

KEY HAZARDS & RISKS SUMMARY

(February 2020)

SOUTH AUSTRALIA



Light Square



Government of
South Australia

This project was funded under the Natural Disaster Resilience Program by the South Australian State Government and the Commonwealth Department of Home Affairs.

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PUBLISHED FEBRUARY 2020

This project was funded under the Natural Disaster Resilience Program by the South Australian State Government and the Commonwealth Department of Home Affairs.

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FOREWORD

Across South Australia there are a range of hazards that can have significant impact on people's health and wellbeing, along with severe impacts to the State's economy, the environment, and our communities.

Fortunately the emergencies and disasters we generally experience are generally not at the same frequency or scale as other States and Territories.

Research by Handmer, Ladds and Magee¹ estimates that between 1967 and 2013, South Australia sustained total losses of approximately \$5 billion (i.e. 3.2% of national losses). This assessment included the significant 1992 Adelaide Hills floods, and the 1980 and 1983 Ash Wednesday bushfires.

In 2017, the Australian Business Roundtable noted that "Today, based on the history of natural disasters over the past 50 years, the total economic cost of natural disasters in SA is estimated to be \$200m per year. The cost in SA is forecast to reach \$700m a year by 2050".²

Since 2013, other significant events have impacted South Australia, including the 2015 Sampson Flat and Pinery bushfires and the extreme weather event that caused the State-wide black system event in September/October 2016.

The 2019-2020 bushfire season saw multiple significant bushfires occur across the State including the Cudlee Creek and Kangaroo Island bushfires. By early February 2020 over 265,000 ha had been burnt resulting in 3 fatalities and the loss of 188 houses, 60,000 livestock and large numbers of wildlife.

This document does not address day-to-day emergencies that are managed by response agencies (such as a house fire, road crash rescue or ambulance response to an individual), but has a clear focus on large scale emergencies requiring cross agency cooperation and provision of government support to assist community recovery.

This document provides a snapshot of high impact hazards and associated risks, and supports eleven Emergency Management Zone (regional) Key Hazards and Risks Summaries that provide specific information on the natural disasters and hazards identified relevant to each zone.

As a nation, we are striving to meet the potential impacts of severe to catastrophic disasters. As a State, we all need to participate in preparing for and mitigating emergency events. Building resilience in the community is key to minimising risk and increasing our ability to respond and recover from these events.

Dominic Lane

Chief Executive
SA Fire and Emergency Services Commission

¹ Handmer J, Ladds M, and Magee L, 2016. Disaster losses from natural hazards in Australia, 1967-2013. *(Note, this study was limited to events that caused estimated losses of at least \$10 million, therefore excluding many smaller events that have caused death, injury and losses.)*

² Australian Business Roundtable "Building resilience to natural disasters in our states and territories" November 2017

SOUTH AUSTRALIA IN FOCUS



People

1.73 million people

Average age is **40** years

17.5 % are children aged 0-14 years

18.2% are aged over 65 years

83.4% of South Australians live in the greater Adelaide Planning region



Environment

1,043,514 square kilometres of land mass

3,816 km of mainland coastline plus **1,251 km** island length

5 major deserts

27 prominent natural lakes and lagoons

6 wetlands of international importance



Social setting / community

60 towns and cities with a population greater than 1,000 people

273,321 people speak a language other than English at home

3,392 people speak an Australian Indigenous Language

Top 5 non-English languages

Italian
Mandarin
Greek
Vietnamese
Persian / Dari

Growing ancestries

Chinese (0.8%)
Indian (0.7%)
Irish / Scottish (0.4%)
Vietnamese / Filipino (0.2%)

Growing religions

Hinduism (0.5%)
Christian (nfd) (0.5%)
Islam (0.5%)
Buddhism (0.1%)



Economy

\$107.4 billion

Gross State Product annually

143,542 registered businesses

98% businesses have less than 19 employees

Major industries

Health care
Retail
Manufacturing
Education/training
Public administration

Top 5 occupations

Professionals
Clerical / administrative
Technicians & trades
Managers
Community & personal service

47,000 km of arterial road network

1.36 million registered motor vehicles

75 million passengers on metropolitan public transport network annually

7 million visitors annually

33.5 million Visitor nights annually

\$6.9 billion spent by visitors annually

ZONE KEY HAZARDS AND RISKS SUMMARIES

The *2011 National Strategy for Disaster Resilience* recognised that Australians need to better understand risks relevant to their community and prepare for potential impacts.

South Australia has been divided into 11 Emergency Management Zones based on State Government Regions.

Zone Emergency Management Plans were produced for each zone by State and Local governments based on risk assessments conducted with stakeholders from government agencies and non-government organisations, using the *National Emergency Risk Assessment Guidelines*. Workshop participants used realistic hazard scenarios to assess the risks which were most likely to occur and have the greatest impacts in their zone.

These are detailed in each zone's *Key Hazards and Risks Summary* which are available on the SES website:

https://www.ses.sa.gov.au/site/community_safety/community_engagement/key_hazards_risks_summary_for_zones.jsp



HAZARD IMPACT CATEGORIES

In this report, hazards are assessed in the impact categories of people, the state's economy, environment, and social setting (i.e. community).



People impacts describe deaths and injuries, including psychological effects, as a direct result of the emergency event, relative to the population being considered.



Economic impacts include financial and economic losses resulting directly from damage due to the emergency event. Dollar-value financial losses can be measured as direct and indirect, and tangible and intangible.



Environmental impacts include loss of species and landscapes, and loss of environmental value, as a result of the emergency event.



Social setting / Community impacts are concerned with the effect on communities from the emergency event, as distinct from the individual impacts assessed in the people criteria.

The consequences are concerned with the effect on communities as a whole, such as the diffusion of community activities in the local area, breakdown of community organisations and structures, and a permanent reduction in the community.

SOUTH AUSTRALIAN STATE HAZARDS

Over the past 10 years, risk assessments have been conducted on the State's key hazards using *AS/NZS 4360 Risk management*, *ISO 31000 Risk management*, and the *National Emergency Risk Assessment Guidelines (NERAG)*.

A hazard is a source of potential harm, or a situation that can cause loss.

The *State Emergency Management Committee* has identified a range of hazards that have the potential to cause significant impacts.

Animal and plant disease

Black system event

Bushfire

Earthquake

Escape of hazardous materials

Flood

Heatwave

Human disease

Storm

Structure fire

Hazards are reviewed periodically, and can be added or removed as a State Hazard. For example:

- Riverbank collapse was added in 2009 after drought conditions saw River Murray levels drop by 1.5 metres below Lock 1, and removed in 2015 after river flows and pool levels returned to normal;
- Black System Event was added after the September 2016 state-wide power outage; and
- Cyber Crisis has been identified as an emerging risk and is being considered by the State Emergency Management Committee for inclusion as a State Hazard.

DISASTER RISK REDUCTION

In 2015, Australia became a signatory to the international *Sendai Framework for Disaster Risk Reduction 2015-2030*. The Commonwealth, States and Territory Governments developed and endorsed in 2018 the following two frameworks:

- *National Disaster Risk Reduction Framework* – which outlines a national comprehensive approach to proactively reducing risk now, and into the future, and
- *Australian Disaster Preparedness Framework* - a guideline to develop the capabilities required to manage severe to catastrophic disasters.

Each of the State Hazards has specific agencies – known as **Hazard Leaders** and **Control Agencies** – assigned to manage and lead response when an emergency occurs.

HAZARD LEADER

An agency of the Government of South Australia which has knowledge, expertise and resources, to provide leadership for emergency management planning for an appointed hazard.

It is not necessarily the case that the Hazard Leader is the Control Agency as these roles may be split based on the respective agency resources and expertise.

Role

- Bring together all agencies of government and any required Commonwealth, local or non-government entities to undertake comprehensive planning processes relating to its assigned Hazard
- Prepare, review and maintain a hazard plan for their assigned hazard
- Review other plans to ensure that all aspects of their assigned hazard have been addressed
- Work with the various Sub-Committees, Control Agencies, Support Agencies, and Functional Support Groups to ensure that all aspects of the state's approach to a hazard, including mitigation, response and recovery measures, are coordinated.

