KEY HAZARDS & RISKS SUMMARY

Emergency Management Plan

LIMESTONE COAST ZONE

Bowman scenic drive, Limestone Coast.

Government of South Australia

CONTENTS

councils

City of Mount Gambier
District Council of Grant
District Council of Robe
Kingston District Council
Naracoorte Lucindale Council
Tatiara District Council
Wattle Range Council

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INTRODUCTION

Across South Australia, there are a range of hazards including natural disasters such as bushfires, storms, heatwaves and floods that can have significant effects on peoples' health and wellbeing, along with severe impacts on community, social, environmental and economic structures.

This is a concise summary of the Limestone Coast Zone Emergency Management Plan (ZEMP) which provides information on natural disasters and hazards identified as having a specific relationship to the Limestone Coast Zone.

Robe, South Australia.

TOP HAZARDS AT A GLANCE FOR THE LIMESTONE COAST ZONE AND THEIR IMPACTS

Hazard	People	Economy	Social/ Community	Environment
Earthquake				
Flood				
Extreme Weather - Heat				
Extreme Weather - Storm				
Bushfire				
Animal and Plant disease				

The table above gives an indication of the greatest impacts of disaster events on different aspects of the community. The extent of the impact felt is influenced by the intensity of the event, the actions taken to reduce or avoid the effects and the ability of the community, businesses and government to respond and recover.

Earthquake – Adelaide is the most earthquake-prone capital city in Australia. Earthquakes occurring in urban areas pose a risk to residents and essential societal systems, including critical infrastructure. In an earthquake, it's important that you quickly drop to the ground close to you, where you can avoid injury from flying debris; take cover under something strong, like a sturdy table; and hold on to it until the shaking stops.

Flood – Flood is the most costly natural disaster in South Australia. It is important to be aware of flood and severe weather warnings, ensure you have adequate insurance if you live in a flood prone area and never drive in floodwaters.

Extreme Weather (Heat) – Extreme heat causes more deaths in Australia than all other natural hazards combined. Take precautions to keep cool, take shelter from the heat and drink water; even individuals who are healthy can be affected. Never leave children or pets in cars as vehicles can quickly heat up to deadly temperatures even on relatively mild days.

Extreme Weather (Storms) – Extreme storms are more commonly observed than any other natural hazard in South Australia. To stay safe you should move vehicles under cover or away from trees; secure or put away loose items around your property and stay indoors, away from windows, while conditions are severe.

Bushfire – South Australia can expect 6 or 7 serious fires every 10 years. Be prepared for a bushfire if you live in a bushfire area, and be bushfire ready by having a bushfire plan.

Animal and Plant Disease – A major outbreak of an animal or plant disease has the potential to cost billions of dollars in lost earnings. Exotic disease can easily be mistaken for common diseases seen on South Australian farms every day. Seek professional assistance as soon as any problem is noticed to protect the future of the agriculture, viticulture and livestock industry.

ALL SECTORS OF THE COMMUNITY HAVE A COLLECTIVE RESPONSIBILITY WHEN IT COMES TO EMERGENCY MANAGEMENT.

Coonawarra Region, South Australia..

LIMESTONE COAST ZONE IN FOCUS

7 councils

Population **64,794**

SIZE **21,336** square kilometres

employment **29,911**

$3.94b Gross Regional Product

7,413 businesses

51% of SA's **milk production**

29% of SA's **wool**

27% of SA's **meat**

5% population **speak another language**

MAJOR Industries

Agriculture

HORTICULTURE

Livestock

tourism

KEY infrastracture

Road/rail link – Adelaide to Melbourne

MOUNT GAMBIER AIRPORT

Electricity generators

BLUE LAKE Tailem Bend – Keith water pipeline

SEAGas pipeline

HEALTH SERVICES

15 MAJOR health facilities

14 aged care facilities

TOURISM

$393m per year

1.2m visitors per year

2 WETLANDS OF International Importance

Bool and Hacks Lagoon

Piccaninnie Ponds

by 2070

1.4°C WARMER

30-40cm SEA LEVEL RISE

6% RAINFALL DECLINE

5% INCREASE **RAINFALL INTENSITY**

RENOWN FOR

fertile soils

reliable rainfall

significant groundwater resources

UNDERSTANDING OUR RISK PROFILE

Disasters are having an increasing financial and social impact on individuals, communities and businesses. There are large upfront costs for response and recovery and long–term impacts on wellbeing. The cost of disasters, both direct and intangible, are expected to rise significantly in the coming years.

