ability of people to respond to hazards (Cutter et al., 2003; Birkmann, 2006; Bankoff, 2019).
- a resilience perspective, where people are learning to live with a changing, unpredictable and uncertain environment (Folke et al., 2002; Bankoff, 2019), of which natural hazards are a part. Resilience is a process linking a set of capacities to a positive trajectory of functioning and adaptation after a disturbance (Norris et al., 2008).

This resilience perspective has been adopted in the Australian Disaster Resilience Index, with the aim of better understanding and assessing the disaster resilience of Australian communities nationwide.

As such, disaster resilience can be understood as a protective characteristic that acts to reduce the effects of, and losses from, natural hazards. Resilience arises from the capacities of social, economic and government systems to prepare for, respond to and recover from a natural hazard event, and to learn, adapt and transform in anticipation of future natural hazard events.

Understanding Australia's capacity for disaster resilience

The Australian Disaster Resilience Index defines resilience to natural hazards as:

Resilience is the capacity of communities to prepare for, absorb and recover from natural hazard events and to learn, adapt and transform in ways that enhance these capacities in the face of future events.

The Australian Disaster Resilience Index assesses resilience based on two sets of capacities—coping capacity and adaptive capacity:

- Coping capacity is the means by which people or organisations can use available resources and abilities to face adverse consequences that could lead to a disaster (UNISDR, 2009). In a practical sense, coping capacity relates to the factors influencing the ability of a community to prepare for, absorb and recover from a natural hazard event.
- Adaptive capacity is the arrangements and processes that enable adjustment through learning, adaptation and transformation. Adaptive capacity entails the existence of institutions and networks that learn and store knowledge and experience, create flexibility in problem solving, and balance power among interest groups (Folke et al., 2002).

The Australian Disaster Resilience Index measures resilience through a combination of social, economic, natural environment, built environment, governance and geographical factors (Appendix 1), providing spatial outputs (maps) that identify the mosaic of disaster resilience, and the factors that contribute to this resilience, across Australia.

The Index is intended to be used alongside existing information, including:

- natural hazard risk maps to examine the intersection between prevailing natural hazard exposure and risk, and the capacities for resilience.
- changes to external drivers and linkages, including broad demographic and economic trends, regional development, and environmental changes.

Conceptual elements of the Australian Disaster Resilience Index. Coping and adaptive capacities form the basis for assessment of disaster resilience, which sits within a context of the occurrence of different natural hazard types and external drivers and linkages (dashed lines). Sourced from Parsons et al. (2016).

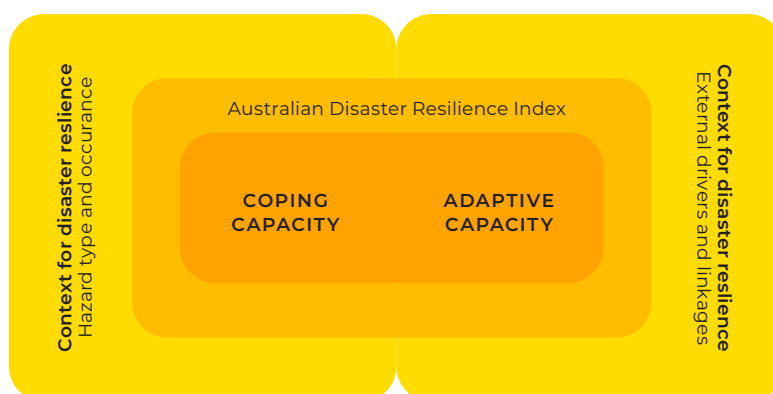
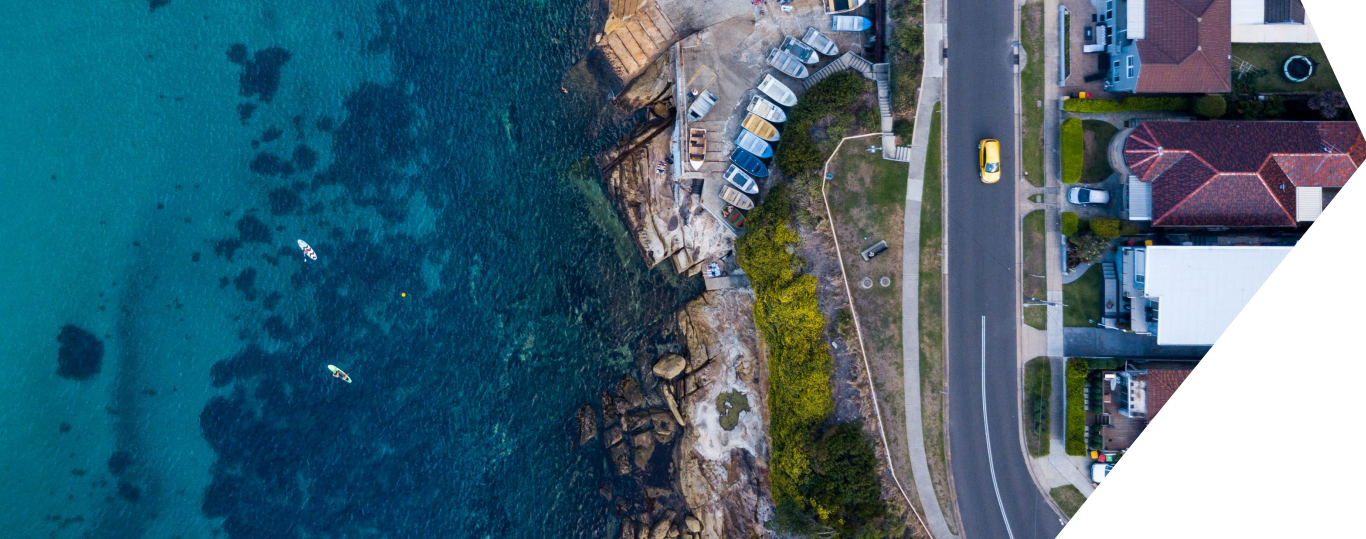


Figure 1



Australia's new disaster resilience index explained

Using 77 separate indicators (Appendix 2) of coping and adaptive capacities for disaster resilience, the Australian Disaster Resilience Index estimates the status of the coping and adaptive capacities and shows how they are distributed across Australia. The Index provides an opportunity to audit the state of disaster resilience at specified points in time, allowing changes in disaster resilience to be tracked over time.

The Index is a nationally standardised assessment of the state of disaster resilience in Australia. The assessment provides a benchmark against which to assess future change in disaster resilience. Understanding the distribution of disaster resilience in Australia will assist communities, governments, organisations and businesses to build the capacities needed for living with, and adapting to, natural hazards.