CONTROL AGENCY

An agency assigned under legislation (or the State Emergency Management Plan) to perform the function of exercising control of an emergency.

Role

- Take control of the response
- Ensure a safe working environment
- Ensure effective liaison, communication and cooperation
- Continually assess the situation, identify risks and share information with all involved
- Develop and share plans and strategies
- Implement and monitor incident action plans
- Ensure the effective allocation of available resources
- Ensure the public is adequately informed and warned
- Facilitate investigation of the emergency and review of response activities
- Coordinate the transition from response to recovery

CLIMATE CHANGING OUR WORLD

Climate change is already happening and further change is inevitable. The effects of a changing climate affect most sectors of the environment, economy and community.

The failure of climate-change mitigation and adaptation has been identified by the World Economic Forum's *Global Risks Report 2019* as the second most important global risk in terms of likelihood and impact.

FIVE MOST LIKELY GLOBAL RISKS:

- Extreme weather events
- Failure of climate-change mitigation and adaptation
- Natural disasters
- Data fraud or theft
- Cyber attacks

FIVE MOST IMPACTFUL GLOBAL RISKS:

- Weapons of mass destruction
- Failure of climate-change mitigation and adaptation
- Extreme weather events
- Water crises
- Natural disasters

In South Australia, climate change is already apparent over a range of time-scales:

Since 1910, average surface air temperature and surrounding sea surface temperature has warmed by around one degree Celsius.

Since 1965, sea levels along our coast have risen by between 1.5 and 4 mm per year.

Since 1990, annual rainfall between April and October has reduced by 10 to 40 mm per decade across some southern agricultural areas.

The Department for Environment and Water (DEW) is supporting the [Premier's Climate Change Council](#) to establish a new across agency climate change strategy for South Australia and to develop a blue carbon strategy for South Australia in collaboration with government agencies and other stakeholders. More information can be found here:

<https://www.environment.sa.gov.au/topics/climate-change>

Future climate change may include:



Average temperatures in South Australia are projected to increase by between 1.0 and 2.1 degrees by 2050.



Sea levels across South Australia are projected to rise by 22 to 25 cm by 2050. This will raise the height of coastal sea level events related to high tides and storm surges, resulting in more frequent floods and increased coastal erosion.



ANIMAL AND PLANT DISEASE

The Department of Primary Industries and Regions South Australia (PIRSA) is the designated Hazard Leader and Control Agency.

Animal and plant diseases are defined under legislation (and the *Emergency Plant Pest Response Deed*, or *Emergency Animal Disease Response Agreement*) including:

- *Fisheries Management Act 2007* (e.g. emergency aquatic (marine and freshwater) pests)
- *Livestock Act 2007* (e.g. emergency animal diseases, and emergency aquatic animal diseases)
- *Natural Resources Management Act 2004* (e.g. pests, and some invasive vertebrate pests and weeds)
- *Plant Health Act 2009* (e.g. emergency plant pests/diseases)

Biosecurity means:

“protecting the economy, environment, and the community from the negative impacts of pests, disease, weeds, and contaminants.”

It includes trying to prevent new pests and diseases from establishing, through early detection, and helping to control outbreaks when they do occur.

POTENTIAL IMPACTS



Physical injury, illness or death from exposure to physical, biological or chemical hazards, and threat to mental health and wellbeing from any losses or impacts experienced.



Disruption to economic activity, potential for significant loss of local and export trade earnings, reputational damage, and loss of long-term market share.



Contamination of soil and waterways, loss of animal or plant species in local area, and elevated risk of large-scale waste disposal requirements.



Response-related quarantine or movement control measures, and long-term recovery issues related to business viability, local economy, employment migration or loss of major industry / employer.

For more information regarding Animal and Plant Disease visit:

www.sa.gov.au/topics/emergencies-and-safety/types/animal-and-plant-disease

HISTORICAL EVENTS

August 2007: A large Equine Influenza outbreak, associated with imported horses, was experienced in New South Wales and Queensland, with nearly 10,000 properties affected during the epidemic. In South Australia, it resulted in a two-week, state-wide horse standstill order, replaced with a risk-based permit system for horse events.

Late 2014: The Giant Pine Scales (insect) is an exotic plant pest that was detected in three pine tree species, and posed a threat to Australia's softwood plantation industry, parks, forests and residential properties. A national response plan was unable to eradicate the pest in Victoria. In October 2016, without an effective chemical treatment, a management program was implemented.

February 2016: Pacific Oyster Mortality Syndrome (disease) causes cumulative mortalities to oysters within 10 days. When the disease was confirmed in Tasmania, from where South Australia imports most of its oyster spat, PIRSA conducted extensive sample testing across the state, and a Notice of Prohibition on the entry of live oysters remains in place until March 2020. Surveillance indicates that South Australia remains free of the disease, however the industry impacts included job losses and a significant reduction in sales for more than 24 months.

Climate change factors that influence the occurrence of this hazard:

- Higher average temperatures
- Fewer frosts
- Warmer water temperatures
- Increased temperature and/or acidity of oceans

KEY RISKS FOR SOUTH AUSTRALIA

The \$22.3b Agriculture, Food and Wood industry is at risk from more than 285 exotic pests or diseases of consequence. Outbreaks can result from a number of circumstances such as:

- Zoonotic transmission (i.e. human to animal)
- Vector borne (e.g. biting insects)
- Mitigation program failure
- Intentional introduction (e.g. illegal introduction of prohibited items)
- Bioterrorism
- Contaminated feed
- In/on packaging of imported goods
- On the footwear or clothing of travellers
- Bio-fouling on ships or in ballast water
- Escape or release of species (e.g. from aquarium trade)

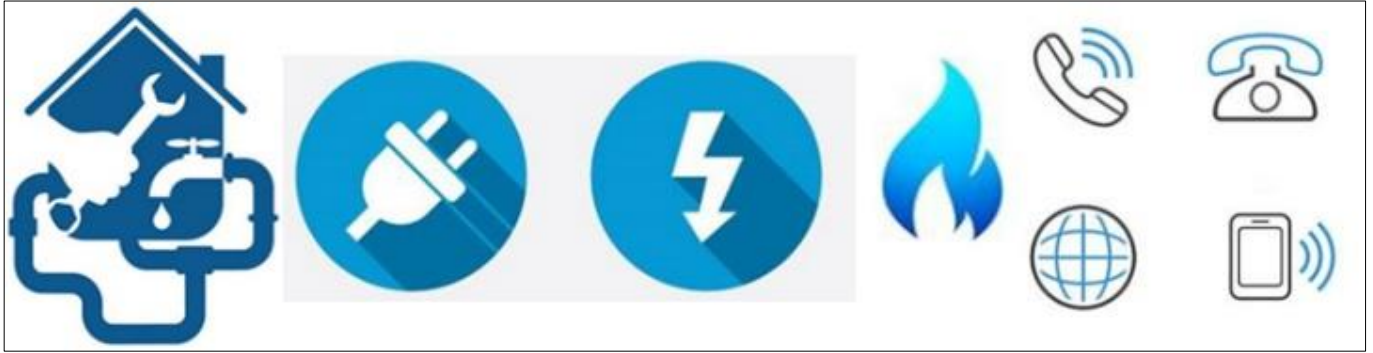
Impacts may vary in scale due to specific environmental requirements of the pest/disease, host density, weather conditions, and timing of detection, and therefore may be experienced on a local, state or national level.

PIRSA actively:

- Undertakes prevention, surveillance and eradication activities to keep animal and plant pests out of the state
- Develops partnerships with government, industry and community to implement biosecurity risk management strategies where eradication is not achievable

Community resilience improves with:

- Early detection and reporting of unusual pests, disease symptoms or weeds



BLACK SYSTEM EVENT

South Australia Police (SAPOL) is the designated Hazard Leader and Control Agency for a black system event (i.e. large-scale power outage).