In 2011, the Australian Government released the National Strategy for Disaster Resilience[1] (the Strategy). The Strategy aims to promote a shared responsibility between governments, business, not-for-profit organisations, communities and individuals. The Strategy recognises that Australians need to focus more on understanding risks relevant to their community and preparing for potential impacts.

Keeping the community informed is a key aspect in building community resilience – before an emergency to help with prevention and preparedness, while responding to the emergency and after, to help with recovery.

This plan is a public version of the Limestone Coast Zone Emergency Management Plan (ZEMP). The ZEMP relies on strong, cooperative, coordinated and consultative relationships among State Government agencies and local governments to work together in disasters. State Government and Local Government have plans to maintain effective service delivery to ensure that an efficient and coordinated response and recovery can be delivered to any disaster.

All sectors of the community have a collective responsibility when it comes to emergency management.

[1]National Strategy for Disaster Resilience: *http://www.safecom.sa.gov.au/site/emergency_management/natural_disaster_resilience_program.jsp*

Naracoorte Caves, Naracoorte.

South Australia's emergency management arrangements involve the following activities:

- **Prevention** – actions undertaken in advance. Sometimes this is referred to as mitigation. Examples include prescribed burning or constructing flood mitigation dams, having back-up generators or alternative communication systems in place. Prevention activities occur prior to disasters.
- **Preparedness** – making arrangements, creating and testing plans, training, educating and sharing information to prepare organisations and communities before a disaster occurs.
- **Response** – the assistance and intervention during or immediately after a disaster. Focus is on saving lives and protecting community assets (buildings, roads and infrastructure) and the environment.
- **Recovery** – the coordinated process of supporting emergency-affected communities in reconstruction of physical infrastructure and restoration of emotional, social, economic and physical wellbeing. Recovery can be required for months and/or years after the disaster.

Umpherston Sinkhole, Limestone Coast.

MAJOR HAZARDS

The Limestone Coast Zone

1. Earthquake
2. Flood
3. Extreme Weather - Heat
4. Extreme Weather - Storm
5. Bushfire
6. Animal and Plant Disease

Risk Assessment Process

The arrangements for the state to manage emergencies are outlined in the State Emergency Management Plan (SEMP).

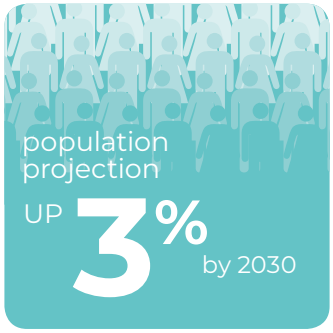
The SEMP identifies the State's eleven Emergency Management Zones. Each of these Zones has specific characteristics that are vulnerable to disasters, for example different demographics, industry, infrastructure, businesses and economic factors.

Each Zone has a Zone Emergency Management Committee (ZEMC) made up of Local and State Government and emergency management staff. These committees have a risk assurance role and provide regional leadership in emergency management in their Zones. One of their main roles is the development of a Zone Emergency Management Plan. This is important as understanding the potential impact of disasters on the region is essential for planning and preparation.

Zone Emergency Management Plans were produced by conducting risk assessment workshops with stakeholders from government and non-government organisations. These workshops used realistic scenarios about a hazard. Attendees then assessed which risks were the most likely to occur and could have the greatest impacts in the Zone.

The Limestone Coast Zone Emergency Management Plan includes detailed information about the six relevant hazards in the Zone: earthquake, flood, extreme heat, extreme storm, bushfire and animal and plant disease and the main risks associated with each. Information about the priority hazards and their likely impacts are detailed in the following pages.

Risk assessments used *The National Emergency Risk Assessment Guidelines* based on ISO 31000 to ensure a consistent and rigorous approach.