If policy and planning initiatives to improve disaster resilience are to be undertaken anywhere in Australia, or for specific regions, a usable index of the capacity for disaster resilience must have national coverage. There are significant limitations if estimates of the capacity for disaster resilience are only available for localities where natural hazards have already occurred. For this reason, the Index is based on the known or presumed causal factors for disaster resilience (see below and Appendix 1).

Assessing disaster resilience using a composite index

The Australian Disaster Resilience Index is a composite index. Composite indices are frequently used as assessment tools to summarise and report complex relational measurements about a particular issue (OECD, 2008). As a composite index, the Australian Disaster Resilience Index will reflect resilience according to the behaviour of the indicators that are used to build the index values.

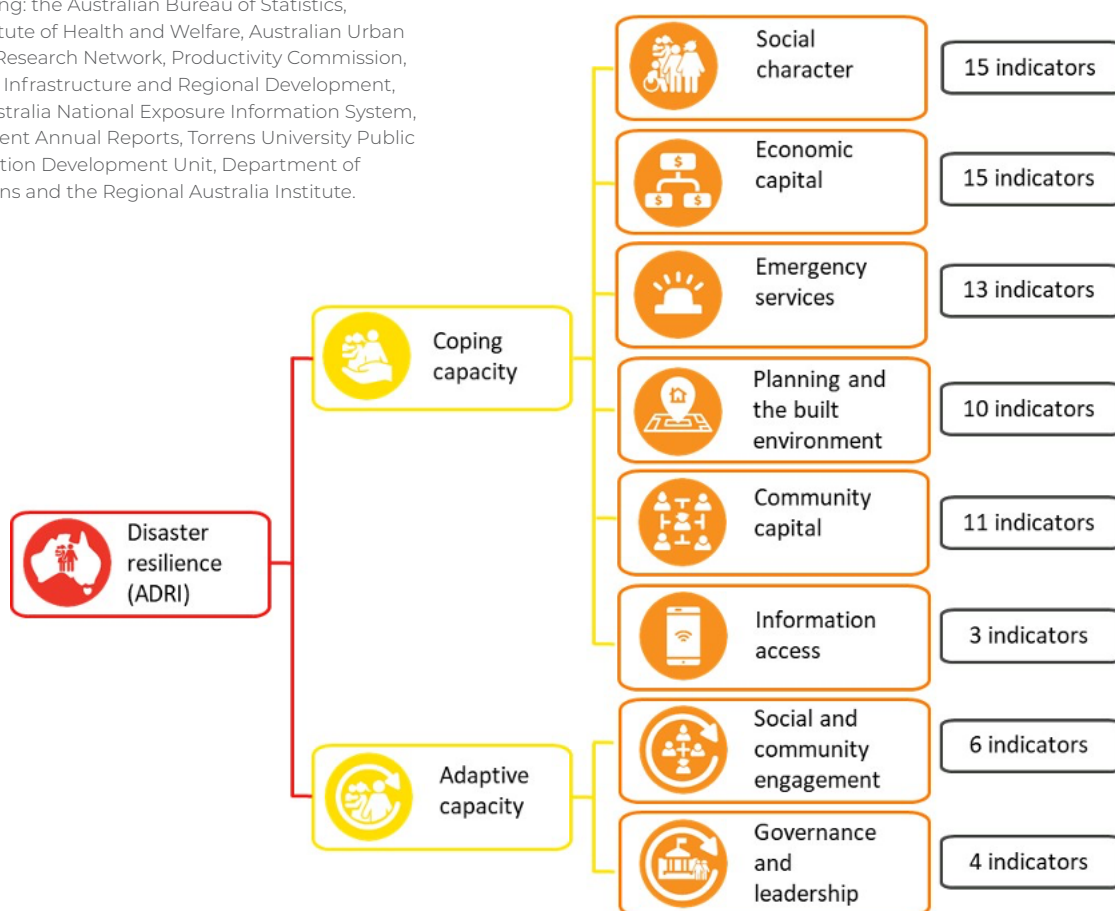
The Index assesses disaster resilience indirectly, by its causes or effects on the indicators (Appendix 2) that are used to inform the Index. The Index takes a top-down assessment approach, and uses indicators derived from secondary data. Assessment is at a national scale and provides nationally standardised coverage of the entire country. The use of a top-down assessment, in combination with the coping and adaptive capacity framework of disaster resilience, governs the interpretation of the state of disaster resilience in Australia.

The Index assesses the capacities for disaster resilience, not the actual realisation of disaster resilience following any one event.

Structure of the Australian Disaster Resilience Index

The Australian Disaster Resilience Index is computed hierarchically. The capacities for disaster resilience are made up of eight sub-index factors (or themes) that each capture different dimensions of disaster resilience. These sub-index factors are combined into coping capacity and adaptive capacity sub-indices and, in turn, these indices are then combined to produce the overall index value.

¹ The indicators are developed from publicly available data sources including: the Australian Bureau of Statistics, Australian Institute of Health and Welfare, Australian Urban Infrastructure Research Network, Productivity Commission, Department of Infrastructure and Regional Development, Geoscience Australia National Exposure Information System, Local Government Annual Reports, Torrens University Public Health Information Development Unit, Department of Communications and the Regional Australia Institute.



The Australian Disaster Resilience Index structure. The first level (in red) is the overall assessment of disaster resilience. The second level (in yellow) comprises coping capacity and adaptive capacity. The third level (in orange) is made up of eight sub-index factors that capture the dimensions of disaster resilience within coping capacity and adaptive capacity (see also Appendix 1). The fourth level (in black) comprises indicator sets that measure the status of each sub-index factor (see also Appendix 2). An index value is computed for the top three levels, using the indicators collected at the fourth level.

