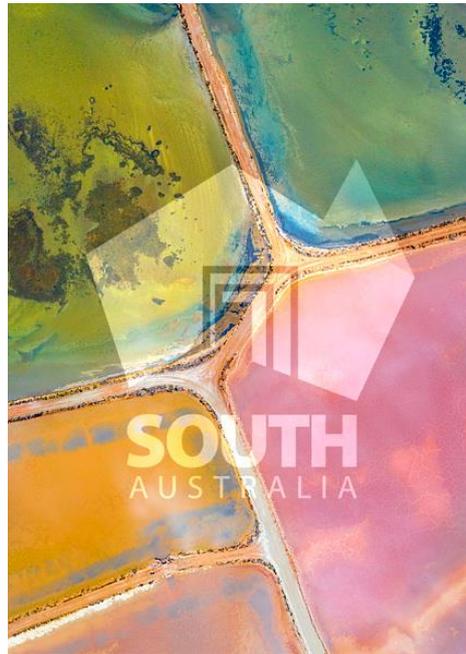


# SOUTH AUSTRALIA

## Key Hazards & Risk Summary

December 2022



Government of  
South Australia

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# FOREWORD

South Australia's State Emergency Management Plan (SEMP) identifies 11 hazards that can have a state level impact on people's health and wellbeing, infrastructure and/or the state's economy and environment and the communities in which we reside.

In comparison to many other Australian states and territories, South Australia has historically experienced emergency events at a lesser frequency and scale. According to a Bureau of Transport Economics report Economic Costs of Natural Disasters in Australia (2001), on average, South Australia has just over 3% of the total national disaster costs<sup>1</sup>.

Although this sounds like a positive, the total cost of natural disasters under a low emission climate scenario over the next 40 years is estimated to be \$30 billion. This is based on predictions between 2020-2060 by the 2021 Australian Business Roundtable.<sup>2</sup>

In recent years we have experienced several emergency declarations as well as the acceptance and acknowledgement, at state and national levels, of climate change being a standalone risk as well as a contributing factor towards other hazards.

The COVID-19 major emergency declaration was a historic 793-day declaration starting on 22 March 2020 and ending on 24 May 2022. The declaration saw impacts enforced such as state lockdowns, mandatory testing, mask mandates and quarantining. The lifting of the declaration acknowledged amendments made to the Public Health Act to continue management of the event<sup>3</sup>.

In January 2022, widespread flooding affected South Australia with some areas in the Far North and Eyre Peninsula receiving a years' worth of rain in just three days, resulting in a major emergency being declared. In November 2022, a major emergency was again declared, this time for extensive flooding along the River Murray. Both events destroyed infrastructure, impacted property, cut off entire towns, and impacted supply chains. Recovery efforts from the River Murray floods are expected to be extensive, and will extend into 2023 and beyond.

Other notable events in South Australia's recent history include the 2019-2020 bushfires at Cudlee Creek and Kangaroo Island, the 2016 State-wide black system event and the Sampson Flat and Pinery bushfires in 2015.

This document does not address day-to-day emergencies that are considered business as usual for response agencies; but has a clear focus on large scale emergencies requiring cross agency cooperation and provision of government support to assist community recovery.

The target audiences of this document are the State Emergency Management Committee (SEMC) and other high-level bodies. For specific information on the hazards identified as risks to the State's 11 individual Emergency Management Zones (regional) refer to the *Zone Key Hazards and Risks Summaries*.

As a state, we are committed to preventing and reducing hazard risk, being ready to respond to emergencies, and assisting the affected community's recovery after an incident. Assurance efforts, which confirm that agencies and organisations with functions under the SEMP can carry out their functions and are supported, are a new and crucial phase in this process.

**Julia Waddington-Powell**

Chief Executive  
SA Fire and Emergency Services Commission

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<sup>1</sup> Australian Disaster Resilience Knowledge Hub, Updating the costs of disaster in Australia: <https://knowledge.aidr.org.au/resources/ajem-apr-2018-updating-the-costs-of-disasters-in-australia/>

<sup>2</sup> Special Report: Update to the economic costs of natural disasters in Australia, Australian Business Roundtable for Disaster Resilience & Safer Communities

<sup>3</sup> Premier of South Australia media announcement: <https://www.premier.sa.gov.au/media-releases/news-items-2022/covid-major-emergency-declaration-ends>

## ACRONYMS

The following acronyms and terms are used within this document.