EMERGENCY SERVICES

81 CFS Brigades
5 SES units
1 MFS stations
12 POLICE stations
12 AMBULANCE stations

History of Emergencies

1964 FLOODS
1983 ASH WEDNESDAY FIRE
2016 STORMS

1. EARTHQUAKE

An earthquake is shaking of the surface of the earth caused by underground movement, such as along a fault line or by volcanic activity. They range in strength from slight tremors to major shaking, lasting from a few seconds to a few minutes and may be followed by aftershocks. Apart from the damage caused by the ground shaking, earthquakes can also lead to liquefaction (soil becoming liquid) which can cause extensive damage to buildings.

Earthquakes are measured on the Richter Scale, with 9.5 being the highest possible magnitude. Australia averages 80 earthquakes per year with a magnitude greater than 3.0. An earthquake of 5.5 is experienced approximately every two years and a 6.0 every five years.

Earthquake was considered for this Zone as it has been subject to earthquake activity in the past.

Earthquakes may cause injury and death and impact the health system. Damage to residential, commercial and industrial buildings, as well as stock and equipment is possible. The tourism industry may be impacted and Local Government infrastructure, may be damaged. Release of hazardous materials is also a concern.

The social fabric of the community may be affected when people are unable to return to the community due to loss of houses or businesses, interruption to public services and amenities or impaired access to their properties.

In an earthquake it's important that you quickly:

- **DROP** to the ground close to you, where you can avoid injury from flying debris.
- Take **COVER** under something strong, like a sturdy table.
- **HOLD** on to it until the shaking stops.

For information on what can be done to minimise the impact to you and your family, or business visit: https://www.sa.gov.au/topics/emergencies-and-safety/types/earthquake

RECENT EARTHQUAKE EVENTS

- In 1898, Beachport experienced a 4.9 magnitude earthquake causing extensive damage to houses, businesses, schools, a police station and courthouse as well as roads. Liquefaction also occurred during this event. Damage is expected to have occurred up to 12kms away and felt up to 150kms away.
- In 1954, Darlington experienced a 5.5 magnitude earthquake causing 16 injuries and damage to buildings totalling $90 million. Damage is expected to have occurred up to 20kms away.

Risk Assessment Scenarios

To understand the impact of earthquake on the Zone, the following scenarios were considered as part of the risk assessment:

Scenario 1 – 5.0 Magnitude – hypothetical event based on Kalgoorlie 2010 earthquake

- $116m damage to residential homes
- $8 million damage to commercial and industrial buildings
- 1 severe injury or death
- 3 light to moderate injuries

Scenario 2 – 5.6 Magnitude – hypothetical event based on New Castle 1989 earthquake

- $193m damage to residential homes
- $56 million damage to commercial and industrial buildings
- 1 severe injury or death
- 5 light to moderate injuries

2. FLOOD

The Limestone Coast region covers a large area with rural and metropolitan sections. Key flood sources are from the a failure of the drainage systems across the region, high intensity rainfall resulting in flash flooding in the smaller creek systems, and storm surge and other coastal flooding.

The local creeks' seasonal flow is dependent on local rainfall. The catchment is relatively flat with some depression areas which are not free draining. The catchment also features runaway holes and other natural, as well as artificially created, drainage features. These characteristics result in significant runoff from the catchment being challenging to manage.

Urban areas within the Zone may also be impacted by stormwater flooding, which is urban flooding caused by local drainage capacity (pipes, gutters and side entry pits) being exceeded by the flow, or blocked with debris causing localised flooding. Stormwater flooding is generally very localised and quick to respond to rainfall.

The assessments showed that the main risks to people were death and injury as well as increased demands on health services. There is the risk of entire communities being isolated or people being unable to return to their homes due to loss or damage to their property or businesses.

Floods significantly affect the economy through disruption and damage to industries such as agriculture and tourism.

It is very important to never drive through floodwaters and ensure that you have adequate insurance if you live in a flood-prone area.

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

Flood is the most costly natural disaster in South Australia. For the period of 1967-2013 the cost of flooding was approximate $48 million per year.