Figure 2

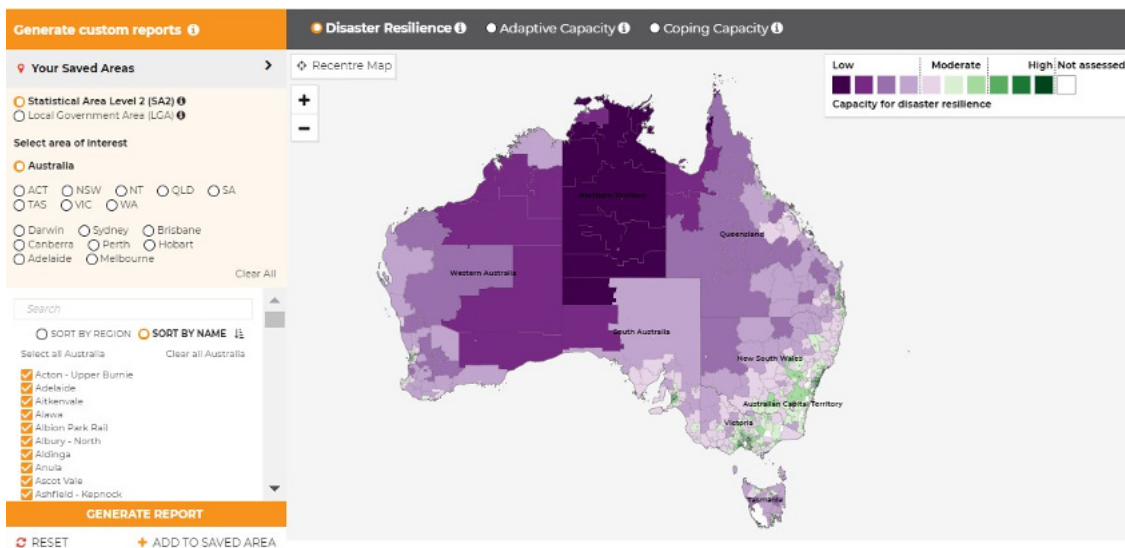
Spatial resolution of the Australian Disaster Resilience Index

The Australian Disaster Resilience Index community boundaries are based on the Statistical Area Level 2 (SA2), defined in the 2011 Australian Statistical Geography Standard (ABS, 2011). SA2s are determined by the Australian Bureau of Statistics using criteria of population, functional areas, growth, gazetted suburbs or localities, local government area boundaries, and rural or city locations (ABS, 2011). SA2s generally have a population range of 3,000 to 25,000 people, with an average population of about 10,000 people (ABS, 2011).

There are 2,214 SA2s across Australia. The Australian Disaster Resilience Index was computed for 2,084 of these SA2s: 130 SA2s (6 per cent) were excluded because they were areas of no or low population (e.g. national parks, ports, airports, industrial estates). Jervis Bay, Christmas Island, the Cocos-Keeling Islands, Lord Howe Island and French Island were also excluded from the Index because the availability of indicator data for these areas was inconsistent.

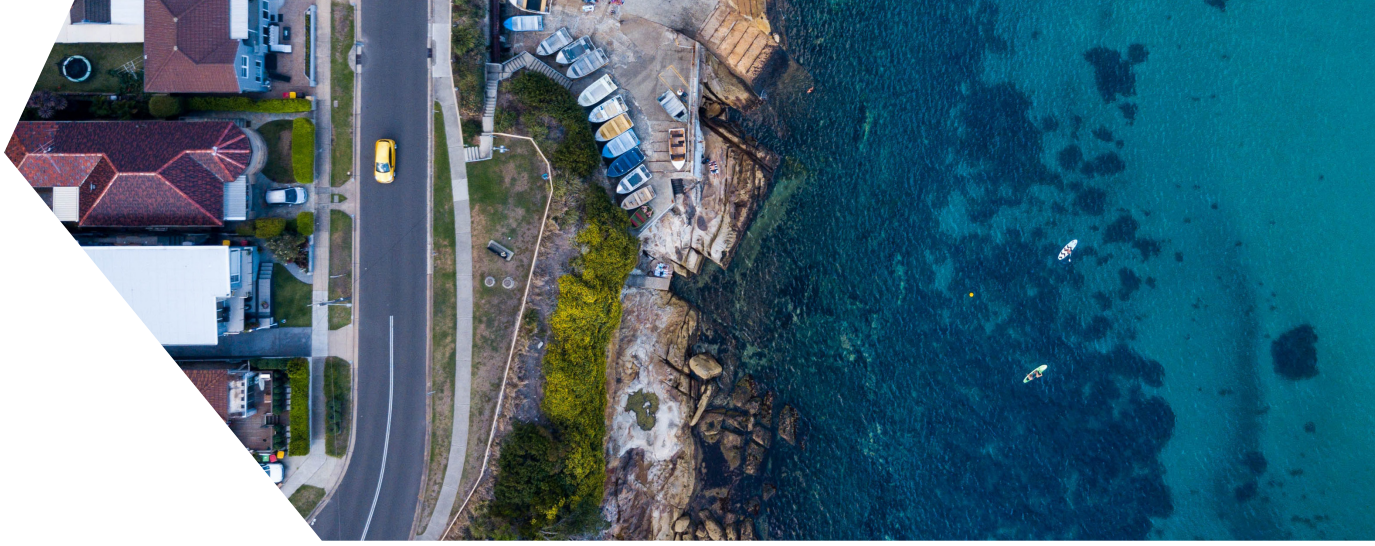
Spatial visualisation of disaster resilience

The final form of the Australian Disaster Resilience Index, and component coping capacity, adaptive capacity and theme sub-indices, is an index value in the range of 0 to 1. Values of 0 correspond to lower disaster resilience and values of 1 correspond to higher disaster resilience. These values of the Index, and component sub-indices, can be viewed spatially on maps, or analysed further to determine the spatial patterns of index values, find groups of SA2s with similar disaster resilience, or examine the relationships between index values and population characteristics.



The mapping function of the Australian Disaster Resilience Index, showing assessed capacity for resilience of Australian communities, ranging from low (dark purple) to high (dark green). Sourced from adri.bnhrc.com.au

Figure 3



A snapshot of Australia's current disaster resilience using the Index

Where people live makes a difference to disaster resilience

Disaster resilience in Australia is not uniformly distributed. The assessment of disaster resilience using the Australian Disaster Resilience Index shows that communities in Australia do not all have the same capacity for disaster resilience. Analysis of the distribution of disaster resilience in Australia revealed that:

- 32 per cent of the population live in areas with high capacity for disaster resilience
- 52 per cent of the population live in areas with moderate capacity for disaster resilience, and
- 16 per cent of the population live in areas with low capacity for disaster resilience.

Looking in more detail:

- Most of the population live in areas assessed as having moderate or high capacity for disaster resilience.
- Most areas of higher capacity for disaster resilience are located in metropolitan and inner regional Australia, with only three outer regional areas having high capacity for disaster resilience.
- No remote or very remote areas were assessed as having high capacity for disaster resilience.

The areas with high capacity for disaster resilience are not distributed evenly through metropolitan areas. Rather, these areas are usually clustered together, forming multiple pockets of higher capacity within the metropolitan area.

- Areas of higher capacity for disaster resilience comprise only 0.5 per cent of land surface area.
- Most areas of low capacity for disaster resilience are in outer regional, remote and very remote Australia (comprising about 435,000 people).
- Areas of lower capacity for disaster resilience comprise over 93 per cent of land surface area.
- Less than 10 per cent of metropolitan areas have lower capacity for disaster resilience, compared to almost 50 per cent in non-metro areas.
- Patterns of capacity for disaster resilience at the national level are generally, but not always, upheld in each state or territory.