The Department for Energy and Mining (DEM) is the designated Control Agency for electricity shortages (e.g. normal day-to-day outages).

A Black System Event is defined as:

“The absence of voltage on all or a significant part of the transmission system or within a region during a major supply disruption affecting a significant number of customers.”

A black system event can include:

- An outage affecting the whole of the South Australian National Energy Market region
- All local generation trips and every on-grid electrical device shuts off (including traffic and street lights buildings, industry and residences). Only sites with uninterruptible power supplies or back-up generators will retain power to the extent those redundancies permit
- Requires a system restart of local generation
- Requires incremental load restoration.

POTENTIAL IMPACTS



Physical injury, illness or death to vulnerable people (e.g. aged, unwell, reliant on life-support devices, heating or cooling) from loss of power and/or lack of back-up arrangements, and threat to mental health and wellbeing from any losses or impacts experienced.



Disruption to economic activity, loss of state revenue, and elevated risk of financial hardship for business and industry.



Clashing power lines may cause fires in native vegetation, forests, parks and reserves.



Short-term interruption to community functionality and morale (e.g. sporting events, community gatherings, commercial services).

For more information on how to minimise the impact to you and your family, visit:

<https://www.sa.gov.au/topics/energy-and-environment/energy-supply/electricity-power-outages>

HISTORICAL EVENTS

September 2016: A major storm resulting in 80,000 lightning strikes, large hailstones, heavy rain, and destructive winds (including 190-260 km/h tornadoes), caused damage to 23 transmission towers in the Mid North region, affecting three of the four interconnectors connecting Adelaide to the north and west of the state. This triggered a late-afternoon, state-wide power outage. Power was progressively restored to 40% of customers within three hours, and 80-90% with eight hours, and the last of the remaining customers had power restored 14 days later. A Business SA survey estimated the cost of the blackout to the state to be about \$367m, which would have been higher had it occurred earlier in the day.

December 2016: Severe storms caused damage to more than 350 distribution network power lines, resulting in 155,000 properties losing power for upwards of 12 hours in the Adelaide Hills, Mid North, Flinders Ranges, and Murraylands. About 1,600 households in the Adelaide Hills were without power for more than 80 hours.

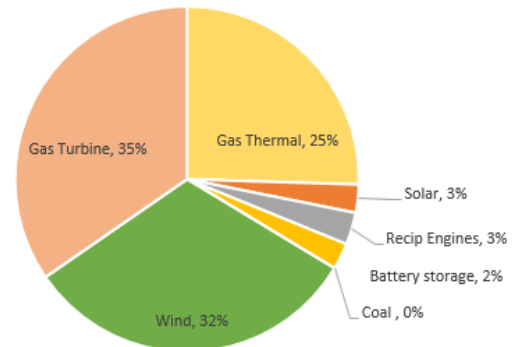
February 2017: More than 90,000 households in Adelaide lost power for 45 minutes in the middle of a major heatwave. This occurred when AEMO did not receive sufficient bids from generators to provide power to cope with an evening peak demand. Approximately 100 MW was shed to avoid potential damage to network equipment, and maintain the security of the power system.

Climate change factors that influence the occurrence of this hazard:

- Increased risk of extreme heat may overload components in the electricity transmission and distribution networks
- More frequent heatwaves may place greater demand on electricity generation
- Increased intensity of storm events may damage components in the transmission and distribution networks

South Australia is a region within the National Energy Market (NEM), which is operated by the Australian Energy Market Operator (AEMO). Interruptions can occur at:

- Interconnectors at Heywood and Murraylink connect South Australia to the national grid.
- Power generation sites, which includes various generation types:



- Transmission network of 5,591 km, and
- Distribution network of 87,999 km (including 71,177 km overhead and 16,822 km underground).

SA Police actively:

- Review risk based on ongoing changes to the electrical network in SA
- Address issues identified by the Burns inquiry
- Reinforce the need for good business continuity practices for all community and business members as well as government

Community resilience improves with:

- Being self-sufficient for at least 72 hours at home and at work
- Having an emergency kit available for you and your family



BUSHFIRE

The South Australian Country Fire Service (CFS) is the designated Hazard Leader and Control Agency for Bushfire.

The Australasian Fire and Emergency Services Authorities Council (AFAC) defines bushfire as:

“An unplanned vegetation fire. A generic term which includes grass fires, forest fires and scrub fires.”

In South Australia, a bushfire is:

“the combination of environmental factors which influence fire behaviour in a non-urban setting and includes factors such as topography, aspect, vegetation constituting fuel, fuel quantity and arrangement, that in combination with human settlement may cause harm to people or damage to property or the environment.”

POTENTIAL IMPACTS



Physical injury, illness or death from flames or smoke whilst attempting to combat the fire, shelter-in-place, perform a rescue, or attempt an evacuation, and threat to mental health and wellbeing from any losses or impacts experienced.



Damage to, or loss of, homes, public buildings, businesses, utilities infrastructure (e.g. gas, water, electricity, communications), crops, livestock and interruption to local economy (e.g. businesses and industries).



Destroy native vegetation, injure or kill wildlife, contribute to loss of habitat/species, and elevated soil erosion risk.



Initial recovery and long-term reconstruction to rebuild damaged properties, infrastructure and local economy, restoration of local community services, and recovery of local environment.

For information on how to minimise the impact to you and your family or business, visit:

<https://www.sa.gov.au/topics/emergencies-and-safety/types/bushfire>

HISTORICAL EVENTS

February 1980: Ash Wednesday I bushfire, burnt 4,770 hectares, resulting in 40 injuries, and destroyed 76 homes or other buildings. Insured costs estimated at \$132m ^{2011 value}.

February 1983: Ash Wednesday II bushfire, burnt 200,000 hectares, resulting in 28 deaths, 1,500 injuries, and destroyed 283 houses. Insured costs estimated at \$308m ^{2011 value}.

January 2005: Wangary bushfire, burnt 78,000 hectares, resulting in 9 deaths, 115 injuries, and destroyed 93 homes and 316 farm sheds. Insured costs estimated at \$41m ^{2011 value}.

January 2014: Eden Valley bushfire, burnt 25,000 hectares, destroyed 4 homes and hundreds of kilometres of fencing, and killed livestock and native animals.

January 2014: Bangor bushfire, burnt 35,000 hectares, destroyed 5 homes, killed 700 sheep, burnt for more than 30 days.

January 2015: Sampson Flat bushfire, burnt 20,000 hectares, resulting in 134 injuries and damaged 167 buildings. More than 3,500 firefighters responded (including support from New South Wales and Victoria). Damage was estimated at \$13m.

November 2015: Pinery bushfire, burnt 86,000 hectares, resulting in 2 deaths and 90 injuries, and damaged 470 buildings and 18,000 sheep and 87 cattle were killed. Losses also included unharvested production losses of 60,000 tonnes grain, 33,000 tonnes of hay, and 50,000 tonnes of straw. More than 1,700 firefighters responded to the fire (including support from Victoria). Insured costs estimated at \$170m ^{2016 value}.

December 2019/January 2020: The Cudlee Creek and Kangaroo Island bushfires burnt over 265,000 ha, resulting in 3 fatalities and the loss of 188 houses, 60,000 livestock and large numbers of wildlife.

Climate change factors that influence the occurrence of this hazard:

- Higher average temperatures
- Decreased annual rainfall
- Increased time spent in drought
- Harsher fire weather climate

KEY RISKS FOR SOUTH AUSTRALIA

The underpinning climatic features of South Australia are hot, dry summers with relatively cool winters, with the majority of rainfall occurring between May and August, which influence the growth and curing of fire fuel and fire behaviour.

Key bushfire risk locations include:

- Far North
- Mid North
- Lower Eyre Peninsula
- Adelaide Hills
- Kangaroo Island
- Murray Mallee
- Upper and Lower South East

CFS actively:

- Develops community information and resources for community education and engagement activities
- Provides fire danger ratings, fire bans, warnings and emergency alerts during the bushfire season
- Maps of assets at risk from bushfire and assigns treatments to mitigate the risk to these assets across the state through the Bushfire Management Area Plan (BMAP) process
- Assesses new developments in bushfire prone areas to ensure they are built to required standards based on the Bushfire Attack Level (BAL) for each site.