The main types of flooding include:

Flash flooding – flooding that occurs quickly from heavy rainfall and can be very localised

Riverine flooding – flooding that occurs in a river catchment or watercourse

Infrastructure failure – including structural failure of pipes, dams or levees

Coastal inundation – that occurs from large waves from storm events

Groundwater flooding – flooding that occurs when sub-surface water emerges from the ground due to high rainfall, high river levels or high tides.

A HISTORY OF FLOODING IN THE ZONE

1865 Storm surge at Port MacDonnell flooding front streets and causing severe damage to the jetty.

1889 Heavy rain caused flooding in Kingston, Bordertown, Naracoorte and surrounding areas resulting in significant evacuations and extensive damage to public and private infrastructure and private property.

1946 Continuous heavy rains in the region caused widespread long-lasting flooding with main roads closed and extensive damage to agriculture.

1947 Large areas of land between Bordertown and Port MacDonnell flooded resulting in evacuation of homes, damage to infrastructure, roads, rail, and large losses to agriculture.

1964 Thousands of acres were flooded in Mt Gambier, Naracoorte and surrounds with Millicent airport closed for a number of days and long-lasting floodwaters caused damage to agriculture.

Risk Assessment Scenarios

To understand the impact of flood on the Zone, the following scenarios were considered as part of the risk assessment:

Riverine Flooding – Tatiara Creek, Naracoorte Creek, and Morambro Creek.

Coastal Inundation and Sea Level Rise

Infrastructure failures – including South East drains

Flash flooding – in Mt Gambier

Ground Water Mounding

3. EXTREME HEAT

Extreme heat causes more deaths in Australia than all other natural hazards combined.

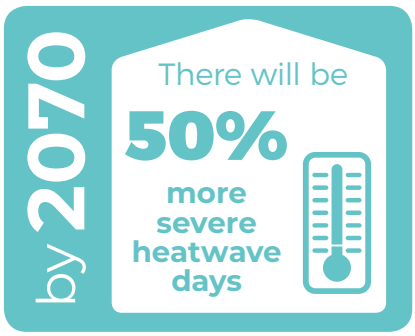
Extreme heat, also known as a heatwave, is defined as three or more days of high maximum and minimum temperatures that are unusual for that location.

Heatwaves can be the cause of death and significant health issues in people with kidney, heart disease and mental health issues. The risk of death and serious illness is particularly high for the elderly, children, rough sleepers, travellers and those working or enjoying recreational activities outdoors.

People are encouraged to take shelter from the heat, drink water and keep cool. Never leave children or pets in cars as they can heat quickly to deadly temperatures even on relatively mild days. Heatwaves are a particular risk for anyone who does not take precautions to keep cool, even individuals who are healthy.

Stock, crops, the natural environment and infrastructure, such as power, communications, water and transport are at risk. Heatwaves can also impact the continuity of service provision from businesses and Local and State Governments. Extreme heat can also impact on health services, Local Government infrastructure and tourism.

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



Risk Assessment Scenarios

To understand the impact of extreme heat on the Zone, the following scenarios were considered as part of the risk assessment:

Scenario 1 - In March 2008 a heat event with 15 consecutive days with a max temp >37.8˚C (in Adelaide), caused at least $150 million in damage and reduced income for South Australia. There was a threefold increase in heat related hospital admissions.

Scenario 2 - The January / February 2009 heat event which ran for 13 consecutive days across South Australia with temperatures up to almost 49˚C recorded and over 34 deaths in South Australia.

Scenario 3 - A hypothetical heat scenario – a combination of the extended period of the 2008 event and the intensity of the 2009 event with expected breakdown of critical infrastructure such as electricity, transport network and communications. Likely impacts included increased demand on ambulance and hospitals, hundreds of deaths, outdoor work ceases and food shortages.

RECENT EXTREME HEAT EVENTS

Heat Event of 2014

- 38 deaths
- 294 heat-related emergency presentations at hospitals

4. EXTREME STORM

Extreme storms are more commonly observed than any other natural hazard in South Australia. Extreme thunderstorms can occur at any time of the year, however in South Australia, they are more common in spring and summer. The Zone experiences storms several times per year. The Bureau of Meteorology has identified two types of extreme storm that can affect the Zone. These are:

Thunderstorm:

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

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.