ACSC	Australian Cyber Security Centre's
Act	Emergency Management Act 2004 (SA)
AFAC	Australasian Fire and Emergency Services Authorities Council
ASIO	Australian Security Intelligence Organisation
BoM	Bureau of Meteorology
CFS	Country Fire Service
DEM	Department for Energy and Mining
DEW	Department for Environment and Water
DHW	Department for Health and Wellbeing
DIT	Department for Infrastructure and Transport
DPC	Department of the Premier and Cabinet
EMCC	Emergency Management Cabinet Committee
EPA	Environment Protection Agency
JEV	Japanese Encephalitis Virus
MFS	Metropolitan Fire Service
NERAG	National Emergency Risk Assessment Guidelines
PIRSA	Department of Primary Industries and Regions South Australia
SAFECOM	South Australian Fire and Emergency Services Commission
SAPOL	South Australia Police
SBCC	State Bushfire Coordination Committee
SEMC	State Emergency Management Committee
SEMP	State Emergency Management Plan
SES	State Emergency Service

# 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.



## 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.



## Environmental

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

# SOUTH AUSTRALIA IN FOCUS



## People

**1.78** million people

**41** is the average age

**17%** are children aged 0-14 years

**20%** are aged over 65 years

**80%** of South Australians live in Adelaide and surrounding metropolitan areas



## Environment

**983,482** square kilometres of land mass

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

**5** major deserts

**10** metropolitan reservoirs plus

**6** regional reservoirs

**6** wetlands of international importance



## Social setting / community

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

**22.4%** of households speak a language other than English at home

**4,305** people speak an Aboriginal and Torres Strait Islander language at home

### Top 5 non-English languages

Mandarin  
Arabic  
Vietnamese  
Cantonese  
Punjabi

### Top 5 Ancestries

English (33%)  
Australian (29.9%)  
Irish (9.5%)  
Scottish (8.6%)  
Chinese (5.5%)

### Top 5 religious affiliations

No religion (38.9%)  
Catholic (20%)  
Anglican (9.8%)  
Islam (3.2%)  
Hinduism (2.7%)



## Economy

**\$117.7 billion**

Estimated Gross State Product

**145,863** registered businesses

### Largest output sectors

Manufacturing  
Construction  
Rental, Hiring & Real Estate  
Public administration & safety  
Mining

### Employment by industry

Health Care & Social Assistance  
Retail trade  
Education and Training  
Manufacturing  
Construction

**91%** of households have at least 1 or more registered motor vehicles

**5.9** million domestic overnight trips

**22** million domestic nights

**\$5.9** billion spent on domestic expenditure

Please see Further Reading page of this document for statistical references (as of October 2022).

## 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 biosecurity  
Black system event  
Cyber Crisis  
Earthquake  
Extreme weather (heatwave and storm)  
Flood  
Hazardous materials (including marine oil spills)  
Human disease  
Rural fire  
Terrorism  
Urban 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 added after it was identified as an emerging risk.

# 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 in 2018 endorsed 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 Risk Reduction Leaders** and **Control Agencies** – assigned to manage and lead response when an emergency occurs.

## HAZARD RISK REDUCTION LEADER

Hazard Risk Reduction Leaders are agencies of the Government of South Australia, appointed by SEMC based on the respective agency's resources and expertise.

A Hazard Risk Reduction Leader is not necessarily the control agency for an emergency.

### Role

- Lead emergency management planning activities in collaboration with other stakeholders for prevention, risk reduction, preparedness, response and recovery relating to the assigned hazard.
- Preparing, reviewing and maintaining a Hazard Risk Reduction Management Plan for its assigned hazard in line with the Principles of the Act and the SEMP.
- Participate in the SEMC assurance program and examining other plans prepared under the SEMP to ensure that all aspects of the assigned hazard have been addressed.
- Review and report to SEMC on activities and issues arising with agency planning and/or coordination including conflicts or risk impacts from other agency plans.
- Provide advice to SEMC on any proposals to amend or remove the hazard listing.

Hazard Risk Reduction Leaders coordinate Commonwealth, state, local government or non-government resources to undertake hazard risk reduction activities.

## CONTROL AGENCY

A control agency is the agency appointed under the Act in relation to an emergency.

A control agency is responsible for ensuring it is adequately prepared to respond to an emergency event. This includes monitoring for potential emergency events and, where appropriate, taking actions to prevent an emergency event occurring and responding to events of lesser significance to prevent escalation to an emergency level.