Community resilience improves with:

- Being bushfire ready at home and at work
- Having a 5 Minute Bushfire Plan
- Acting Now



CYBER CRISIS (emerging)

Cyber threats are an emerging hazard and the South Australian Government is actively working with the Commonwealth Government on prevention, preparation, response and recovery arrangements for cyber crisis.

The Department of the Premier and Cabinet (DPC) is the Control Agency for Cyber Crisis.

A Cyber Crisis is defined as:

“malicious cyber activity, with consequences so severe the full Cyber Crisis Incident Management Framework is activated for a whole-of-government or whole of state response.”

The Department of the Premier and Cabinet (DPC) leads a coordinated response to prepare for, respond to, and recover from cyber security incidents affecting government or the community.

Engaging online is part of everyday life but the online world can give criminals opportunities to steal money, information or identities. To protect community's loss of money, information or identities DPC recommends the community use the Stay Smart Online service (www.staysmartonline.gov.au). This is a free service for Australian internet users that explains recent online threats and how they can be managed.

POTENTIAL IMPACTS



Elevated distress, fear and/or anger within the local community, and society as a result or consequence of an incident.

Physical injury, illness or death from intentional disablement of critical services.



Disruption to the continuity of business service delivery and inability to re-commence after theft, loss or inappropriate disclosure of data critical to business operations.



Damage to or contamination of the environment where cyber activity aims to disrupt or disable resource processing facilities or infrastructure (e.g. waste or water).



Disruption to or undermining the delivery of critical services to the community.

Interruption to community functionality and social connectedness.

HISTORICAL EVENTS

Globally and locally cybersecurity risks are growing in their prevalence as well as their potential to disrupt or cause damage. Many examples remain classified and cannot be published broadly, however, recent public examples in South Australia include:

2012: Adelaide-based defence electronics manufacturer was subject to a cyber-attack that allegedly led to the stealing of sensitive engineering designs leading to a significant loss of revenue and a drop in annual net-profit from \$45 million to \$9 million.

2016: South Australian Government departments and public schools were subjected to sporadic denial of service cyber-attacks which disabled systems over a period of two weeks. The attacks were only stopped when SA Police were able to identify and arrest the attacker.

2017: Two South Australian consumers lost a total of \$900,000 in real estate themed cybercrime scam undertaken by criminal organisations.

2018: South Australian Government's Cyber Crisis Watch Desk received 1287 cyber security threat reports from government agencies over the year. This was up from 1098 reports in 2017 and 743 reports in 2016.

KEY RISKS FOR SOUTH AUSTRALIA

South Australia maintains vigilance of cyber security risks identified locally, nationally and internationally, potentially involving:

- Critical infrastructure and critical service delivery
- Espionage and foreign interference
- Sensitive and personal information.

DPC actively:

- Assists all South Australian government agencies to manage cyber security in accordance with whole of government policy, based on national and international best practice for information security risk management.
- Helps to improve the cyber resilience of the government services that the community rely on, including working with law enforcement agencies.
- Promotes State and National awareness programs that provide information on how the community can prepare and recovery from incidents that impact them.

Community resilience improves with:

- Understanding potential threats to their information and data and protecting themselves when they are using online services at home and at work.

Climate change factors that influence the occurrence of this hazard:

- Based on current research, no link has been established between climate change and the occurrence of cyber crisis, however, communities already dealing with escalating climate impacts may be more vulnerable to opportunistic cyber crime activities.



EARTHQUAKE

The Department of Planning, Transport and Infrastructure (DPTI) is the designated Hazard Leader.

South Australia Police (SAPOL) is the designated Control Agency.

An earthquake is defined as:

“the shaking of the surface of the earth caused by underground movement, such as along a fault line or by volcanic activity. They range from slight tremors to major shaking, lasting from a few seconds to a few minutes, and may be followed by aftershocks.”

Geoscience Australia monitors seismic data from more than 60 stations around Australia, and reports on significant earthquakes to alert the Australian Government, State and Territory Governments and the public about earthquakes in Australia and overseas.

An earthquake’s magnitude is a measure of the energy released by the earthquake (traditionally measured on the Richter scale).

Earthquake effects, based on human observation, are rated using the Modified Mercalli (MM) Intensity Scale, which ranges from I (imperceptible) to XII (total destruction).

POTENTIAL IMPACTS



Physical injury, illness or death from impacts of collapsing buildings, exposure to hazardous materials, and threat to mental health and wellbeing from any losses or impacts experienced.



Disruption to economic activity, damage to physical assets, and impacts upon key infrastructure and services.



Potential changes to landscape such as land slips, ground deformation and liquefaction.



Short-term clean up, and long-term recovery and reconstruction activity to rebuild homes, restore community infrastructure, services and local economy.

For information on how to minimise the impact to you and your family or business visit:

<https://www.sa.gov.au/topics/emergencies-and-safety/types/earthquake>

Geoscience Australia monitors earthquake events at www.ga.gov.au

HISTORICAL EVENTS

May 1897: Beachport, magnitude 6.5 with about 5 serious and 45 minor injuries reported. Damage concentrated in the Kingston, Beachport and Robe areas.

September 1902: Warooka, magnitude 6.0 causing 2 deaths and 1 injury, and widespread damage to the town's stone buildings.

March 1954: Darlington, magnitude 5.4 felt up to 250 km away, causing 16 injuries and damage to 3,000 buildings.

March 1986: Marryat Creek, magnitude 6.0 just south of the Northern Territory border resulted in a 14 km boomerang shaped surface rupture.

March 1997: Burra, magnitude 5.1 felt up to 170 km away, however no major damage caused.

April 2014: Yunta, magnitude 4.7, felt widely across the state.

June 2016: Kangaroo Island, magnitude 4.9 felt up to 200 km away, with damaging vibrations limited to 20 km.

KEY RISKS FOR SOUTH AUSTRALIA

Key earthquake risk locations include:

- Far North
- Mid North
- Eyre Peninsula
- Greater Adelaide metropolitan area
- Lower South East

Apart from the damage caused by the ground shaking, earthquakes can also lead to:

- Aftershocks (which follow the largest shock of an earthquake sequence)
- Soil liquefaction (involves the loss of soil's capacity to support the foundations of buildings and other infrastructure)
- Ground surface rupture and deformation
- Landslides and rock falls
- Tsunamis
- Hazardous material release
- Fire (resulting from damage to gas or other utility infrastructure or utility disruption)
- Flooding

DPTI actively:

- Undertakes a leadership role in planning emergency management activities regarding earthquakes
- Seeks to mitigate risk from the earthquake hazards by providing technical advice on land use planning and building codes
- Maintains the currency of community resilience information on the earthquake pages on sa.gov.au

Climate change factors that influence the occurrence of this hazard:

- Based on current research, no link has been established between climate change and the occurrence of earthquakes.

Community resilience improves with:

- Preparing a business continuity plan or household emergency plan and emergency kit

Knowing how to:

- **Drop** to the ground close to you where you can avoid injury from falling debris
- Take **Cover** under something strong (e.g. sturdy table)
- **Hold** on to it until the shaking stops



ESCAPE OF HAZARDOUS MATERIALS

SafeWork SA is the designated Hazard Leader.

The South Australian Metropolitan Fire Service (MFS) and Country Fire Service (CFS), depending on the location of the incident, are the designated Control Agencies.

The Department of Planning, Transport and Infrastructure (DPTI) is the Control Agency for marine spill into coastal waters.

The Environment Protection Agency (EPA) is the lead agency responsible for the management of site contamination resulting from a release of hazardous materials.

POTENTIAL IMPACTS



Immediate and long-term physical injury or illness, or death from hazardous substances exposure, and threat to mental health and wellbeing from any losses or impacts experienced.



Disrupt economic activity (e.g. business trading, traffic flow) and cause damage to and/or destroy physical assets.



Contamination of soil and waterways.



