

# KEY HAZARDS & RISKS SUMMARY

Emergency Management Plan

## NORTHERN ADELAIDE ZONE



City of Port Adelaide Enfield, Grand Junction Road



Government  
of South Australia

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### councils

City of Playford

City of Port Adelaide Enfield

City of Salisbury

City of Tea Tree Gully

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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 impacts on communities, social, environmental and economic structures.

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



*Northern Expressway (Image courtesy of Department of Planning, Transport and Infrastructure).*

## TOP HAZARDS AT A GLANCE FOR NORTHERN ADELAIDE ZONE AND THEIR IMPACTS

Hazard	People	Economy	Social/ Community	Environment
Extreme Weather - Heat				
Extreme Weather - Storm				
Flood				
Earthquake				
Bushfire				

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.

**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 (Storm)** – 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.

**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.

**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.

**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.



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





## NORTHERN ADELAIDE ZONE IN FOCUS

4

councils



Population  
**365,000**

SIZE  
**640km<sup>2</sup>**

metropolitan and  
residential areas,  
mangroves, foothills,  
horticulture and  
farming land



employment  
**198,776**

**\$13,366**  
million

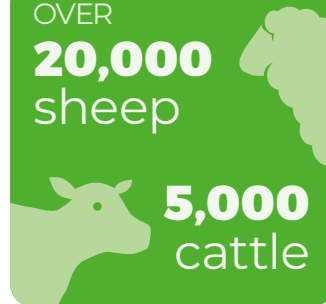
Gross  
Regional  
Product

**\$147m**  
agricultural  
production



OVER  
**20,000**  
sheep

**5,000**  
cattle



**YOUNG**  
and  
culturally  
diverse  
**community**

MAJOR Industries

horticulture  
NURSERIES  
chicken  
manufacturing

KEY infrastructure

Bolivar Treatment Plant  
PARAFIELD AIRPORT  
Edinburgh Air Force  
Base  
Gawler Railway Line  
Northern Expressway  
O-BAHN BUSWAY

HEALTH SERVICES

**3**  
hospitals  
**40+**  
aged care  
facilities

VIRGINIA  
**FOOD  
BOWL**

**LITTLE PARA  
RESERVOIR**

Hope Valley  
Reservoir

**Port River**  
DRY CREEK

Gawler River



by **2070**

**11%**  
DRIER



**2.3°C**  
WARMER



**41 cm**  
SEA  
LEVEL  
RISE



RAINFALL  
**16%**  
MORE  
INTENSE

Adelaide  
International  
Raceway

Para Wirra  
Conservation  
Park



## 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](#)<sup>1</sup> (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 Northern Adelaide 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.



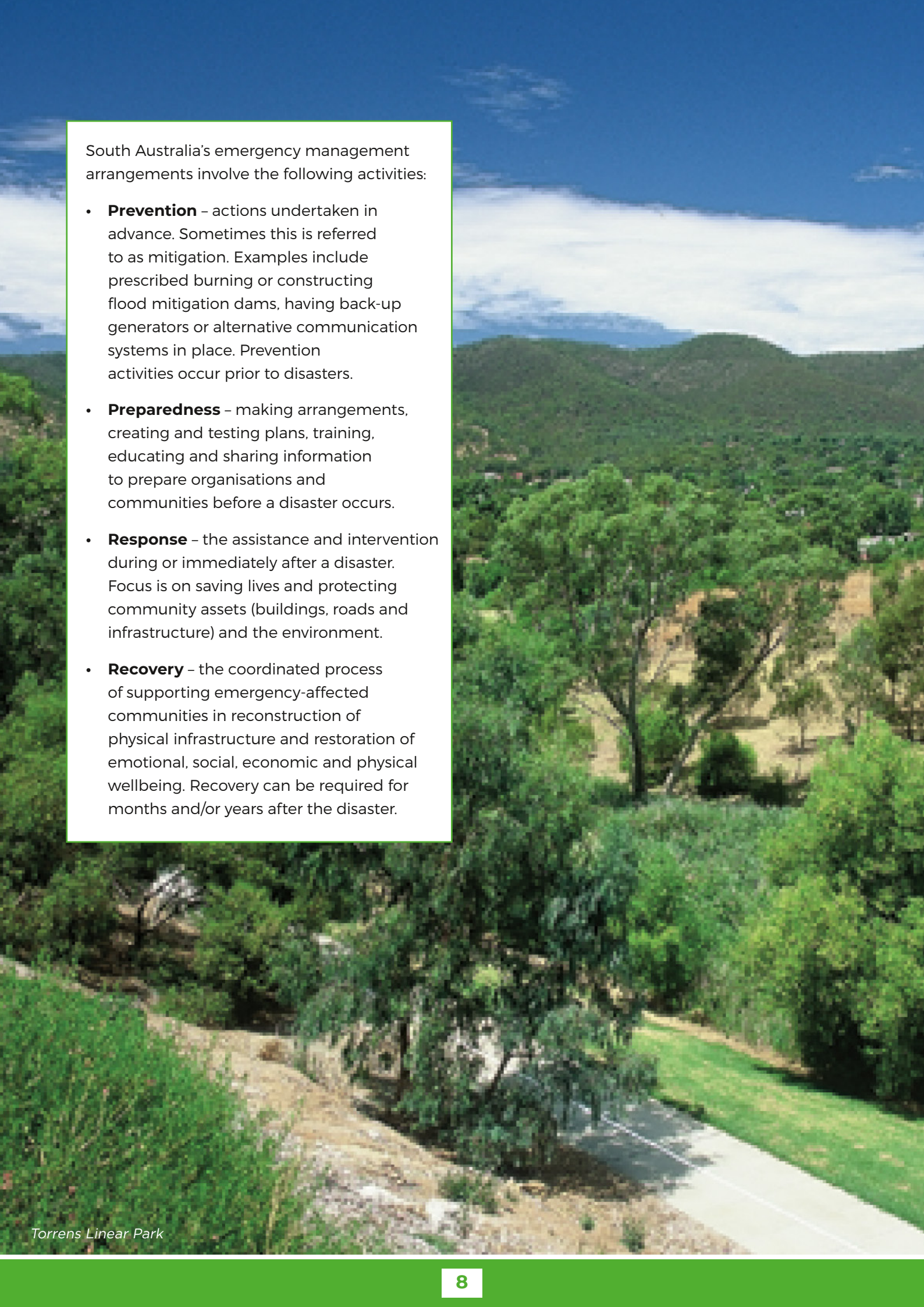
**All sectors of the community have a collective responsibility when it comes to emergency management.**