### Role

- Take control of the response
- Ensure a safe working environment and safe systems of work
- Ensure effective stakeholder engagement, communication and cooperation with all involved
- Continually assess the situation, identify, assess and manage current and potential risks and consequences, share information with all involved
- Develop and share plans and strategies
- Implement and monitor incident action plans
- Ensure the effective allocation and use of available resources
- Ensure the public is adequately informed and warned to enhance community safety
- Facilitate investigation of the emergency and review of response activities
- Ensure transition from response to recovery.

# MANAGING RISKS TO SOUTH AUSTRALIA

## OUR GOVERNANCE FRAMEWORK

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

**Emergency Management Cabinet Committee (EMCC):** The EMCC is chaired by the Premier and is in place to support the Premier in undertaking the Premier's responsibilities under the Act.

**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.

**State Emergency Management Committee (SEMC):** Established under the Act. SEMC is tasked with leadership and oversight of emergency management planning, preparation and review of the SEMP, conducting risk assessments and assuring emergency management arrangements, amongst other things. It can also establish sub-committees to enable it to fulfil its responsibilities.

**Fire and Emergency Services Act 2005 (SA):** 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 will also include elements relating to the management of emergencies e.g., *Local Government Act 1999* and *Public Health Act 2011*.

The **State Emergency Management Plan (SEMP)** identifies the arrangements for the management of emergencies as:

**Prevention and Hazard Risk Reduction:**

An ongoing process based on risk assessment, research, experience of events and exercises. It also recognises risks vary over time and climate change influences hazards and risks.

**Preparedness:** The requirement to have staff capability and capacity, plans, processes, structures and training in place to meet agency and organisational responsibilities listed within the SEMP.

**Response:** Measures taken in anticipation of, during or immediately after an emergency to ensure that the effect of the emergency is minimised and that affected individuals are given immediate relief and support. Response activity is usually based on pre-existing plans and supporting plans which are scalable and flexible.

**Recovery:** The process of restoring or improving the livelihood and health, as well as the economic, physical, social, cultural and environmental assets, systems and activities of a disaster-affected community

## 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 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 which are fundamental to building resilience in SA:

- 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 essential to guiding the strategy and its implementation:

- 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 strengthens 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.



# CLIMATE CHANGE

Climate change is here and further change is inevitable. The effects of a changing climate are experienced across society, our environment, economy and communities.

The failure of climate-change mitigation and adaptation has been identified by the World Economic Forum's *Global Risks Report 2022* as the most severe global risk over the next 10 years.

## THREE MOST SEVERE GLOBAL RISKS:

- Failure of climate-change mitigation and adaptation
- Extreme weather events
- Biodiversity loss

## The Intergovernmental Panel on Climate Change states that:

- The extent and magnitude of climate change impacts are larger than previously estimated
- Taking action to adapt is critical
- Some limits to adaptation are being reached

Source: Climate Change 2022: Impacts, Adaptation

In South Australia, climate change is already apparent over a range of timescales:

Since 1910, average annual temperatures have increased by 1.6 degrees Celsius.

Since 1965, sea levels along our coast have risen by between 1.5 and 5 mm per year.

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

Future impacts of climate change are projected to include:



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

More frequent extreme heat days and hotter and longer heatwaves are projected across all South Australian regions.



Sea levels across South Australia are projected to rise by 22 to 25cm by 2050 and by 39 to 85cm by the end of the century.

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.



An increase in the number of days of severe fire danger ratings (FFDI>50) is projected across all of South Australia.



The amount of rain falling in extreme rainfall events will increase in all South Australian regions and the frequency of extreme rainfall events will increase.

**For more information about climate change and the South Australian Government's response visit:**  
[www.environment.sa.gov.au/topics/climate-change](http://www.environment.sa.gov.au/topics/climate-change)

# ANIMAL AND PLANT BIOSECURITY

The Department of Primary Industries and Regions (PIRSA) is the designated Hazard Risk Reduction Leader and Control Agency for Animal and Plant Biosecurity.