The extreme storm risk assessment identified a number of risks to the Zone. Extreme storms can cause injury or death, as well as increased demand on health services. Houses may become unliveable due to damage or lack of essential services. Interruption and damage to businesses as well as Local, State and Commonwealth Government infrastructure may also be possible, while crops, livestock, fishing and tourism could also be affected.

To stay safe people should:

- Move vehicles under cover or away from trees;
- Secure or put away loose items around your property.
- Stay indoors, away from windows, while conditions are severe.

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

Risk Assessment Scenarios

To understand the impact of storm on the Zone, the following scenarios were considered as part of the risk assessment:

Scenario 1 – Example Penola Tornado 2010

- Over 40 buildings damaged
- 3 houses uninhabitable
- Clubhouse destroyed
- Winds estimated around 180km/h
- 2 people treated for minor injuries
- Trees uprooted and power lines down
- Cost $7 million

Scenario 2 - hypothetical storm event - synoptically driven extreme storm event, triggering smaller scale, very dangerous supercell thunderstorms. Long-lived and widespread.

- Long term power outages
- Extensive damage to houses
- Large number of deaths and/or injuries
- Roads blocked by trees
- Health and other response agencies overwhelmed

RECENT EXTREME STORM EVENTS

March 2003, a storm hit the South East with reports of up to 112mm of rain at Kangaroo Inn School. There was minor flooding of homes, trees and power lines down, roofs damaged, a serious accident attributed to weather conditions and the loss of 150 sheep.

December 2004, a thunderstorm caused 40mm to fall in less than 1 hour causing flash flooding in Mount Gambier CBD.

September 2016, a state-wide extreme storm led to extensive power outages and flooding; costing businesses $367 million state-wide.

5. 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."

South Australia can expect 6 or 7 serious fires every 10 years. The Zone has a history of bushfires including Ash Wednesday, Ngarkat Fires in 1999, 2001, and 2014 and the Tilley Swamp fire in 2013.

The bushfire risk assessment showed that the main risks to people were death and injury resulting from last minute evacuations, traffic accidents and people staying to defend their homes or protect their animals. Disabled people, children, elderly, new residents, tourists, outdoor workers and emergency services personnel are especially vulnerable.

Bushfire also significantly affects the economy through disruption and damage to infrastructure, such as essential services, loss of stock and primary production, damage to, or loss of, buildings, and loss of earnings.

The social fabric of the community is affected when people are unable to return to community due to loss of houses or businesses or interruption to public services and amenities (including the health system, emergency response services and other service providers). Psychological stress and isolation can lead to a breakdown of social networks and social unrest, while the loss of items of cultural significance can also impact on community.

Bushfire can be catastrophic for the environment, destroying critically endangered ecosystems, while the event may overwhelm Local Government routine functions.

It is important to be aware of your bushfire risk and have a plan in case a bushfire threatens your home.

Risk Assessment Scenarios

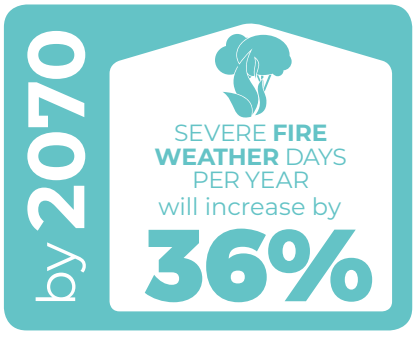
To understand the impact of bushfire on the Zone, the following scenarios were considered as part of the risk assessment:

Scenario 1 – Wangary Fire – January 2005

- 9 people killed, 115 injured,
- 93 homes, 316 sheds, 45 vehicles and 139 farm machines destroyed,
- 6,300kms of fencing lost,
- 47,000 livestock losses,
- Estimated loss > $100m.