<sup>1</sup>National Strategy for Disaster Resilience: [http://www.safecom.sa.gov.au/site/emergency\\_management/natural\\_disaster\\_resilience\\_program.jsp](http://www.safecom.sa.gov.au/site/emergency_management/natural_disaster_resilience_program.jsp)



One Tree Hill Institute





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.



## MAJOR HAZARDS

### The Northern Adelaide Zone

1. Extreme Weather (heat)
2. Extreme Weather (storm)
3. Flood
4. Earthquake
5. Bushfire

### 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 Northern Adelaide Zone Emergency Management Plan includes detailed information about the five relevant hazards in the Zone: extreme heat, extreme storm, flood, earthquake and bushfire 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

**5** CFS stations  
**5** MFS stations  
**3** SES units  
**4** AMBULANCE stations  
**7** POLICE stations

### History of Emergencies

**2016**

**EXTREME STORM AND  
GAWLER FLOOD**

**2015**

**SAMPSON FLAT BUSHFIRE**

**2010**

**GAWLER RIVER FLOOD**

## 1. 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 are a particular risk for anyone who does not take precautions to keep cool, even individuals who are healthy.

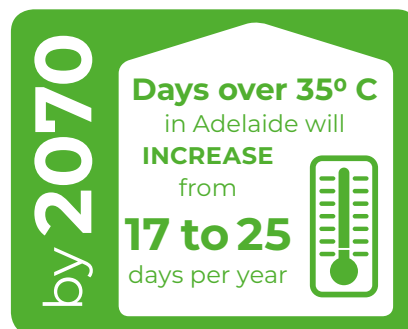
Heatwaves can be the cause of death and significant health issues in people with kidney, heart disease and mental health issues. Animals including livestock, pets and wildlife, as well as the environment are also at risk.

Heatwaves increase the demand on health services, public facilities and public information capability. Normally reliable infrastructure, such as railway, electricity and traffic management systems may be overloaded or struggle to maintain service during periods of extremely hot weather. Local Government services may also be impacted and experience an increase in demand.

The economy can be impacted by heatwaves due to damage to the horticulture and viticulture industries in Northern Adelaide, business losses from damage to stock and equipment, outdoor workers not being able to attend their workplace and flow-on impacts to business associated with infrastructure failures.

**Extreme heatwaves are a particular risk for anyone who does not take precautions to keep cool, even individuals who are healthy.**

The risk of death and serious illness is particularly high for the elderly, children and those working 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.



### 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



**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](http://www.sa.gov.au/topics/emergencies-and-safety/types/extreme-heat)**



## 2. EXTREME STORM

Extreme storms are more common than any other natural hazard in South Australia. The Bureau of Meteorology has identified two types of extreme storm that can impact 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 Zone experiences storms several times per year. Extreme storms can result in death and injury, people having to find alternate accommodation due to property damage, increased demand on health services and impacts to sporting events and gatherings.

There could be significant damage to horticulture and viticulture industries within Northern Adelaide as well as disruption to major freight routes and buildings or property. Loss of power and traffic management systems are also common impacts of extreme storms. All of these factors can have economic impacts.

At a community level, people may experience stress and a loss of morale particularly if there have been significant personal or economic losses.

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.

### 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** – Based on the Port Broughton storm in 1979. Impacts of this event included:

- 50 homes destroyed and over 200 damaged
- Planes at airfields damaged
- Many street trees blown down
- Power lines in many suburbs brought down
- Millions of dollars damage to horticultural production

**Scenario 2** - A hypothetical escalation of Scenario 1. Impacts include:

- Widespread loss of food
- Breakdown in transport systems
- Overwhelming of the health sector
- Significant and extended power failures

### RECENT EXTREME STORM EVENTS

September 2016 - a state-wide extreme storm led to state-wide power outages and flooding in the Zone. The storm cost \$367m to businesses state-wide.