This geographic pattern of disaster resilience echoes that found in social and economic assessments of education (ACARA, 2016), health (NRHA, 2016; AIHW, 2018), planning (Horney et al., 2017), employment (Hajkowicz et al., 2016) and income (NRHA & ACOSS, 2013; ACOSS & UNSW, 2018), where outer regional, remote and very remote areas generally experience poorer outcomes compared to metropolitan areas.



Understanding coping and adaptive capacity

In addition to an overall measure of resilience, the Index uses the eight sub-indices described in Appendix 1 to provide a snapshot of current coping and adaptive capacities within communities. The combinations of these capacities will differ between communities (that is, a community with a high overall resilience index does not necessarily have both high adaptive and high coping capacities).

The extent to which high levels of one capacity can compensate for lower levels of the other is not clear because the characteristics make different contributions throughout the disaster management cycle. Thus, a strength in either capacity is always considered advantageous.

The Index assesses current capacity combinations:

- 72 per cent of Australia's population (17.2 million people) live in areas assessed as having a combination of moderate or high coping and adaptive capacities. Communities with this combination often occur in highly populated areas—metropolitan or inner regional areas—and are supported by systems and social processes with enhanced capacities to anticipate and withstand unpredictable and adverse events, and to adjust to current and future predicted changes.
- 9 per cent of the population (1.6 million people) live in areas assessed as having a combination of low coping and adaptive capacities. Areas with this combination face constraints on their ability to anticipate and withstand unpredictable and adverse events, and to adjust to current or predicted change. These constraints may arise from the status of social, economic or government processes and the ways that these inhibit access to resources and opportunities, or the ability for flexibility and agility.
- Communities may also have a combination of strength in either the coping or adaptive capacity and a constraint in the other, with 21 per cent of the population (5 million people) living in areas with this combination.

Understanding the building blocks of disaster resilience in Australia

Each Australian community possesses a particular combination of factors that enhance or constrain its capacity for disaster resilience—a unique combination that differs from place to place. This generates a heterogeneous and complex picture of disaster resilience in Australia at a state/territory and national level.

Analysis of the distribution of the eight sub-index factors revealed:

- **Social character** often constrains the capacity for disaster resilience in Australia. Geographic distribution of the social character sub-index is mixed; however, lower values of the social character sub-index are concentrated in metropolitan and very remote areas.
- Australia has a mix of areas with higher and lower **economic capital**. All areas can experience constraints on disaster resilience associated with low economic capital. However, lower economic capital is most pronounced in remote and very remote areas, while higher economic capital is most pronounced in metropolitan and inner regional areas.
- **Emergency services** generally enable the capacity for disaster resilience in Australia. The emergency services sub-index is usually moderate to high, although considerable variation can still be found within and between regional and metropolitan areas.
- **Planning and the built environment** is not a significant barrier to the capacity for disaster resilience in Australia. The planning and the built environment sub-index is moderate to high in most areas of Australia, with the exception of some remote and very remote areas.
- Australia has a mix of areas with higher and lower **community capital**. Higher community capital tends to occur in regional areas. In cities, areas of higher and lower community capital are often clustered.

- **Information access** is a significant barrier to the capacity for disaster resilience in Australia, particularly in regional and remote areas.
- Many areas are associated with moderate **social and community engagement**. High social and community engagement is concentrated in metropolitan and inner regional areas, while low social and community engagement is concentrated in remote and very remote areas.
- Moderate to high **governance and leadership** is concentrated in metropolitan and inner regional areas. An increase in remoteness decreases governance and leadership capacities.

Further detail about the eight sub-index factors can be seen in Appendix 1.

Understanding the interconnectedness of different aspects of resilience

Lower disaster resilience is not always confined to outer regional, remote and very remote areas. Approximately 9.5 per cent of Australia's population (2.3 million people) live in metropolitan and inner regional areas that have a low capacity for disaster resilience. These communities are embedded within well-resourced, highly populated surrounding regions. For these communities, it is more likely that they will have social characteristics that work against disaster resilience outcomes, despite their metropolitan or inner regional location. Influencing these social characteristics, such as through length of residence, community cohesion and need for assistance, is generally beyond the focus of any one public agency or strategy and highlights the

essential need for connections between initiatives designed to increase resilience to disasters.

Outer regional, remote and very remote areas are generally associated with lower capacity for disaster resilience. These areas often face constraints from economic capital, planning and the built environment, emergency services, information access, and governance and leadership. However, metropolitan and inner regional areas are not exempt from these same constraints.

Remoteness can mean longer and more complex disaster recovery, increased post-disaster out-migration (moving out of the affected area), disruptive regional economic change, under-resourced or distant government services, and limited access to digital services and localised information. These outcomes reveal many opportunities for resilience-improving initiatives in remote areas.

Remoteness can also be associated with high levels of community cohesion and social capital, where community bonds may self-generate support and resources before, during and after emergencies. These strengths can be utilised in conjunction with resilience-improving initiatives to build on the capacity for resilience of remote areas.





Profiles of disaster resilience

Profiles of disaster resilience across Australia can be used to identify areas that have similar disaster resilience characteristics to each other—that is, areas that face the same strengths and constraints to disaster resilience.

The Australian Disaster Resilience Index identifies five groups, each with a distinct profile, which can be used to understand disaster resilience in local communities, as well as the strengths and opportunities for enhancing or improving disaster resilience in those areas. Each of the five groups include communities across Australia with the same profile—that is, the communities in these groups share similar strengths and constraints to disaster resilience:

- Areas in Group 1 are located across a mix of areas and jurisdictions. These areas are generally well-supported by government services, have good access to information and emergency services, and high economic capital. However, these areas have constrained community capital, social character, and social and community engagement.
- Areas in Group 2 are mostly inner regional, whose only constraint is poor access to information about natural hazards.
- Areas in Group 3 are mostly regional and remote. The resilience of these areas is strengthened by strong pro-social settings. However, communities with this profile face the most significant constraints, arising from reduced economic capital,

planning and the built environment, emergency services, information access, and governance and leadership.

- Most SA2s fall into Group 4, and these are largely in metropolitan Australia. In comparison to other groups, areas within Group 4 are best placed overall to cope with, and adapt to, complex change associated with natural hazards, with no significant barriers to resilience.
- Areas in Group 5 are predominantly metropolitan SA2s that are well-placed to adapt to complex change, although these areas have constraints that arise from social character and community capital.