Short-term disruption to local community service delivery by government bodies and utilities.

A hazardous material may be defined as:

“any substance, including dangerous goods and dangerous substances, that can escape controlled confinement and produce a risk to persons, infrastructure, the environment or the economy of the State.”

For information on how to minimise the impact to you and your family visit:
<http://www.sa.gov.au/topics/emergencies-and-safety/types/chemical-emergency>

HISTORICAL EVENTS

June 1999: After the oil tanker *Chanda* completed discharging its cargo of crude oil at Port Stanvac, a discharge hose, separated whilst being pressure tested, and released oil to the sea. The 260 cubic metre spillage created a slick about 5-10 km long and 500-800 metres wide. The light oiling of beaches at Sellicks and Aldinga resulted in 400 cubic metres of oiled sand and seaweed being removed.

July 2007: The spill of about 10,000 litres of used motor oil from an industrial storage tank at Largs Bay, spread onto adjoining land, covering an area of 1,100 square metres. The clean-up operation, costing about \$200,000, involved the use of 650 tonnes of sand.

October 2010: The 225 metre grain carrier *Grand Rodosi* collided with, and sank, the 47 metre tuna vessel *Apollo S*, moored at the Port Lincoln wharf. Containment booms were deployed for the oil and diesel spill, and a 300 metre exclusion zone was established to isolate the damaged wharf and sunken vessel. \$28m law suit (\$20m loss of vessel, \$4m replacement for fishing, \$4m economic loss and salvage).

October 2017: A transformer at a Thebarton electrical substation, holding about 10,000 litres of insulating oil, exploded. The resulting fire generated substantial smoke pollution, and oil caused a two kilometre slick in the River Torrens.

KEY RISKS FOR SOUTH AUSTRALIA

Hazardous materials are usually stored in association with significant fuel storage locations, service stations, water and waste water treatment plants, wineries, mine sites, processing plants, and manufacturing sites.

Hazardous materials are transported daily by road and rail, often in populated urban areas, to ensure supplies of fuel and other materials used by industry and the public.

Some hazardous materials can cause explosions or fires when not contained.

SafeWork SA actively:

- Provides advice, industry information and education resources to assist workplaces
- Issues media releases and Incident Alerts in response to significant events
- Conducts proactive and reactive worksite Health and Safety Inspections to ensure compliance and enforcement

Community resilience improves with:

- Labelling chemicals correctly
- Preparing and practicing site emergency response plans

Climate change factors that influence the occurrence of this hazard:

- Higher average temperatures
- Increased risk of extreme heat
- Increased intensity of storm events



FLOOD

The Department for Environment and Water (DEW) is the designated Hazard Leader.

The South Australian State Emergency Service (SES) is the designated Control Agency.

Flood is the most costly natural disaster in South Australia. The main types of flooding are:

- **Riverine flooding** – occurs six or more hours after heavy rainfall when excess water flows over the banks of watercourses.
- **Flash flooding** – occurs less than six hours after heavy rainfall. Causes are overbank flow from quick response streams, run-off on its way to a waterway or run-off exceeding local drainage capacity (stormwater flooding in urban catchments).
- **Infrastructure failure** – caused by failure of infrastructure that controls, conveys or stores water e.g. pipes, pumps, dams or levees.
- **Coastal flooding** – caused by elevated sea levels as a result of tidal and/or wind-driven events, including storm surges in lower coastal waterways.

POTENTIAL IMPACTS



Physical injury, illness or death from fast-moving, deep or contaminated water, and threat to mental health and wellbeing from any losses or impacts experienced. Secondary health effects e.g. mosquito borne disease.



Inundation and damage to, or loss of, homes, vehicles, public buildings, businesses, physical infrastructure (e.g. roads, bridges), loss of access to transportation routes, loss of crops and livestock, and interruption to local economy (e.g. businesses and industries).



Submerge land, injure or kill wildlife by drowning or isolation from food sources, physical change to water courses, deposits of silt and refuse, reduced water quality and elevated risk of erosion.



Floodwaters may take time to recede and some communities (especially in remote locations) may be isolated for some time.

For more information on how to minimise the impact to you and your family visit:
<https://www.sa.gov.au/topics/emergencies-and-safety/types/flood>

HISTORICAL EVENTS

August 1956: The River Murray flow peaked at 341 GL/day. 1,500 people were evacuated, and 15,000 visitors per day were impacted at Mannum. Some inundation remained for six months. Estimated losses not available.

March 1983: Drought breaking thunderstorm rains caused flood and storm damage in Adelaide suburbs and the Barossa Valley. Estimated losses of \$56m ^{2013 value}.

December 1992: Widespread flooding between Gawler, eastern Adelaide Hills and Goolwa. Numerous homes inundated, 1 reported death, and damage to crops and market gardens. Estimated losses of \$2.4b ^{2013 value}.

June 2003: The Patawalonga River broke its banks at Glenelg North, following heavy rain and a weir malfunction, flooding about 160 homes. Estimated losses of \$38m ^{2013 value}.

November 2005: Gawler River flooding caused extensive damage to 1,500 ha of market gardens. Estimated losses of \$61m ^{2013 value}.

December 2010: Two storm fronts delivered widespread rainfall through Pt Pirie, Clare, Snowtown, Renmark and the Mt Lofty Ranges, flooding Riverton, Stockport, Tarlee and Saddleworth. Damage to 66 homes, roads, infrastructure, crops and livestock, totalled more than \$11m.

May 2016: A storm surge 1.2m above predicted astronomic high tide impacted multiple coastal suburbs and a Port River king tide flooded 50ha of Mutton Cove Conservation Park killing samphire vegetation habitats. Estimated losses of \$3.5m ^{2016 value}.

September 2016: Two flood events, involving multiple watercourses, inundated homes, required some Old Noarlunga residents to evacuate, and damaged bridges, paths and levee banks along the River Torrens. 250 crop growers around the Light and Gawler Rivers were also impacted. Estimated losses of \$66m ^{2016 value}.

Due to climate change, this hazard is expected to result in:

- Increased intensity of storm events
- Increased extreme rainfall intensity
- Higher extreme sea level events
- More coastal erosion and flooding

State flood risk locations include:

- Gawler River
- Light, Gilbert and Wakefield Rivers
- Brownhill and Keswick Creeks
- Numbered (First to Fifth) Creeks
- Port Adelaide area (sea and stormwater flooding)
- River Murray
- Upper and Lower Onkaparinga River
- Dry Creek
- River Torrens (events larger than 1% AEP)
- Coastal areas of the state (expected to increase with mean sea level rise)

DEW actively:

- Provides public flood study data on the [Flood Awareness website](#)
- Provides state-wide flood risk assessment and oversight of the state-wide flood warning infrastructure network
- Develops flood management policies, such as for dam safety and levee bank management
- Provides technical advice and advocacy for appropriate land use and building controls that consider the flood hazard
- Provides technical advice to SES during incidents and on flood response planning and flood impact warnings
- Collaborates with the Bureau of Meteorology and SES to monitor water forecasts and water levels and support public warnings.

Community resilience improves with:

- Understanding flood risk of homes and businesses
- Having a Flood Emergency Plan
- Land use planning and building requirements that considers flood risk
- Keeping clear of flooded creeks, rivers and stormwater drains
- Receiving and understanding flood warnings



HEATWAVE

The South Australian State Emergency Service (SES) is the designated Hazard Leader and Control Agency.

A heatwave is defined as:

“three or more days of high maximum and minimum temperatures that are unusual for that location and time.”

In the last 200 years, severe and extreme heatwaves have taken more lives than any other natural hazard in Australia.

Localised heatwave warnings are issued to the public across the Bureau of Meteorology (BoM) forecast areas using the forecast maximum and minimum temperatures over the coming three days.

Heatwaves are classified as:

- Low-intensity heatwave: Expected to be experienced through summer, most people can cope with this level of heat, but begin to see health effects if no precautions taken.
- Severe heatwave: Less frequent, but challenging for the vulnerable.
- Extreme heatwave: Rare, but can affect the health of anyone who does not take precautions to keep cool, even those who are healthy, and affect reliability of infrastructure (e.g. power, transport).