Animal and plant diseases include:

- Emergency animal diseases (defined in *Livestock Act 1997* and Emergency Animal Disease Response Agreement)
- Emergency plant pests / diseases (categorised in *Plant Health Act 2009* and Emergency Plant Pest Response Deed)
- Emergency aquatic animal diseases (defined in *Livestock Act 1997*)
- Emergency aquatic pests (defined in *Fisheries Management Act 2007*, *Landscape South Australia Act 2019* and National Environmental Biosecurity Response Agreement)
- Some invasive species (categorised under *Landscape South Australia Act 2019* and National Environmental Biosecurity Response Agreement)

Biosecurity means:

***“Protecting the economy, environment, and the community from the negative impacts of pests, diseases, weeds, and contaminants.”***

It includes trying to prevent new pests and diseases from entering, emerging, establishing or spreading, 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



Biodiversity decline, 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 Biodiversity visit:

<https://www.sa.gov.au/topics/emergencies-and-safety/types/animal-and-plant-disease2>

## HISTORICAL EVENTS

**Present / ongoing:** Most years around \$5M is spent keeping fruit fly and other plant pests out of SA. The incidence of fruit fly outbreaks is increasing, with significant metropolitan and Riverland outbreaks occurring over the past 3 years.

**June 2022:** Heightened border activities to reduce the risk of Foot and Mouth Disease are being introduced to SA and/or Australia following a recent outbreak in Indonesia.

**June 2022:** Varroa destructor, a parasite mite affecting honey bees, was discovered in NSW. SA introduced movement restrictions for bees, components and products and is undertaking surveillance and tracing activities to confirm that Varroa is not present in SA.

**February 2022:** Japanese encephalitis (JE) detected in SA in early March. Susceptible species include water birds, humans, pigs, horses and, rarely, other species. As eradication is not deemed feasible, the response transitioned to a PIRSA Animal Health program in June 2022.

**October 2020:** Khapra beetle, a significant grain storage pest, was detected in a shipment of imported furniture distributed nationally, including to SA. The Commonwealth conducted the initial response with ongoing surveillance and retreatments undertaken by affected locations until conclusion of the proof of freedom phase (2 years from detection).

**February 2018:** First detection of Pacific Oyster Mortality Syndrome (POMS) in SA was discovered in feral oysters in the Port River. A POMS management plan to contain the virus is in place and all commercial oyster growing areas in SA remain free of disease.

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

- More severe weather events elevating the risk of introduction of exotic pests and diseases from overseas due to their impact on insect and migratory animal movement
- Temperature and humidity changes affecting establishment patterns for exotic pests and disease
- Increased temperature and/or acidity of oceans resulting in marine ecosystem stress and the movement of aquatic animals

## KEY RISKS FOR SOUTH AUSTRALIA

South Australia's agriculture, forestry and fishing sectors, which contributed \$6.02 billion (2020-21) to the Gross State Product are at risk from more than 285 exotic pests or diseases of consequence.

Outbreaks can result from several 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 travelers
- Biofouling on ships or in ballast water
- Escape or release of species (e.g., from aquarium trade)
- Failure to comply with biosecurity restrictions
- New and emerging diseases
- Climate change (e.g., changing pest, disease and vector distributions)

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

### Community resilience improves with:

- Early detection and reporting of unusual pests, disease symptoms or weeds
- Understanding of and compliance with biosecurity restrictions



South Australia Police (SAPOL) is the designated Hazard Risk Reduction 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 streetlights, 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.
- 

Power outages due to damaged electricity transmission lines or related infrastructure.
- 

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

**March 2021:** Very low demand for electricity occurred due to high levels of photovoltaic (solar) generation. Solar system outputs were curtailed to reduce risk to the network.

**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.

**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.

**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, 80-90% within eight hours, and the last of the remaining customers 14 days later. A Business SA survey estimated the cost of the blackout to be about \$367m.

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

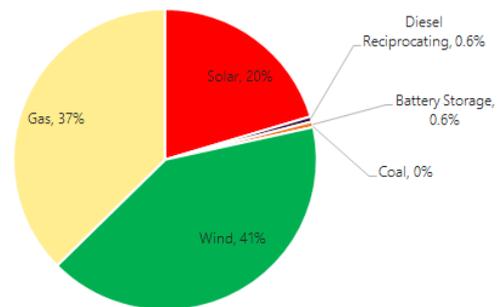
- Increased risk of extreme heat may overload components in the electricity transmission and distribution networks
- More frequent heatwaves may place greater demand on electricity generation
- Increased intensity of storm events may damage components in the transmission and distribution networks

## KEY RISKS FOR SOUTH AUSTRALIA

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.

South Australian Electricity Generation by Type 2020-21



- Transmission network of 5,591 km, and
- Distribution network of 87,999 km (including 71,177 km overhead and 16,822 km underground).
- The Energy Connect Project has commenced that will develop a new interconnector between South Australia and New South Wales to improve network redundancy.