Variation in the strengths and constraints on disaster resilience suggest that place-based strategies need to be applied to support the different dimensions of disaster resilience. It's important to note that, with minor variations, some place-based strategies may be transferable between areas with a similar resilience profile.

A summary of the five groups is included in Table 1 and a detailed analysis of each group can be found in Appendix 3.

	Profile group				
	Group 1	Group 2	Group 3	Group 4	Group 5
Disaster resilience strengths	Emergency services Economic capital Planning and the built environment Information access Governance and leadership	Social character Community capital Social and community engagement Economic capital Planning and the built environment Emergency services Governance and leadership	Social character Community capital Social and community engagement	Economic capital Information access Governance and leadership Social character Planning and the built environment Emergency services Community capital Social and community engagement	Planning and the built environment Governance and leadership Economic capital Emergency services Information access Social and community engagement
Disaster resilience constraints	Community capital Social and community engagement Social character	Information access	Economic capital Planning and the built environment Emergency services Information access Governance and leadership		Social character Community capital
Population^{**}	3,567,512	3,266,777	3,156,814	7,474,525	6,337,995
% population	15.0	13.7	13.3	31.4	26.6
Land area (km²)[^]	10,399	405,546	7,211,800	10,689	6,328
% land area[^]	0.1	5.3	94.3	0.1	0.1
Number of SA2s⁺	308	389	447	572	368
Metropolitan SA2s[§]	158 (13%)	125 (10%)	70 (6%)	495 (41%)	355 (30%)
Inner regional SA2s[§]	70 (15%)	204 (43%)	133 (28%)	59 (12%)	10 (2%)
Outer regional SA2s[§]	73 (24%)	55 (18%)	161 (52%)	17 (6%)	3 (1%)
Remote SA2s[§]	6 (13%)	4 (8%)	37 (77%)	1 (2%)	0 (0%)
Very remote SA2s[§]	1 (2%)	1 (2%)	46 (96%)	0 (0%)	0 (0%)

* Computed using ABS Estimated Resident population as of 30 June 2015.

Excludes SA2s not used in the Index. The population in SA2s used in the Index is 23,803,623 people. The population in SA2s not used in the Index is a further 12,372 people.

^ Excludes SA2s not used in the Index. The land area of SA2s used in the Index is 7,644,763km². The land area of SA2s not used in the Index is a further 43,047km².

+ Excludes SA2s not used in the Index. Of the 2214 SA2s in the ASGS 2011, 2,084 were used in the Index and 130 excluded.

§ ABS remoteness categories, ASGS 2011.

Summary of disaster resilience profiles in Australia.

Table 1



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Appendices

Appendix 1: Eight sub-index factors

Coping capacity comprises six sub-index factors, while adaptive capacity comprises two sub-index factors. For more detail about the raw data that was used to compute these factors, see Appendix 2.



Theme	Description	Relationship to disaster resilience
Coping capacity		
Social character 	<p>The social characteristics of the community.</p> <p>Represents the social and demographic factors that influence the ability to prepare for and recover from a natural hazard event.</p>	<p>Social and demographic factors have well-known influences on capacity to prepare for, respond to and recover from natural hazard events. These include household and family composition, age, sex, education, employment, disability, language and length of residence.</p>
Economic capital 	<p>The economic characteristics of the community.</p> <p>Represents the economic factors that influence the ability to prepare for and recover from a natural hazard event.</p>	<p>Economic capital can facilitate disaster resilience by reducing the losses from natural hazards. Economic resilience can contribute to the reduction of losses from natural hazards through improved mitigation and risk management, individual flexibility and adaptation, enhanced recovery, market continuity and business continuity.</p> <p>Losses from natural hazard events may increase with wealth, but increased potential for loss can also be a motivation for mitigation.</p> <p>High level of economic capital aligns with high levels of social capital.</p>
Emergency services 	<p>The presence, capability and resourcing of emergency services.</p> <p>Represents the potential to respond to a natural hazard event.</p>	<p>Emergency management is a core function of government.</p> <p>The capacity for emergency response is integral to community disaster resilience. Emergency management is also a key inclusion in policy guiding disaster resilience and disaster risk reduction.</p> <p>Increasing remoteness implies barriers to the provision of, and access to, services.</p>
Planning and the built environment 	<p>The presence of legislation, plans, structures or codes to protect communities and their built environment.</p> <p>Represents preparation for natural hazard events using strategies of mitigation, planning or risk management.</p>	<p>Considered land use planning is a core hazard mitigation strategy in built environments. Good planning policy is essential to reduce risk and enhance resilience. Good planning policy can also reduce future risk.</p> <p>Building codes set construction standards to reduce damage from natural hazard events.</p>
Community capital 	<p>The cohesion and connectedness of the community.</p> <p>Represents the features of a community that facilitate coordination and cooperation for mutual benefit.</p>	<p>Participation in social networks can enhance solutions to collective action problems.</p> <p>Disaster resilience is enhanced by the ways the sense of community fosters participation, community competency, pro-social behaviour and preparedness through working with others to solve shared local problems.</p> <p>Social capital facilitates disaster resilience before, during and after disasters, and is often highlighted in times of disaster because it is a resource that facilitates collective action for mutual benefit.</p>





Theme	Description	Relationship to disaster resilience
Coping capacity		
Information access 	<p>The potential for communities to engage with natural hazard information.</p> <p>Represents the relationship between communities and natural hazard information and the uptake of knowledge required for preparation and self-reliance.</p>	<p>Telecommunication and internet access are vital to information sharing through all phases of a disaster. As digital communication has become the default medium for everyday exchanges, information sharing and access to essential services, the disadvantages of being offline increase.</p> <p>Community engagement activities enable disaster resilience through public participation in decision making about natural hazards. Community engagement has been shown to have direct benefit for community resilience through capacity building, social connectedness and empowerment, self-reliance, education and training, awareness of risk and psycho-social preparation.</p>
Adaptive capacity		
Social and community engagement 	<p>The capacity within communities to adaptively learn and transform in the face of complex change.</p> <p>Represents the resources and support available within communities for engagement and renewal for mutual benefit.</p>	<p>Adaptive communities are able to manage complex change. Characteristics of adaptive communities include social engagement, trust, cooperation, learning and well-being.</p>
Governance and leadership 	<p>The capacity within organisations to adaptively learn, review and adjust policies and procedures, or to transform organisational practices.</p> <p>Represents the flexibility within organisations to learn from experience and adjust accordingly.</p>	<p>Adaptive institutions have conditions suited to the development of the skills, knowledge and culture for managing complex change. Enabling conditions include social learning, research, innovation, collaboration and leadership.</p> <p>Effective response to natural hazard events can be facilitated by long term design efforts in public leadership.</p>

Appendix 2: Indicators

These 77 indicators are the variables used to determine the status of a sub-index, and represent the raw data used to compute the Index.