POTENTIAL IMPACTS



Exacerbate existing health issues, and elevate the risk of heat-related illnesses (e.g. heat cramps, fainting, heat exhaustion, heat stroke) or death from dehydration or drowning.



Damage to crops and community infrastructure, loss of stock, increased power prices, reduced labour output, reduced patronage at businesses or community events.



Trees at risk of dropping limbs, wildlife seeking water or shelter in populated areas, blue-green algae outbreaks in waterways, elevated bushfire risk.



Disruption to, or cancellation of, community events, short-term response and recovery activity to repair damaged power, communications, water and transport infrastructure (e.g. overheated equipment components, excessive soil movement, and damage to roads, railway lines and bridges).

For more information on how to minimise the impact to you and your family visit:
<https://www.sa.gov.au/topics/emergencies-and-safety/types/heatwave>

HISTORICAL EVENTS

March 2008: During a record-breaking, fifteen-day heatwave Adelaide experienced the longest period of maximum daily temperatures of 35°C and above on record for any capital city. It resulted in at least \$150m in damage and reduced income for South Australia.

January/February 2009: During a thirteen-day heatwave from 26 January to 7 February 2009 (inclusive of a 33°C day) Adelaide experienced eight days above 40°C, with a highest temperature of 45.7°C. More than 34 excess heat-related deaths were reported.

January 2014: Adelaide recorded five consecutive days above 42°C between the 13 and 17 January 2014. There were 294 heat-related emergency presentations at hospitals, and 38 excess heat-related deaths reported.

December 2015: Adelaide recorded four consecutive days above 40°C for the first time in December, between the 16 and 19, with more than 85 people admitted to hospitals with heat-related illnesses.

December 2019: South Australia as a whole had its hottest day on record on 19 December, when it reached 47.1°C, exceeding the previous record of 45.7°C on 24 January 2019. Fifteen locations in South Australia recorded new highest temperatures including Nullarbor 49.9°C and Ceduna 48.9°C.

Due to climate change, this hazard is expected to result in:

- Higher average temperatures
- Increased risk of extreme heat
- More frequent heatwaves

KEY RISKS FOR SOUTH AUSTRALIA

Heatwaves cause more deaths than any other natural hazard.

Whilst any individual, regardless of age, sex or health status, can develop heat stress if engaged in intense physical activity and/or exposed to environmental heat, additional factors can increase the risk of extreme heat on a person, such as:

- Older people (over 65 years)
- Acute, chronic and severe illness
- Inability to keep cool
- Disability
- Environmental and social factors

SES actively:

- Liaises with Bureau of Meteorology on forecasts for heatwave
- Engages with the community and provides education for getting ready
- Provides early warnings to the community
- Responds to requests for assistance from the community

Community resilience improves with:

- Keeping yourself cool
- Staying hydrated
- Checking up on vulnerable people you know to see if they are okay



HUMAN DISEASE

The Department for Health and Wellbeing (DHW) is the designated Hazard Leader and Control Agency.

Human disease is defined as:

***“any impairment of normal physiological function affecting all or part of an organism, especially a specific pathological change caused by infection, stress, etc., producing characteristic symptoms, illness or sickness in general detected in humans.*”**

An epidemic is defined as:

“An outbreak or unusually high occurrence of a disease or illness in a population or area that has the potential to cause harm to the people, environment or economy to an extent which could overwhelm the capacity of existing health response resources.”

A pandemic is defined as:

“an epidemic on a global scale.”

POTENTIAL IMPACTS



Serious illness or death from a disease, and threat to mental health and wellbeing of communities from any losses or impacts experienced, especially affecting priority populations such as indigenous, rural and regional, socio-economically disadvantaged, and culturally and linguistically diverse, being most at risk.



Elevated absenteeism from workplaces, closing of businesses, reduction in economic productivity and income, and increased demand on health services.



Environmental damage due to inappropriate disposal of biological waste.



Protracted response and recovery activity, potential for increased social isolation of affected communities due to quarantine controls (e.g. travel restrictions, closing of schools), and breakdown of community support networks.

For more information on how to minimise the impact to you and your family visit:

<https://www.sa.gov.au/topics/emergencies-and-safety/types/human-disease>

HISTORICAL EVENTS

Haemolytic Uraemic Syndrome 1995: There were 23 confirmed cases of food poisoning and one death after adults and children consumed metwurst contaminated with *Escherichia coli* (E.coli) bacteria. Many continue to suffer severe ongoing health problems, including some who have had organ transplants.

H1N1 Influenza 2009: South Australia recorded 8,944 confirmed cases of Human Swine Flu and 28 deaths, with two high school closures. Thermal imaging equipment and nurses were deployed at international airports, and airlines were required to report passengers with influenza symptoms.

Food and Water Contamination 2016: SA Health was involved in 19 food-borne disease outbreak investigations and took 800 food samples as part of investigations. SA Health also provided advice on the management of 56 incidents where the safety of drinking water was potentially compromised.

Seasonal Influenza 2019: Between 1 January and 11 May 2019, SA Health has received 12,339 notifications of influenza (compared to 1,348 cases for the same period the previous year) and recorded 17 deaths, including children as well as adults.

Climate change factors that influence the occurrence of this hazard:

- Heatwaves, drought and bushfires increases the threat to physical and mental health and wellbeing for all communities, especially priority populations.
- Increased average temperatures and/or extreme rainfall events can cause diseases to emerge, or increase in prevalence, that then spread between animals and people (e.g. insect bites), as well as vector-borne diseases (e.g. bacteria, fungi, and viruses).
- Drought can reduce access to supplies of safe drinking water.

KEY RISKS FOR SOUTH AUSTRALIA

Infectious diseases caused by organisms such as bacteria, fungi, parasites or viruses. These can be spread to humans by:

- Other humans (e.g. coughing, sneezing, blood and body fluids)
- The environment, including food and water (e.g. food poisoning)
- Animals and insects (e.g. mosquito bites)
- Bioterrorism event (e.g. deliberate act to cause an infectious disease outbreak utilising any of the above mechanisms)

SA Health actively:

- Undertakes human disease surveillance and monitoring of potential risks and action to respond to cases of infectious diseases in the community
- Provides State funded vaccination programs, including influenza
- Provides environmental health monitoring and coordinated action to rapidly identify and respond to incidents

Community resilience improves with:

- **Getting vaccinated** to prevent infectious diseases (e.g. annual flu shot), or reduce your risk of becoming ill whilst travelling overseas (especially in high risk countries).
- **Washing your hands** with soap and water before eating or preparing food, after going to the toilet, and after touching animals or their environment.
- **Staying home** from work, school or public places if you are ill to stop the spread of disease.
- **Covering up**, applying insect repellents, or avoiding exposure outdoors when mosquitoes are most active.



STORM

The South Australian State Emergency Service (SES) is the designated Hazard Leader and Control Agency.

Storms are more commonly observed than any other natural hazard in South Australia. The Bureau of Meteorology has identified two types of severe storm that can impact upon the State:

A Thunderstorm may include:

- Heavy rainfall leading to flash flooding (> 30 mm/h)
- Wind gusts (90 km/h or greater)
- Damaging hailstones (2 cm diameter or greater)
- TORNADOS

A Synoptic Storm could include some/all of the above, but also:

- Mean wind speed 63 km/h or greater (land gale)
- Storm tide/surge higher than astronomical tide causing damage/destruction to foreshore

POTENTIAL IMPACTS



Physical injury, illness or death from impacts of rain, wind, hail or lightning, and threat to mental health and wellbeing from any losses or impacts experienced.



Damage to crops, loss of livestock, damage to vehicles, homes, buildings and physical infrastructure, power failure, disruption to transport systems (e.g. road, rail, air, and sea), and reduction in economic activity.



Trees at risk of falling over or dropping limbs, death of wildlife, contribute to elevated flood risk, potential for erosion, landslips and rock falls, and elevated risk of bushfire from dry lightning.