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

# CYBER CRISIS

The Department of the Premier and Cabinet (DPC) is the designated Hazard Risk Reduction Leader and 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.

No sector of the Australian economy is immune from the impacts of malicious cyber activity. Government agencies at all levels, large organisations, critical infrastructure providers were all targeted during 2020/21 period, predominantly by criminals or state actors and continue to be targeted at growing rate.

Engaging online is part of everyday life but the online world can give criminals opportunities to steal money, information or identities. To protect the community DPC recommends using the Australian Cyber Security Centre’s (ACSC) advice (<https://www.cyber.gov.au>). The ACSC provides information on 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 a cyber 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

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/cyber-security>

## 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:

**2022:** The South Australian Government's Cyber Security Watch Desk detected and responded to an increase in the number of threats to the South Australian Government. This is reflective of the increase in cyber security incident reports across recent Financial Years: in FY 21/22 the number of reports more than doubled from the 1,960 incidents reported in FY 20/21.

**2021:** The Texas to New York pipeline responsible for the transportation of refined gasoline and jet fuel experiences a shut down due to a cyber-attack. The attack resulted in long lines, higher retail fuel prices, empty service stations and the threat of data leakage. \$4.4M USD in bitcoin was paid to regain access to their data and systems

**2019:** Victorian Country Health was subject to a cyber-attack that shut down access to critical patient records, booking and management systems and causing delays to elective surgeries. The outage cost has not been released however the Victorian Government had to invest \$30 million to modernise IT infrastructure of 28 hospitals and health services.

**2017:** A global cyber-attack affecting 50 countries, known as WannaCry, caused disruption of services across hospital sites and GP practices. The cost of the incident and recovery efforts is estimated at £92m with over 19,000 patients having their medical appointments cancelled or delayed and digital processes reverting to manual processes for blood results and clinical records and the diversion of emergency ambulances to other hospitals.

### 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.

## 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.

### Strategic Risks

- Significant cyber security skills shortage (capability and capacity) nationally, but even more difficult for South Australia to compete.
- South Australia increasing global target due to positioning itself as a leader in areas of agriculture, defence, space, machine learning and hydrogen.
- The rapidly advancing technological landscape presents great opportunities but also serious threats.

### DPC actively:

- Lead the 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.
- Leads the improvement of cyber resilience of government services that the community rely on, including working with law enforcement agencies.
- Work with State and National on the emerging threats and risk reduction activities.
- Promotes State and National awareness programs that provide information on how the community can prepare and recovery from incidents that impact them.

### 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 for Infrastructure and Transport (DIT) is the designated Hazard Risk Reduction Leader for earthquake.

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

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 including environmental contamination



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

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/earthquake>

Geoscience Australia monitors earthquake events at [www.ga.gov.au](http://www.ga.gov.au)

## HISTORICAL EVENTS

**March 2022:** Mount Barker magnitude 2.9, nil damage, felt widely across the metropolitan area.

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

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

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

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

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

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

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

### 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

## 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

DIT 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](http://sa.gov.au)

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

- Based on current research, there is evidence to suggest the impact of melting ice caps might contribute to earthquake frequency.

# EXTREME WEATHER: HEATWAVE

The South Australian State Emergency Service (SES) is the designated Hazard Risk Reduction Leader and Control Agency for Extreme Weather: Heatwave.

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. Extreme heat poses an increased risk to the health and wellbeing of the mentally ill.



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/extreme-weather>

## HISTORICAL EVENTS

**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.

**December 2015:** Adelaide recorded four consecutive days above 40°C, a first in the month of December, with more than 85 people admitted to hospitals with heat-related illnesses.

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

**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 the highest temperature of 45.7°C. More than 34 excess heat-related deaths were reported.

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

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

- Higher average temperatures
- Increased risk of extreme heat events
- 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, including those with mental illness
- Inability to keep cool
- Disability
- Environmental and social factors

The 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

# EXTREME WEATHER: STORM

The South Australian State Emergency Service (SES) is the designated Hazard Risk Reduction Leader and Control Agency for Extreme Weather: Storm.

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:

## ***Thunderstorm which 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***

## ***Synoptic Storm could include some or 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:

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

## HISTORICAL EVENTS

**May 2022:** Intense rain and damaging winds brought down trees, damaged powerlines and caused property damage due to water ingress broadly across the State. Coastal erosion was reported along Adelaide's Metropolitan beaches. Based on the type and pattern of the damage reports, along with radar evidence of rotation, this was classified as a tornado.