Theme	Indicator
Coping capacity	
Social character 	% population arrived in Australia 2001 onwards
	% households with all or some residents not present a year ago
	% speaks English not well or not at all
	% population with a core activity need for assistance
	% one parent families
	% households with children
	% lone person households
	% group households
	Sex ratio
	% population aged over 75
	% population aged below 15
	Ratio of certificate/postgraduate educational attainment to Year 8-12 educational attainment
	% of labour force unemployed
	% not in labour force
	% employed as managers and professionals
Economic capital 	% residents owning their home outright
	% residents owning their home with a mortgage
	% residents renting their home
	Median weekly rent (\$)
	Median monthly mortgage repayment (\$)
	Median weekly personal income (\$)
	Median weekly family income (\$)
	% families with less than \$600 per week income
	% families with more than \$3,000 per week income
	% employment in largest single sector
	Economic Diversity Index
	% businesses employing 20 or more people



Theme	Indicator
Coping capacity	
Economic capital (cont.)	Retail and/or commercial establishments per 1,000 people
	% population change 2001 to 2011
	Local government grant per capita
Emergency services	Medical practitioners per 1,000 population
	Registered nurses per 1,000 population
	Psychologists per 1,000 population
	Welfare support workers per 1,000 population
	Available hospital beds per 1,000 population
	Ambulance officers and paramedics per 1,000 population
	Fire and emergency services workers per 1,000 population
	Police per 1,000 population
	Fire and emergency services and SES organisations funding per 1,000 population
	Ambulance organisations funding per 1,000 population
	Fire service volunteers per 1,000 population
	SES volunteers per 1,000 population
	Distance to medical facility (km)
Planning and the built environment	% caravan and improvised dwellings
	% residential dwellings built post 1981
	% commercial and industrial dwellings built post 1981
	Emergency planning assessment score
	Full-time equivalent council staff
	Council area per full-time equivalent council staff
	Number of dwellings per full-time equivalent council staff
	New dwellings (2012-2016) as a proportion of 2011 dwellings
	New dwellings per week (2015-2016)
	Planning assessment score


Theme	Indicator
Coping capacity	
Community capital 	Offences against person per 100,000 population
	Offences against property per 100,000 population
	Age standardised number of people per 100 population who feel safe walking in their neighbourhood
	Age standardised number of people per 100 population who are able to get support in times of crisis
	Age standardised number of people per 100 population whose household could raise \$2,000 in a week
	Age standardised number of people per 100 population who had difficulty accessing services
	% households with no motor vehicle
	Age standardised number of people per 100 population with fair or poor self-assessed health
	% residents in same residence for greater than 5 years
	% population undertaking voluntary work
	% jobless families
Information access 	% area with excellent or good ADSL coverage
	% area with mobile phone coverage
	Community engagement score
Adaptive capacity	
Social and community engagement 	% population with life satisfaction scale 70 and above
	% population with high generalised trust
	Migration effectiveness 2006-2011
	% population with post school educational qualification
	% population over 15 in further education
% participation in personal interest learning	
Governance and leadership 	Presence of research organisations
	Business Dynamo Index
	Local economic development support
	Emergency services governance, policy and leadership score




Appendix 3: Disaster resilience profiles


The themes that influence disaster resilience in different locations have been used to group areas with similar resilience profiles. Each profile group identifies SA2s with similar patterns of resilience. The typology of each group can be used to understand disaster resilience in local communities, and the strengths and opportunities for enhancing or improving disaster resilience.

Profile Group 1

Profile Group 1	
Number of SA2s	308
Mean ADRI value	0.4787
Approximate population and proportion of total	3.6 million 15%
Land area and proportion of total	10,399 km ² 0.1%
Location	SA2s in Group 1 are located across a mix of areas: metropolitan, inner regional, outer regional and remote.
Disaster resilience strengths 	Emergency services (High) <p>The presence, capability and resourcing of emergency services should enhance the capacity of these communities to respond to natural hazard events. While the combination of emergency services characteristics will vary across SA2s within the group, it is likely that most of these communities will have relatively high levels of emergency service volunteers, well-resourced ambulance services and good access to medical services.</p>
	Economic capital (Moderate) <p>These communities have some economic characteristics that support the capacity to prepare for, respond to and recover from natural hazard events, but may also have some economic characteristics that constrain this capacity. The combination of supporting and constraining economic characteristics will vary across SA2s within the group, but it is likely that communities will have mid-range proportions of renters and mid-range income levels. Their economies are likely to be only moderately diversified.</p>
	Planning and the built environment (Moderate) <p>These communities have some planning system and built environment characteristics that support their capacity to prepare for, respond to and recover from natural hazard events using strategies of mitigation, planning or risk management. However, there may also be some planning system and built environment characteristics that constrain this capacity. The combination of supporting and constraining planning and the built environment characteristics will vary across SA2s in the group, but it is likely that many communities will have a significant proportion of older buildings. Others with fewer older buildings may be constrained instead by emergency and other planning systems that could be improved to a higher standard.</p>
	Information access (Moderate) <p>These communities have some capacity to engage with natural hazard information and to access knowledge associated with natural hazard preparation, self-reliance and response. There may be some constraints on capacity arising from reduced telecommunications access.</p>

Profile Group 1	
Disaster resilience strengths (cont.)	Governance and leadership (Moderate) <p>These communities are associated with a governance environment that supports the capacity of organisations to adaptively learn, transform and adjust to complex change, including that related to natural hazards. However, the governance environment may also face some constraints on this capacity, associated with the need for improvement in research presence, innovation or agency agility, flexibility and adaptation.</p>
Barriers to disaster resilience 	Community capital (Low) <p>The cohesion and connectedness of these communities may constrain the capacity to coordinate and cooperate for mutual benefit, including preparing for, responding to and recovering from natural hazard events. The circumstances constraining this capacity will vary across SA2s in the group but are likely to arise from a high incidence of crime, low community safety and other factors that limit social support and community participation. The level of volunteering activity is also likely to be low.</p>
	Social and community engagement (Low) <p>These communities have constrained capacity to adaptively learn and transform in response to complex change, including that associated with natural hazards. The characteristics constraining capacity will vary across SA2s in the group but are most likely to arise from low levels of past and present participation in education. Some communities may also be constrained by high levels of population turnover.</p>
	Social character (Low) <p>These communities have social and demographic characteristics that may constrain their capacity to prepare for, respond to and recover from natural hazard events. The circumstances limiting this capacity will vary, but it is likely that many of these communities will have lower levels of education, employment and English language proficiency. Further constraints on capacity may come from a higher need for assistance and a relatively higher proportion of the working population in occupations other than management and professional occupations.</p>

Profile Group 2

Profile Group 2	
Number of SA2s	389
Mean ADRI value	0.5731
Approximate population and proportion of total	3.3 million 14%
Land area and proportion of total	405,546 km ² 5.3%
Location	SA2s in Group 2 are predominantly inner regional, but also contain a moderate proportion of outer regional and metropolitan SA2s.
Disaster resilience strengths 	Social character (High) <p>These communities have social and demographic characteristics that should enhance the capacity to prepare for, respond to and recover from natural hazard events. In general, enhanced capacity comes from higher levels of education, employment and English language proficiency and a somewhat lower need for assistance.</p>



Profile Group 2

Disaster resilience strengths (cont.)