**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](http://www.sa.gov.au/topics/emergencies-and-safety/types/extreme-storm)**

### 3. FLOOD

The main riverine flood sources in the Northern Adelaide region are the Gawler River and the River Torrens.

The North and South Para Rivers join at Gawler to form the Gawler River. Both North and South Para Rivers have dams which influence flood risk; the South Para Reservoir and the Bruce Eastick Flood Mitigation Dam on the North Para.

The Gawler River channel gets smaller as it near the coast, meaning that the lower portions of the rivers flood easily, with water spreading extensively over the floodplain. The horticultural area of Virginia particularly vulnerable to flooding.

The River Torrens also runs through the Northern Adelaide Zone with Kangaroo Creek Reservoir on the upper section of the river near Cudlee Creek.

Flash flooding occurs in small water courses in the Zone including Smith Creek, Adams Creek, Helps Road Drain, Little Para River, Cobbler Creek and Dry Creek.

The Zone is also impacted by stormwater flooding and coastal inundation. Stormwater flooding occurs in urban areas when drainage infrastructure becomes blocked. This is generally localised and occurs in heavy rainfall. Coastal flooding is a risk in low-lying coastal areas including the St Kilda area.

Flood can cause damage to property and personal belongings leaving people homeless, which in turn can increase the risk of theft. Delayed insurance claims can cause considerable stress on already affected communities. Public infrastructure including Local Government infrastructure and transport infrastructure may be affected which can lead to considerable cost. A further risk is increased demand on hospitals and community buildings from injured and displaced persons.

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

#### RECENT FLOOD EVENTS

- |      |  |
|------|--|
| 1992 | Gawler and Torrens rivers flooded several times during winter and spring.  |
| 2005 | Approximately 100mm of rain in 48 hours caused flooding at Virginia, Port Wakefield and the Gawler Railway line.   |
| 2010 | Flash flooding in Northern Adelaide caused damage to roads and properties.   |
| 2016 | Flooding of the Torrens River and major flooding of Gawler River with millions of dollars damage to agriculture, much of the lower river sandbagged by the Australian Defence Force. |



**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>**



## 4. 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 the Zone has been subject to earthquake activity in the past.

Earthquakes may cause injury and death. Damage to residential, commercial and industrial buildings, as well as stock and equipment are possible. Airstrips; port facilities, electricity and communication network; and sewerage and potable water pumping may be impacted and/or damaged.

The social fabric of the community is affected when people are unable to return to community due to loss of houses or businesses, interruption to public services and amenities or access and egress 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.

### 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** – 4.5 magnitude earthquake near Little Para Reservoir

- \$735 million damage to residential homes
- \$38 million damage to commercial and industrial buildings
- 1 severe injury or death
- 2 light to moderate injuries

**Scenario 2** – 5.6 magnitude earthquake near the foothills of Tea Tree Gully

- \$2.4 billion damage to residential homes
- \$180 million damage to commercial and industrial buildings
- 1 severe injury or death
- 49 minor to moderate injuries

### RECENT EARTHQUAKE EVENTS

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 and felt up to 250kms away.



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

## 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. Northern Adelaide has a history of being affected by bushfire including the Sampson Flat fire in 2015.

The bushfire risk assessment showed that some of the main impacts of a bushfire in the Zone could be to people. This may include death and injury, car accidents, people having to relocate either temporarily or long-term and impacts to vulnerable communities including the emergency service responders.

Financial losses as a result of damage to buildings and contents, businesses and State and Local Government infrastructure could occur. Some breakdowns in infrastructure may also occur, with disruptions or damage to electricity, traffic routes, water pumping stations and health care facilities. If telecommunications is damaged, there may be limited public information capacity.

From an environmental perspective, bushfire can result in damage to native vegetation and a loss of appeal and amenity.

These factors can affect the broader community by loss of earnings and potential for closure of health and aged care facilities.

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

### 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

### RECENT BUSHFIRE EVENTS

#### Sampson Flat - January 2015

This fast moving fire burnt for six days, causing approximately \$13 million damage with 24 houses destroyed and 134 people injured.



**! 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>**



# 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/](http://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/](http://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](http://redcross.org.au/prepare)
- **CFS Bushfire plan:**  
[cfs.sa.gov.au/site/prepare\\_for\\_a\\_fire/5\\_minute\\_bushfire\\_plan.jsp](http://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](http://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!**



Northern Expressway (Image courtesy of Department of Planning, Transport and Infrastructure).

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

-  [sa.gov.au/topics/emergencies-and-safety](https://sa.gov.au/topics/emergencies-and-safety)
-  **your local radio station** (ABC Radio 891 AM)
-  **bom.gov.au** for Bureau of Meteorology (BoM) weather and warnings updates including local seven day forecasts.



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