**October 2021:** A low-pressure system crossed South Australia saw localised giant hail and sustained damaging winds. Significant impacts to roofs, vehicles, and infrastructure. Numerous public schools were closed in affected areas, and significant numbers of power outages were reported across the state due to the severe weather. The Insurance Council of Australia declared this event an Insurance Catastrophe with costs estimated to be around \$100m.

**July 2021:** SES responded to more than 100 weather-related incidents, including trees in several locations in the Mt Lofty Ranges. BoM indicated that it was likely that multiple small and fast-moving tornadoes occurred, possibly more than 125 km/h at times.

**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.

**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.

**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. King tide and storm surge led to \$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.

## 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 can 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.

The SES actively undertakes:

- Close liaison with Bureau of Meteorology on forecasts for storms
- Community engagement and education
- Where possible, providing warnings to the community
- Respond to requests for assistance from the community

### 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

### 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

# FLOOD



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

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

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

- **Riverine flooding** – caused by prolonged or severe rain in the upper reaches of the catchment of a watercourse. Occurs six or more hours after heavy rainfall when excess water flows over the banks of watercourses.
- **Flash flooding** – caused by heavy rainfall in quick response streams, run-off to a waterway or run-off exceeding local drainage capacity (stormwater flooding in urban catchments). Occurs very quickly after a high intensity rain event and can generate fast moving water.
- **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 due to tidal and/or wind-driven events, including storm surges in lower coastal waterways.

## POTENTIAL IMPACTS

The impacts of a flood event are a function of several characteristics of the event:

- flood type

- Location and extent, relative to assets at risk from damage or loss
- timing and duration
- magnitude (resulting flood depth and velocity)
- available warning time
- community vulnerability preparedness and response.



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, loss of access to transportation routes, loss of crops and livestock, and interruption to local economy.



Injury or death of wildlife by drowning or isolation from food sources, physical change to water courses, deposits of silt and refuse, reduced water quality, damage to soils and elevated risk of erosion.



Disruption to utilities and government services, communication networks, sporting and cultural events, isolation of communities, damage to culturally and socially significant sites.

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/extreme-weather>

## HISTORICAL EVENTS

### November 2022 – present (December 2022):

High upstream flows and higher than average rainfall are causing significant flooding along the River Murray. High water flows and water levels are expected to last several months into 2023. Major disruption to road and ferry services, homes and infrastructure damaged.

**January-February 2022:** Record rainfall caused significant impacts in northern, central, and western parts of SA. Included major disruption to road and rail networks connecting the state to WA and NT. Estimated cost to state government infrastructure of \$156m.

**September 2016:** Two flood events, involving multiple watercourses, inundated homes, residents required to evacuate, damaged infrastructure along the River Torrens. Crop growers also impacted. Estimated losses of \$66m <sup>2016 value</sup>.

**May 2016:** Storm surge 1.2m above predicted astronomical high tide impacted multiple coastal suburbs and Conservation Park vegetation. Estimated losses of \$3.5m <sup>2016 value</sup>.

**December 2010:** Two storm fronts delivered widespread rainfall through the mid north, Riverland and Mt Lofty Ranges. Damage to 66 homes, roads, infrastructure, crops, and livestock, totalled more than \$11m.

**November 2005:** Gawler River flooding caused extensive damage to 1,500ha of market gardens. Estimated losses of \$61m <sup>2013 value</sup>.

**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 <sup>2013 value</sup>.

**December 1992:** Widespread flooding between Gawler, eastern Adelaide Hills, and Goolwa. Homes inundated, 1 reported death, damage to crops and market gardens. Estimated losses of \$2.4b <sup>2013 value</sup>.

**March 1983:** Drought breaking thunderstorm rains caused flood and storm damage in Adelaide suburbs and the Barossa Valley. Estimated losses of \$56m <sup>2013 value</sup>.

**August 1956:** The River Murray flow peaked at 341 GL/day. 1,500 people were evacuated,

## KEY RISKS FOR SOUTH AUSTRALIA

State flood risk locations include:

- Gawler River catchment
- Light and Wakefield Rivers catchment
- Brownhill and Keswick Creeks catchments
- Numbered (First to Fifth) Creek catchments
- Port Adelaide area (sea and stormwater flooding)
- River Murray floodplain
- Upper and Lower Onkaparinga River catchment
- Dry Creek catchment
- River Torrens
- Coastal areas of the state (expected to increase with mean sea level rise).