Community capital (High)

The cohesion and connectedness of these communities should enhance the capacity to coordinate and cooperate for mutual benefit, including preparing for, responding to and recovering from natural hazard events. These communities are likely to have low crime rates, and be safe, supportive and relatively well-off neighbourhoods with significant levels of community participation activity such as volunteering.

Social and community engagement (High)

These communities have enhanced capacity to adaptively learn and transform in response to complex change, including that associated with natural hazards. The enhanced capacity of these communities for learning and transformation may arise through high levels of past participation in education, high life satisfaction and a stable population.

Economic capital (Moderate)

These communities have some economic characteristics that support the capacity to prepare for, respond to and recover from natural hazard events, but may also have some economic characteristics that constrain this capacity. The combination of supporting and constraining economic characteristics will vary across SA2s within the group, but it is likely that communities will have mid-range proportions of renters and mid-range income levels. Their economies are likely to be only moderately diversified.

Planning and the built environment (Moderate)

These communities have some planning system and built environment characteristics that support their capacity to prepare for, respond to and recover from natural hazards using strategies of mitigation, planning or risk management. However, there may also be some planning system and built environment characteristics that constrain this capacity. The combination of supporting and constraining planning and the built environment characteristics will vary across SA2s in the group, but it is likely that many communities will have a significant proportion of older buildings. Others with fewer older buildings may be constrained instead by emergency and other planning systems that could be improved to a higher standard.

Emergency services (Moderate)

Some characteristics of emergency services supports the capacity of these communities to respond to natural hazard events, while other emergency services characteristics may constrain this capacity. The combination of supporting and constraining emergency services characteristics will vary across SA2s within this group, but most communities are likely to have high levels of emergency services volunteers and well-resourced ambulance organisations. Capacity to respond to natural hazard events may be constrained by poorer access to medical services.

Governance and leadership (Moderate)

These communities are associated with a governance environment that supports the capacity of organisations to adaptively learn, transform and adjust to complex change, including that related to natural hazards. However, the governance environment may also face some constraints on this capacity, associated with the need for improvement in research presence, innovation or agency agility, flexibility and adaptation.



Barriers to disaster resilience



Information access (Low)

These communities have constrained capacity to engage with natural hazard information and to access knowledge associated with natural hazard preparation, self-reliance and response. The main characteristic contributing to reduced capacity is limited telecommunications access.


Profile Group 3

Profile Group 3	
Number of SA2s	447
Mean ADRI value	0.3717
Approximate population and proportion of total	3.2 million 13%
Land area and proportion of total	7,211,800 km ² 94.3%
Location	Most of the SA2s in Group 3 are inner regional and outer regional. Group 3 also contains the majority (96%) of remote and very remote SA2s.
Disaster resilience strengths 	<p>Social character (Moderate)</p> <p>These communities have some social and demographic characteristics that support the capacity to prepare for, respond to and recover from natural hazard events, but may also have some social and demographic characteristics that constrain this capacity. The combination of supporting and constraining social and demographic characteristics will vary across SA2s within the group, but it is likely that communities will have mid-range levels of education, employment and English language proficiency.</p> <p>Community capital (Moderate)</p> <p>The cohesion and connectedness of these communities supports the capacity to coordinate and cooperate for mutual benefit, including preparing for, responding to and recovering from natural hazard events. However, there may be some community capital characteristics that constrain this capacity. The combination of supporting and constraining circumstances will vary across SA2s in the group, but capacity may be constrained by mid-range crime rates, slightly less supportive and well-off neighbourhoods, and lower levels of volunteering.</p> <p>Social and community engagement (Moderate)</p> <p>These communities have some capacity to adaptively learn and transform in response to complex change, including that associated with natural hazards, but may also face some constraints on this capacity. While the characteristics supporting and constraining capacity will vary across SA2s in the group, these communities can be expected to have mid-range levels of in and out migration, suggesting a slightly less stable population.</p>
Barriers to disaster resilience 	<p>Economic capital (Low)</p> <p>These communities have economic characteristics that may constrain their capacity to prepare for, respond to and recover from natural hazard events. The circumstances limiting this capacity will vary, but it is likely that these communities will have relatively high proportions of rental households and low-income households, resulting in a limited capacity to buffer external financial shocks. In many cases, this will be exacerbated by an economy dominated by a single industry sector.</p> <p>Planning and the built environment (Low)</p> <p>Planning systems and the character of the built environment may constrain the capacity of these communities to prepare for natural hazard events using strategies of mitigation, planning or risk management. While the characteristics constraining this capacity will vary across SA2s in the group, most communities are likely to have a predominance of older building stock and relatively more people residing in caravans or improvised dwellings.</p>



Profile Group 3	
Barriers to disaster resilience (cont.)	<p>Emergency services (Low)</p> <p>These communities have emergency services characteristics that may constrain their capacity to respond to natural hazard events. Constraint largely arises because of remoteness, which limits the availability of emergency and other services. Due to other sources of disadvantage, these communities may have a greater presence of welfare support workers and police, but these positive aspects of response capacity are offset by their very limited access to medical services.</p>
	<p>Information access (Low)</p> <p>These communities have constrained capacity to engage with natural hazard information and to access knowledge associated with natural hazard preparation, self-reliance and response. The main characteristic contributing to reduced capacity is limited telecommunications access.</p>
	<p>Governance and leadership (Low)</p> <p>These communities are associated with a governance environment that may be limited by the capacity of organisations to adaptively learn, transform and adjust to complex change, including that related to natural hazards. The characteristics constraining capacity will vary across SA2s in the group, but it is likely that these communities do not have the benefit of research organisation presence and innovative commercial firms. Levels of local economic development support may also be limited.</p>

Profile Group 4

Profile Group 4	
Number of SA2s	572
Mean ADRI value	0.7020
Approximate population and proportion of total	7.5 million 31%
Land area and proportion of total	10,689 km ² 0.1%
Location	SA2s in Group 4 are predominantly metropolitan, but also contain a small proportion of inner regional SA2s.
<p>Disaster resilience strengths</p> 	<p>Economic capital (High)</p> <p>These communities have economic characteristics that should enhance the capacity to prepare for, respond to and recover from natural hazard events. The enhanced capacity of these communities arises through access by individuals and households to greater economic resources. This will occur where fewer households are paying rent and income levels are higher. Enhanced capacity also derives from a diversified economy.</p> <p>Information access (High)</p> <p>These communities have enhanced capacity to engage with natural hazard information and to access knowledge associated with natural hazard preparation, self-reliance and response. Generally, this enhanced capacity will be associated with good telecommunications access and, to a lesser extent, engagement in hazard education.</p>

Profile Group 4

Disaster resilience strengths (cont.)

