KEY HAZARDS & RISKS SUMMARY

Emergency Management Plan

MURRAY AND MALLEE ZONE

Murray River, South Australia

Government of South Australia

CONTENTS

councils

Coorong District Council
Berri Barmera Council
District Council of Karoonda East Murray
District Council of Loxton Waikerie
Mid Murray Council
Renmark Paringa Council
Rural City of Murray Bridge
Southern Mallee District Council

PUBLISHED AUGUST 2018

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 people's health and wellbeing, along with severe impacts on communities, social, environmental and economic structures.

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

River Murray

TOP HAZARDS AT A GLANCE FOR THE MURRAY AND MALLEE ZONE AND THEIR IMPACTS

Hazard	People	Economy	Social/ Community	Environment
Riverbank Collapse	●			
Flood	●	●	●	●
Extreme Weather - Storm	●	●	●	
Extreme Weather - Heat	●	●		
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.

Riverbank Collapse – Riverbank Collapse is only experienced in the River Murray. To spot a riverbank collapse, look for cracking in the riverbank, leaning trees, bubbling in the water, fencing and warning signs and steep riverbanks.

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.

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

Canola field

MURRAY AND MALLEE ZONE IN FOCUS

8 councils

population **69,504**

SIZE **36,213** square kilometres

employment **28,885**

$3.71b Gross Regional Product

6,669 businesses

99% SA's CITRUS FRUIT OUTPUT

96% of SA's nuts

55% of SA's grapes

7% population speak another language

MAJOR Industries

- Agriculture
- HORTICULTURE
- Tourism
- livestock

KEY infrastructure

- SA WATER INFRASTRUCTURE
- VIC-SA POWER INTERCONNECT
- SEAGas and MAP-Mildura gas pipelines
- River Murray locks and weirs

HEALTH SERVICES

12 MAJOR health facilities

20 aged care facilities

TOURISM

$289m per year

1.9m visitors per year

5 WETLANDS OF International Importance

Coorong, Lake Alexandrina and Lake Albert

Riverland

BANROCK STATION

by 2070

- **15%** DRIER
- **1.9° C** WARMER
- **26 cm** SEA LEVEL RISE
- **11%** RAINFALL DECLINE

THE FOOD BOWL OF SA

brought to life by the River Murray

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 Murray and Mallee 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.

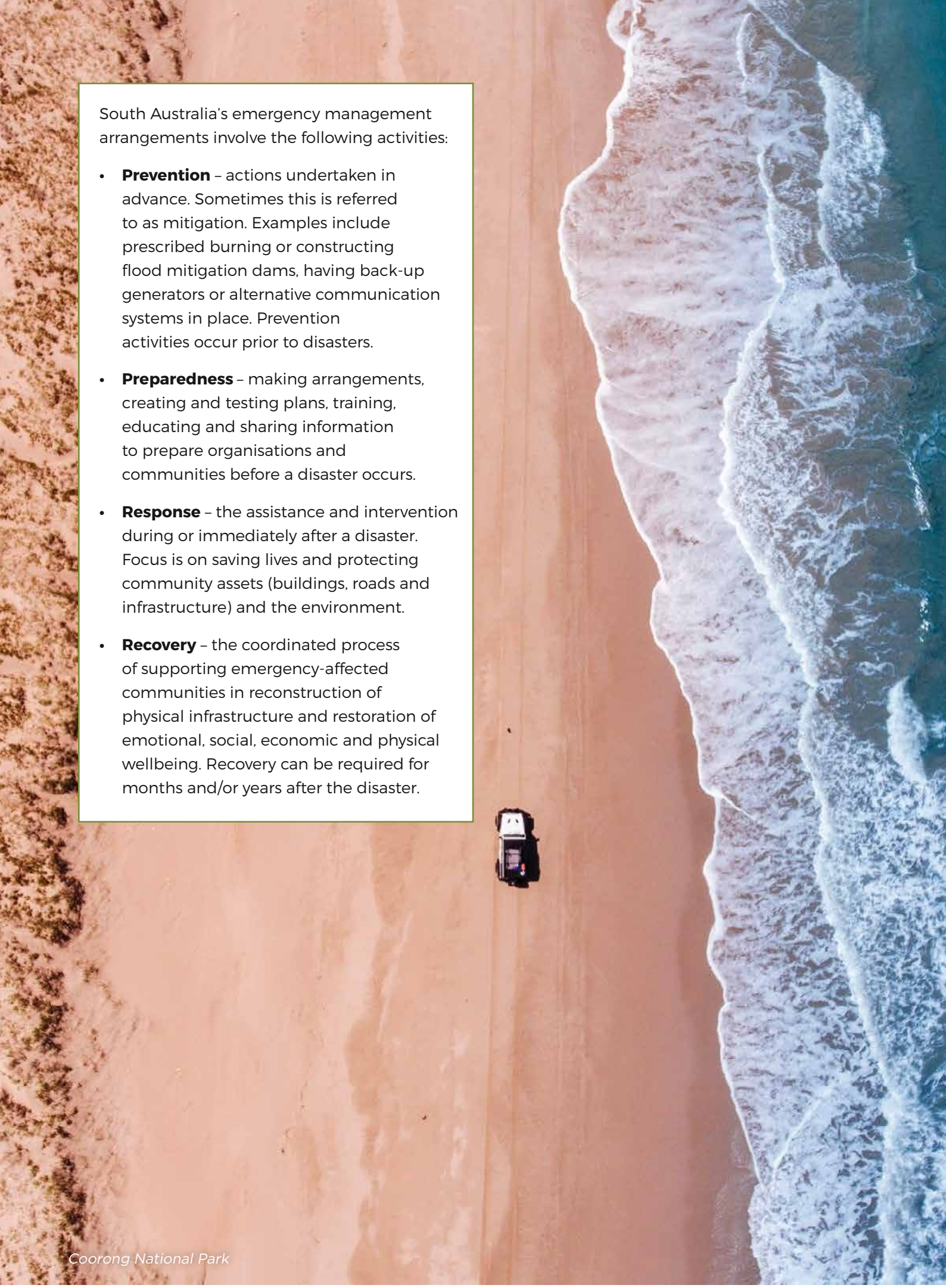
All sectors of the community have a collective responsibility when it comes to emergency management.