DEW undertakes:

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

### The effect of climate change on the flood 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

### 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

and 15,000 visitors per day were impacted at Mannum. Estimated losses \$225m <sup>2012 value</sup>



SafeWork SA is the designated Hazard Risk Reduction Leader for Hazardous Materials.

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 for Infrastructure and Transport (DIT) 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.

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.”***

### 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.

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

**March 2020:** A B-double truck rolled over while travelling on the Dukes Highway near Culburra in the Murraylands. The vehicle contained a mixed load of chemicals which spilt during the incident. While the spill was cleaned, the highway remained closed for 23 hours. The remoteness of the incident site exacerbated and delayed the emergency response

**February 2020:** An unknown quantity of Jet-A1 fuel spilt into the Port River while being transferred from ship to on-shore storage. While immediate action was taken to contain and clean up the spill, nearby residents reported suffering health effects from the odours and fumes.

**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 lawsuit (\$20m loss of vessel, \$4m replacement for fishing, \$4m economic loss and salvage).

**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.

**May 2006:** A factory near Gladstone producing explosives for the mining industry exploded. The resulting blast killed three workers, and two more sustained serious injuries. Rescue and recovery operations were hampered by contamination at the site from materials which included uninitiated explosives and their raw ingredients. The blast levelled all structures within a 100-meter radius and was reported to be heard up to 70 km away.

**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.

## KEY RISKS FOR SOUTH AUSTRALIA

Hazardous materials are usually stored in association with significant fuel storage locations, service stations, water and wastewater 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
- Proactively and reactively conducts worksite Health and Safety Inspections to ensure compliance and enforcement.

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

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

### Community resilience improves with:

- Labelling chemicals correctly
- Safe transport and storage of chemicals
- Training and induction of workers who manufacture or handle chemicals
- Preparing and practicing site emergency response plans

# HUMAN DISEASE



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

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, loneliness, and anxiety of affected communities due to quarantine controls. Mental health issues due to loss of income or 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

### Japanese Encephalitis Virus (JEV) 2022:

Four cases of suspected JEV were first reported on 12 February 2022. By May 2022 there were nine cases (four confirmed and five probable) and one death. This is the first time JEV has been detected in SA. SA Health worked with local councils to support mosquito surveillance and control programs, and JEV vaccines were distributed to identified at risk individuals.

### SARS-COVID-19 Coronavirus ongoing

**since 2019:** SA recorded its first case of COVID-19 on 1 February 2020, from then until 30 July 2022 there have been over 700,000 cases in SA, with over 650 deaths. During this ongoing pandemic, SA has experienced mask mandates, lockdowns, contact tracing, testing, isolation and/or quarantine requirements, and vaccination programs to mitigate, suppress and slow the spread of the virus. As of December 2022, COVID-19 continues to be a pandemic within SA, Australia and internationally.

**H1N1 Influenza 2009:** SA 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, with airlines reporting passengers with influenza symptoms.

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

### 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
- State funded vaccination programs, including influenza and COVID-19
- 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.

# RURAL (BUSHFIRE) FIRE



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

The South Australian Metropolitan Fire Service (MFS) will respond to any bushfires within their legislated response areas.

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 the disruption of natural systems and process e.g., 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

**January 2022:** The Coles bushfire burnt 3,877 ha, resulting in 1 death and the loss of over 1500 ha of plantation. Insured costs estimated beyond \$17m.

**January 2021:** The Blackford (Lucindale) bushfire burnt 14,000 ha resulting in the loss of 3 houses, over 6800 livestock.

**January 2021:** The Cherry Gardens bushfire burnt 2,565 ha and destroyed 2 houses.

**December 2019/January 2020:** The Cudlee Creek and Kangaroo Island bushfires burnt over 265,000 ha, resulting in 3 deaths and the loss of 188 houses, 60,000 livestock and large numbers of wildlife. Combined insured costs estimated at \$186m.

**November 2015:** Pinery bushfire, burnt 86,000 hectares, resulting in 2 deaths, 90 injuries, 470 damaged buildings and the loss of 18,000 sheep and 87 cattle. Losses also included unharvested production. More than 1,700 firefighters responded to the fire (including support from Victoria). Insured costs estimated at \$170m <sup>2016 value</sup>.

**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.

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

**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 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 <sup>2011 value</sup>.