Governance and leadership (High)

These communities are associated with a governance environment that should enhance the capacity of organisations to adaptively learn, transform and adjust to complex change, including that related to natural hazards. Enhanced capacity may be contributed by the presence of research organisations and innovative commercial firms, and an emergency services sector with a capacity for agility, flexibility and adaptation.

Social character (Moderate)

These communities have some social and demographic characteristics that support the capacity to prepare for, respond to and recover from natural hazard events, but may also have some social and demographic characteristics that constrain this capacity. The combination of supporting and constraining social and demographic characteristics will vary across SA2s within the group, but it is likely that communities will have mid-range levels of education, employment and English language proficiency.

Planning and the built environment (Moderate)

These communities have some planning system and built environment characteristics that support their capacity to prepare for, respond to and recover from natural hazard events using strategies of mitigation, planning or risk management. However, there may also be some planning system and built environment characteristics that constrain this capacity. The combination of supporting and constraining planning and the built environment characteristics will vary across SA2s in the group, but it is likely that many communities will have a significant proportion of older buildings. Others with fewer older buildings may be constrained instead by emergency and other planning systems that could be improved to a higher standard.

Emergency services (Moderate)

Some characteristics of emergency services supports the capacity of these communities to respond to natural hazard events, while other emergency services characteristics may constrain this capacity. The combination of supporting and constraining emergency services characteristics will vary across SA2s within this group, but most communities are likely to have high levels of emergency services volunteers and well-resourced ambulance organisations. Capacity to respond to natural hazard events may be constrained by poorer access to medical services.

Community capital (Moderate)

The cohesion and connectedness of these communities supports the capacity to coordinate and cooperate for mutual benefit, including preparing for, responding to and recovering from natural hazard events. However, there may be some community capital characteristics that constrain this capacity. The combination of supporting and constraining circumstances will vary across SA2s in the group, but capacity may be constrained by mid-range crime rates, slightly less supportive and well-off neighbourhoods, and lower levels of volunteering.

Social and community engagement (Moderate)


These communities have some capacity to adaptively learn and transform in response to complex change, including that associated with natural hazards, but may also face some constraints on this capacity. While the characteristics supporting and constraining capacity will vary across SA2s in the group, these communities can be expected to have mid-range levels of in and out migration, suggesting a slightly less stable population.

Barriers to disaster resilience

No themes classed as low



Profile Group 5

Profile Group 5	
Number of SA2s	368
Mean ADRI value	0.5731
Approximate population and proportion of total	6.3 million 27%
Land area and proportion of total	6,328 km ² 0.1%
Location	The majority of SA2s in Group 5 are located in metropolitan areas.
Disaster resilience strengths 	<p>Planning and the built environment (High)</p> <p>Planning systems and the character of the built environment should enhance the capacity of these communities to prepare for natural hazard events using strategies of mitigation, planning or risk management. While the combination of planning and built environment characteristics may vary across SA2s within the group, most of these communities are likely to have newer residential and commercial or industrial buildings, and high standards of emergency and other planning systems. Many of these communities will also be in well-resourced local government areas.</p> <p>Governance and leadership (High)</p> <p>These communities are associated with a governance environment that should enhance the capacity of organisations to adaptively learn, transform and adjust to complex change, including that related to natural hazards. Enhanced capacity may be contributed by the presence of research organisations and innovative commercial firms, and an emergency services sector with a capacity for agility, flexibility and adaptation.</p> <p>Economic capital (Moderate)</p> <p>These communities have some economic characteristics that support the capacity to prepare for, respond to and recover from natural hazard events, but may also have some economic characteristics that constrain this capacity. The combination of supporting and constraining economic characteristics will vary across SA2s within the group, but it is likely that communities will have mid-range proportions of renters and mid-range income levels. Their economies are likely to be only moderately diversified.</p> <p>Emergency services (Moderate)</p> <p>Some characteristics of emergency services support the capacity of these communities to respond to natural hazard events, while other emergency services characteristics may constrain this capacity. The combination of supporting and constraining emergency services characteristics will vary across SA2s within this group, but most communities are likely to have high levels of emergency services volunteers and well-resourced ambulance organisations. Capacity to respond to natural hazard events may be constrained by poorer access to medical services.</p> <p>Information access (Moderate)</p> <p>These communities have some capacity to engage with natural hazard information and to access knowledge associated with natural hazard preparation, self-reliance and response. There may be some constraints on capacity arising from less than universal telecommunications access.</p> <p>Social and community engagement (Moderate)</p> <p>These communities have some capacity to adaptively learn and transform in response to complex change, including that associated with natural hazards, but may also face some constraints on this capacity. While the characteristics supporting and constraining capacity will vary across SA2s in the group, these communities can be expected to have mid-range levels of in and out migration, suggesting a slightly less stable population.</p>

Profile Group 5

Barriers to disaster resilience



Social character (Low)

These communities have social and demographic characteristics that may constrain their capacity to prepare for, respond to and recover from natural hazard events. The circumstances limiting this capacity will vary, but it is likely that many of these communities will have lower levels of education, employment and English language proficiency. Further constraints on capacity may come from a higher need for assistance and a relatively higher proportion of the working population in occupations other than management and professional occupations.

Community capital (Low)

The cohesion and connectedness of these communities may constrain the capacity to coordinate and cooperate for mutual benefit, including preparing for, responding to and recovering from natural hazard events. The circumstances constraining this capacity will vary across SA2s in the group but are likely to arise from a high incidence of crime, low community safety and other factors that limit social support and community participation. The level of volunteering activity is also likely to be low.



The Australian Disaster Resilience Index is a snapshot of the **capacities for disaster resilience** in Australian communities.



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