Scenario 2 - Ash Wednesday – January 1983

- 28 fatalities, over 600 injuries
- Estimated loss of up to $400m in 1983 $
- 190 homes lost
- 250,000 sheep and cattle lost
- 21,000 hectares of pine plantation burnt



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

6. ANIMAL AND PLANT DISEASE

A major outbreak of an animal or plant disease has the potential to cost billions of dollars in lost earnings. It could affect farmers, their produce and livelihoods. Exotic pests and diseases can also damage the State's reputation for producing premium food and wine and risk trade overseas and locally.

The specific diseases chosen as representative of the hazard within the Limestone Coast Zone were Foot and Mouth Disease and Karnal Bunt disease, with Phylloxera also recognised as having the potential for serious impacts.

Exotic diseases can easily be mistaken for common diseases on South Australian farms every day. The Department of Primary Industries and Regions South Australia (PIRSA) subsidises investigation of illness and deaths to ensure exotic diseases are not the cause.

Foot and Mouth Disease (FMD)

- FMD is highly contagious and one of the most serious viral diseases affecting livestock
- FMD can cause serious production losses but the most serious impact is to livestock trade
- Australia's major trading partners either do not import or impose serious restrictions on livestock imports from infected areas
- It is important to seek veterinary assistance as soon as any problem is noticed to protect the future of the livestock industry

Karnal Bunt / Partial Bunt Disease

- A highly invasive fungal disease of wheat
- Infected grain has black powdery spores on the seed head and a strong fishy odour and flavour
- Karnal Bunt has potential to dramatically decrease grain yield and saleability
- Once introduced spores can persist for years, making eradication difficult
- Several chemical control methods exist for Karnal Bunt, but much work is needed in identifying resistant host varieties

Phylloxera Disease

- Phylloxera *(Daktulsphaira vitifoliae)* is a tiny insect pest that destroys grape vines by feeding on their roots. Infested vines die within six years
- Phylloxera is currently confined to Victoria and New South Wales
- Almost 75% of vines in South Australia are susceptible. Introduction of phylloxera could severely affect our $2.35 billion wine trade
- There is no treatment, so infected vineyards must be replanted on phylloxera-resistant soil or by using tolerant rootstock
- The best way to avoid spreading the disease is to keep tourists away or ensure their footwear and clothing is safe before entering vine rows

For more information regarding Animal and Plant Disease visit: www.sa.gov.au/topics/emergencies-and-safety/types/animal-and-plant-disease

ARE YOU PREPARED?
Checklist

Are you prepared?

- [ ] Do you know what types of emergency and disaster might affect you?
- [ ] Does your household have an emergency plan?
  (more details on this page)
- [ ] In the last year, have you done anything to protect your home? (e.g. clear gutters or vegetation)
- [ ] Do you have appropriate and adequate insurance cover?
- [ ] Have you prepared an emergency kit?
  (visit sa.gov.au/emergencies/ and look up emergency preparation for more information)

To assist in your Emergency Management Planning, the following list provides questions to consider:

- [ ] Who will you include in the plan? Family, pets, neighbours, grandparents, children etc
- [ ] What will you do if some of you are not home?
- [ ] Consider when to evacuate during flood, storm, bushfire or other emergencies
- [ ] Where will you evacuate to? Meeting place near home, meeting place away from home?
- [ ] Can you keep your business going during and after disasters? (go to sa.gov.au/emergencies-and-safety/ for more information)

Think about the different kind of emergencies that could affect you.

Have you considered making a plan? For help with making a plan:

- **Red Cross**:
  redcross.org.au/prepare
- **CFS Bushfire plan**:
  cfs.sa.gov.au/site/prepare_for_a_fire/5_minute_bushfire_plan.jsp
- **Emergency plans**:
  sa.gov.au/topics/emergencies-and-safety/prepare-for-an-emergency/emergency-plan

Equipment connected over the nbn™ access network will not work during a power blackout.

Make sure you have a battery powered radio and your mobile phone is fully charged.

Disasters happen - don't think if, think when!

Government of South Australia

NOTES

Blue Lake, Mount Gambier.

Warnings and advice can be obtained from a number of sources:

sa.gov.au/topics/emergencies-and-safety

ABC Mount Gambier 1476am ABC Naracoorte 1161am

bom.gov.au for Bureau of Meteorology (BoM) weather and warnings updates including local seven day forecasts.

Government of South Australia