**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 <sup>2011 value</sup>.

**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 <sup>2011 value</sup>.

## 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 the Far North, Mid North, Lower Eyre Peninsula, Adelaide Hills, Kangaroo Island, Murray Mallee and Upper and Lower South East.

The 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
- Provides executive function to the State Bushfire Coordination Committee (SBCC) and supports the development and implementation of the [State Bushfire Management Plan](#).
- Provides executive function to the Bushfire Management Committees and facilitates the assessment 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.

### 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

### Community resilience improves with:

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

# TERRORISM



ESCAPE. **HIDE.** TELL.

South Australia Police (SAPOL) is the designated Hazard Risk Reduction 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 Australian Security Intelligence Organisation (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 specific terrorism events however there have been some occurrences that have initiated terrorism like responses and/or highlighted possible terrorism risks.

**June 2022:** An Adelaide man was arrested, accused of plotting a terror attack by amassing weapons, explosive material and key tactical information.

**January 2019:** An Administrative officer at Yatala Labour Prison was taken to hospital after coming into contact with white powder while opening mail.

**March and May 2018:** Two separate white powder incidents occurred at different Centrelink offices across Adelaide.

**May 2017:** An Adelaide woman was charged with being a member of terrorist organisation Islamic State.

**December 2017:** A driver and four pedestrians were injured after a car crashed into Christmas shoppers in the CBD. This incident highlighted the risk of vehicles being used as weapons.

**February 2013:** A man with two young children drove down Rundle Mall after fleeing from a prior hit and run collision. Another nonspecific act of terrorism but one that contributed to safety measures being placed in Rundle Mall to prevent public car access and vehicles being used as weapons.

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

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

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

## 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
- Monitoring 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.

# URBAN (STRUCTURE) FIRE



The South Australian Metropolitan Fire Service (SAMFS) is the designated Hazard Risk Reduction Leader and Control Agency for Urban Fire.

The Country Fire Service (CFS) will respond to any structure fires within their legislated response areas

A structure fire is defined as:

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

During 2020-21, the MFS attended a total of 952 calls to incidents classified as structure fire response, including 807 in the Adelaide metropolitan area and 145 in regional areas. MFS report that this number is lower than previous years due to the impact of COVID.

## BUILT ENVIRONS

The South Australian *Planning, Development and Infrastructure Act 2016*, Australian Standards, Minister’s Specifications, National Construction Code, and Work Health and Safety Legislation require 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

**April 2022:** An intense fire broke out at the Meridien Lodge North Adelaide where fifteen guests were trapped on upper floors, 5 were rescued by ladders and the others by MFS Firefighters who were able to reach the trapped hotel guests. Over 40 Firefighters attended the scene, where building sustained approximately \$600,000 damage.

**March 2022:** Structure fire at the Kapunda High School that was attended by approximately 80 MFS and CFS Firefighters where the multiple buildings, including a large heritage building was damaged, estimated loss of \$5 million.

**April 2021:** Structure Fire at Visy's Recycling facility at Wingfield that was attended by approximately 100 Firefighters from the MFS and CFS in the early hours of the morning. The site sustained more than \$1 million worth of damage due to the fuel load of paper and plastic being stored there. The site was used by 11 South Australian councils for processing about 250 tonnes of recycling per day.

**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.

**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.

**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 more than \$300m.

### 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.

The 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 water hydrant, fire alarm and smoke management systems and provides an opportunity for comment on the operation of these systems prior to occupancy for new or renovated buildings to ensure they meet legal obligations of fire safety protection
- Undertakes fire safety inspections of health care buildings, identifying deficiencies and ensuring they are rectified
- Assists each Council's Building Fire Safety Committee to ensure existing buildings provide a 'reasonable level of fire safety'.

### Community resilience improves with:

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

# 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 (NERAG)*. 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: [–SES – Key Hazards & Risks Summary for Zones.](#)



## 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.

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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*.

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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*

[Stronger Together - South Australia's Disaster Resilience Strategy - SAFECOM](#)

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*, 14<sup>th</sup> edition.

### STATISTICAL REFERENCES

South Australia in focus data was obtained from a variety of sources, including:

Australian Bureau of Statistics 2016 Census

Australian Bureau of Statistics 2021 Census

SA.GOV.AU website

EPA.sa.gov.au website

Geoscience website

Department for Environment and Water website

SA Water website

Tourism SA website

National Institute of Economic and Industry Research (NIEIR)



Photo: Loch Luna Game Reserve, Riverland