Short-term response and recovery activity in initial clean-up, repair and reconstruction activity, and restoration of physical infrastructure and community services.

For information on how to minimise the impact to you and your family or business, visit: www.sa.gov.au/topics/emergencies-and-safety/types/extreme-storm

HISTORICAL EVENTS

May 2016: An intense low pressure system, with wind gusts up to 100 km/h and rainfall of up to 88 mm, resulted in nearly 800 requests for SES assistance. The resultant king tide and storm surge led to coastal inundation, and significant damage to some sections of the coastline, including \$1.3m damage to the rock sea wall at West Beach.

September 2016: A state-wide extreme storm led to state-wide power outages and flooding numerous rivers and creeks. [Refer to the description in Black System Event.]

November 2016: An intense late afternoon storm, with golf-ball sized hail and wind gusts of more than 90 km/h, resulted more than 550 calls for SES assistance. Damage in the Riverland region was estimated at \$100 million for affected grape, almond, stone fruit and grain crops.

December 2016: A severe storm, resulting in 1,600 calls for SES assistance, caused a power outage for 155,000 customers and impacted upon 5% of state's grain crop. A subsequent price fall of \$50-80 per tonne potentially resulted in a \$100-200m loss of value on the forecast record grain crop.

October 2017: A storm, with fine hail the size of rice grains, caused damage to a 25% of the State's apple, cherry and pear crop. Growers were facing losses estimated at \$32m in fruit sales. The industry was impacted a second time when a series of wild storm fronts during November 2018 impacted up to 70% of the apple and pear crop.

Due to climate change, this hazard is expected to result in:

- Increased intensity of storm events
- Increased extreme rainfall intensity
- Higher extreme sea level events
- More coastal erosion and flooding

KEY RISKS FOR SOUTH AUSTRALIA

Risks vary depending upon the type of event, where it occurs, the size of the event, and how long it lasts.

- Damage to vehicles, buildings, and crops can occur with very little advance warning, and can occur in a very short time frame.
- Whilst the loss of power can affect many homes, the impacts upon public transport (e.g. street lighting, traffic lights) and ability of businesses creates significant disruption to the community in the first few hours of an event.
- People in open and/or regional areas can be left very exposed to the effects of a storm due to lack of shelter (or protection from the elements). Heavy rain or hail can disrupt traffic and lead to collisions. Lightning is able to be tracked, but individual strikes are difficult to predict. Dry lightning can cause bushfires and strike people or trees from great distances, even on a blue sky day.

SES actively:

- Liaises with Bureau of Meteorology on forecasts for storms
- Provides community engagement and education
- Where possible, provides warnings to the community
- Responds to requests for assistance from the community

Community resilience improves with:

- Seeking shelter during storms
- Keeping clear of fallen power lines which could still be 'live'
- Being aware of fallen trees or debris on the road



STRUCTURE FIRE

The South Australian Metropolitan Fire Service (MFS) is the designated Hazard Leader and Control Agency for Structure Fire.

A structure fire is defined as:

“Uncontrolled fire within or involving any part of a residential, commercial or industrial premises.”

During 2018-19, the MFS and CFS attended 6,221 calls to incidents classified as structure fire response in the Adelaide metropolitan area and 2,115 in regional areas. There were 43 confirmed 'large structure' fires and 1261 domestic and other structure fires in South Australia.

The South Australian Development Act & Regulations, Australian Standards, Minister's Specifications, National Construction Code, and Work Health and Safety Legislation requires buildings to have various safety features incorporated.

As part of the approval process, MFS reviews and provides comment on a building's design to ensure it incorporates adequate safety provisions for building occupants and meets MFS operational requirements.

POTENTIAL IMPACTS



Physical injury, illness or death from flames or smoke whilst attempting to combat the fire, perform a rescue, or attempt an evacuation, and threat to mental health and wellbeing from any losses or impacts experienced.



Damage to, or loss of, homes, public buildings, businesses, utilities infrastructure, and interruption to local economy (e.g. businesses and industries).



Toxic smoke pollution of atmosphere, and contamination of sensitive ecological areas and waterways.



Initial recovery and long-term reconstruction to rebuild damaged properties, infrastructure and local economy, restoration of local community services, and recovery of local environment.

For information on how to minimise the impact to you and your family or business, visit:

<https://www.sa.gov.au/topics/emergencies-and-safety/types/house-fire>

HISTORICAL EVENTS

March 2012: A waste oil depot fire, exploding gas cylinders, which sprayed flames up to 40 metres in the air, and a thick plume of black smoke, was attended by MFS and CFS appliances, 100 firefighters, and a water bombing helicopter. Clean up cost estimated at \$150,000.

January 2014: A fire within a waste pile approximately 50 metres wide, 150 metres long and 5 metres deep, burnt for several days at a waste facility and was attended by MFS appliances and 70 firefighters.

January 2017: An industrial plastics fire in a 2-acre lot, was attended by MFS and CFS appliances, and 100 firefighters.

March 2017: A fire at a scrap metal and recycling facility included a number of gas cylinder explosions and created a thick plume of smoke, was attended by MFS appliances and 70 firefighters, and quickly contained.

January 2018: A fire, at South Australia's largest abattoir, extensively damaged an 8,000 square metre meat processing facility, and was attended by MFS and CFS appliances, and 100 firefighters. Damage estimates are in excess of \$300m.

March 2018: A fire in a large 100 x 80 metre waste and recycling shed destroyed more than 300 tonnes of cardboard, and was attended by MFS appliances and 50 firefighters, using aerial appliances and excavators.

December 2019: Fire at Port Adelaide Greek Orthodox Church approximately 40m x 30m, where over \$1.5m damage was sustained due to burning candles. MFS appliances and 60 Firefighters contained the fire to the front of the premises.

December 2019: Fire at Smithfield Plains High School, extensive damaged to the value of \$2m, MFS appliances along with over 60 Firefighters contained and the fire to the main building.

Climate change factors that influence the occurrence of this hazard:

- Higher average temperatures
- Less rain during the cooler months
- Harsher fire weather climate

KEY RISKS FOR SOUTH AUSTRALIA

Community members who are most vulnerable to structure fires include:

- Children 0-4 years
- People aged 65 years and over
- People from ethnic minorities
- Smokers, and drug/alcohol-impaired people
- People in lower socio-economic groups

Over the past decade, the MFS has reported a slight decrease in the number of fires. This is believed to be the result, in part, to better community awareness of fire risks, as well as the removal of many unsafe household appliances. However, when fires do occur, they now burn faster and cause greater damage because there are more highly flammable (synthetic) products in most urban buildings.

MFS actively:

- Provides fire and life safety information and education programs to the community to build community preparedness and resilience to structure fires, with a focus on at-risk groups
- Commissions hydrant, fire alarm and smoke management systems and provides comment on the satisfactory operation of these systems prior to occupancy of a new or extended building
- Undertakes fire safety inspections of health care buildings, identifying deficiencies and ensuring they are rectified
- Assists Council Building Fire Safety Committees to ensure existing buildings provide a 'reasonable level of fire safety'

Community resilience improves with:

- Regularly testing your smoke alarms and
- Changing the batteries every six months
- Preparing and practicing emergency response and/or evacuation plans
- Business continuity plans



TERRORISM

South Australia Police (SAPOL) is the designated Hazard Leader and Control Agency for Terrorism.

A terrorist act is defined under Australian law as:

“an act or threat, intended to advance a political, ideological or religious cause by coercing or intimidating an Australian or foreign government or the public, by causing serious harm to people or property, creating a serious risk to the health and safety of the public, or seriously disrupting trade, critical infrastructure or electronic systems.”

South Australian agencies use ASIO processes and state-based risk and threat assessments, and the National Terrorism Threat Advisory System to determine the appropriate responses for specific sectors, events or individuals within the State.

The assessment considers the risk to locations and public activities based on:

- Opportunity for attack
- High-impact imagery
- Symbolic value
- Consequences

POTENTIAL IMPACTS



Physical injury, illness or death from an act of violence, and threat to mental health and wellbeing from any losses or other impacts experienced.



Disrupted economic activity (e.g. business trading, public events, traffic flow), and damage caused to physical assets.



Elevated risk of contamination of soil, water courses or air quality.



Elevated distress, fear and/or anger within the local community, and society in general.

For more information on how to minimise the impact to you and your family visit:

<https://www.sa.gov.au/topics/emergencies-and-safety/types/terrorism>

HISTORICAL EVENTS

South Australia has had few events linked to acts of terrorism.

March 1994: A parcel bomb sent to the Adelaide office of the National Crime Authority exploded, killing one person and injuring another.

KEY RISKS FOR SOUTH AUSTRALIA

The nature of terrorism has changed over different decades. South Australia maintains vigilance of terrorism risks identified locally, nationally and internationally, potentially involving:

- Violent extremism
- Critical infrastructure
- Crowded places and major events
- Border security
- Transportation
- Hazardous materials
- Dignitaries and foreign missions

SA Police actively:

- Engage with the community to identify potential threats
- Collaborate with the broader Australian intelligence community to detect, investigate and disrupt terrorism-related activity
- Monitor international activities for trends and threats

Community resilience improves with:

- Reporting anything that doesn't seem right
- Speaking up if something doesn't add up
- Escape. Hide. Tell.

Climate change factors that may influence the occurrence of this hazard:

- Increased time spent in drought may lead to increased economic, community and political pressure

MANAGING RISKS TO SOUTH AUSTRALIA

OUR GOVERNANCE FRAMEWORK

South Australia's emergency management arrangements includes the following governance:

Emergency Management Council

(EMC): The EMC is chaired by the Premier and provides strategic oversight of SA's security and emergency management arrangements and provides executive leadership during significant security events or natural disasters.

Emergency Management Act 2004

(SA): An Act to establish strategies and systems for the management of emergencies in the State; and for other purposes.

It allows declarations of an Identified Major Incident, Major Emergency or Disaster, providing Authorised Officers with a range of powers to take action to assist Control or Support agency activities.

The Act also establishes the **State Emergency Management Committee** (SEMC) and lists its functions and powers, including oversight of the state's emergency management capability and to prepare and keep under review the State Emergency Management Plan (SEMP).

Fire and Emergency Services Act

2005: An Act to establish the South Australian Fire and Emergency Services Commission and to provide for the Commission's role in the governance, strategic and policy aspects of the emergency services sector; to provide for the continuation of a metropolitan fire and emergency service, a country fire and emergency service, and a State emergency service; to provide for the prevention, control and suppression of fires and for the handling of certain emergency situations; and for other purposes.

Other legislation also includes elements relating to the management of emergencies e.g. Local Government Act and Public Health Act.

The **State Emergency Management Plan** (SEMP) identifies the arrangements for activities such as:

Prevention: Actions which seek to minimise the occurrence of incidents (particularly those of human origin) and eliminate, or reduce the impact of, an emergency event.

Preparedness: Arrangements and plans developed in advance of an incident which decrease the impact, extent and severity of an incident through effective government response; and actions that educate, inform or prepare the community to effectively deal with an emergency event.

Response: Actions which activate preparedness arrangements and plans in anticipation of, during or immediately after an emergency event to ensure the impact of the emergency is minimised and that affected individuals are given immediate relief and support.

Relief: Actions which provide temporary respite and support from the impacts of an emergency event, until Recovery can commence, such as the provision of material aid and emergency medical care necessary to save and preserve human lives and enable families to meet their basic needs for shelter, clothing, water, and food.

Recovery: Actions taken after an emergency event to support individuals, families and communities to re-establish the normal pattern of life including emotional, social, economic and physical well-being; and the reconstruction of physical infrastructure affected by the emergency.

SHARED RESPONSIBILITY

Effective emergency management requires a coordinated approach from all levels of government, business, the non-government sector and individuals to build community resilience, reduce the impact of emergencies and ensure a seamless transition to recovery after an emergency.

Businesses, including critical infrastructure owners, contribute by understanding the risks that they face, and ensuring that they can continue to provide services during and soon after a disaster.

Communities and individuals, can improve their resilience by actively planning and preparing for protecting life and property, based on an awareness of the threats relevant to their locality.

Governments, working collaboratively at different levels to incorporate the principles of disaster resilience into aspects of natural disaster arrangements including preventing, preparing for, responding to and recovering from, disasters.

STRONGER TOGETHER

SOUTH AUSTRALIA'S DISASTER RESILIENCE STRATEGY

South Australia's disaster resilience strategy has four key focus areas to provide resilience building actions and investment:

- Informed and connected neighbourhoods and communities working together
- Prepared and adaptable businesses that can continue to operate during and after an emergency or disaster, maintaining their livelihood while supporting their community
- Children and young people actively engaged in reducing their risks and increasing their self-resilience
- Strategic and connected networks that broaden the emergency management sector, working towards common goals and shared outcomes

Cross cutting themes:

- Diversity and inclusion

Activities must consider the diverse ways people are different and unique and embrace, value and celebrate the opportunity these diverse qualities bring to building disaster resilience for individuals and communities.

- Health and wellbeing

General resilience through good health and positive wellbeing strengthen healthy individuals and communities to be more resilient to shocks and stressors, whereas lower levels of health and wellbeing can make people more vulnerable, and impact how they prepare for and recover from emergencies and disasters.

A disaster resilient community is one where we:

- Understand the risks we face based on our location and situation
- Take action where we can to prepare for and manage these risks
- Know our neighbours and those who might need more help in an emergency or disaster
- Know how and where to get the information we need in a range of situations
- Know how to link into services that are there to support us

Being resilient will look different in each community based on their unique needs and abilities.



FURTHER READING

Australian Cyber Security Centre, 2017, ACSC *2017 Threat Report*.

Australian Government, 2015. *Australian Disaster Resilience Handbook 10: National Emergency Risk Assessment Guidelines*, Australian Institute for Disaster Resilience.

Australian Government, Bureau of Meteorology. 2018. *State of the Climate 2018*.

Australian Government, Department of the Environment and Energy, 2018. *Climate Compass: A climate risk management framework for Commonwealth agencies*.

Australian Government, Department of Home Affairs, 2018. *Australian Disaster Preparedness Framework: A guideline to develop the capabilities required to manage severe to catastrophic disasters*.

Australian Government, Department of Home Affairs. 2018. *Profiling Australia's Vulnerability: the interconnected causes and cascading effects of systemic disaster risk*.

Australian Government, Department of Home Affairs, 2018. *National Disaster Risk Reduction Framework*.

Council of Australian Governments, 2011. *National Strategy for Disaster Resilience: Building the resilience of our nation to disasters*, Commonwealth of Australia, Barton, Australian Capital Territory.

Government of South Australia. 2018. *Tracking changes in South Australia's environment 2019*.

Government of South Australia, 2018, *South Australian Government Cyber Security Strategic Plan 2018-2021*.

Government of South Australia, South Australian State Emergency Service, 2018. Collection of *Zone Key Hazards and Risk Summaries* for zones in South Australia, https://www.ses.sa.gov.au/site/community_safety/community_engagement/key_hazards_risks_summary_for_zones.jsp

Government of South Australia, 2019. *Stronger Together: South Australia's Disaster Resilience Strategy 2019-2024*. https://www.safecom.sa.gov.au/site/initiatives/stronger_together_south_australias_disaster_resilience_strategy.jsp

Handmer J, Ladds M and Magee L, 2016. *Disaster losses from natural disasters in Australia, 1967-2013*.

ISO 31000:2018 *Risk management – Guidelines*

Riddell, GA, van Delden H, Dandy GC, Maier HR, Zecchin AC, Newman JP and Newland C, 2017. *Futures Greater Adelaide 2050: An exploration of disaster risk and the future*. Bushfire and Natural Hazards Cooperative Research Centre.

World Bank, 2016, *High and dry: Climate change, water, and the economy*. World Bank, Washington, DC.

World Economic Forum. 2019. *The Global Risks Report 2019*, 14th edition.



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