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

Coonalpyn Silos.

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.



Coorong National Park

MAJOR HAZARDS

The Murray and Mallee Zone

1. Riverbank Collapse
2. Flood
3. Extreme Weather (storm)
4. Extreme Weather (heat)
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 Murray and Mallee Zone Emergency Management Plan includes detailed information about the five relevant hazards in the Zone: riverbank collapse, flood, extreme storm, extreme heat 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

55 CFS Brigades
8 SES units
4 MFS stations
17 POLICE stations
18 AMBULANCE stations

History of Emergencies

1956 River Murray **FLOOD**

2014 Riverland **Complex FIRES**

2016 STORMS

1. RIVERBANK COLLAPSE

Riverbank collapse is defined as "the potential for riverbanks along the River Murray downstream of Lock 1 (Blanchetown) and Wellington to collapse suddenly and in doing so possibly cause harm to people or damage to property or the environment".

There is a direct relationship between riverbank collapse and lowering of river levels, either during extended drought or following high flows and flood events. Riverbank collapse is more likely to occur downstream of Lock 1. Development of riverbanks over time increases the potential for riverbank collapse to occur.

Several major incidents of riverbank collapse occurred during and following the low river levels caused by the Millennium Drought (2008-2010). Some small localised events occurred following the 2016 high flow event due to the rapid recession of the water level. This was upstream of Lock 1 and did not pose a significant threat.

In South Australia, riverbank collapse is identified as a hazard only in the Murray and Mallee Zone.

For information on riverbank collapse visit: https://www.sa.gov.au/topics/boating-and-marine/boat-and-marine-safety/boating-safely/riverbank-collapse

by 2030

THE ZONE WILL BE IMPACTED BY **REDUCED FLOWS** DOWN THE RIVER MURRAY

Identified High Risk Sites

- Riverfront Road, Murray Bridge
- Caloote Landing
- Walker Flat Waste Disposal Station
- Woodlane Reserve, Mypolonga
- East Front Road, Young Husband

RECENT RIVERBANK COLLAPSE EVENTS

In February 2008, signs of riverbank collapse were identified at Riverfront Road, Murray Bridge. The road was closed in 2010 and residents were advised not to access the 15 properties located on this road.

In February 2009, Long Island Marina in Murray Bridge experienced a 70 metre collapse of riverbank. This collapse occurred without warning and resulted in the submergence of approximately 70,000 cubic metres of soil, a number of river red gum trees and three unoccupied vehicles.

2. FLOOD

The Murray Mallee region covers a large area with rural and metropolitan sections. Key flood sources are from the River Murray and other feeder catchments with slow riverine flooding. Some of the smaller creeks also experience flash flooding events.

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.

Coastal flooding could also be an issue in the Murray Mouth area.

The assessments showed that the main risks to people were death and injury as well as increased demands on health services and other areas of public administration. Communities are also affected, as people are unable to return to their homes due to loss or damage to their property.

Floods significantly affect the economy through disruption and damage to infrastructure, such as roads, and tourism sectors. The environment is also impacted due to the spread of noxious pests, plants and animals (including weeds and fish).

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

A HISTORY OF FLOODING IN THE RIVER MURRAY

1955/1956	Flood peaked at 341,000ML/day at the border. Several Riverland communities were significantly inundated with floodwaters remaining for up to six months in some locations. Critical infrastructure was affected and many homes were evacuated with damages to business, agriculture, homes and infrastructure.
1974/1975	Flood peaked at 180,000ML/day at the border. Approximately 400 river shacks were flooded at Blanchetown with other riverside communities also impacted.
2011	Flood peaked at 93,000 ML/day at the border. Some river shacks were impacted.
2016	Flood peaked at 95,000 ML/day at the border. Some river shacks and roads were impacted.

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 – River Murray flows of 90,000, 130,0000, 250,000, 340,000 and greater than 340,000ML/day at the SA/Vic border..

Infrastructure failures – such as failure of storm water ponds, levees, dams and retention basins.

Flash flooding – in Murray Bridge, Mannum, Loxton, Berri, Renmark, Pinnaroo and Lameroo.

3. 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 and State Government may also be possible, while crops and livestock could also be affected. Storms may also cause increased demand upon public facilities and interruption to communications.

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 Karoonda 10 June 2005

- Houses damaged by wind (7 needed to be demolished)
- 4 people treated for shock
- Trees, fences and light poles damaged
- Cost $1-2 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

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

November 2016, a storm caused $74 million worth of damage to grape, almond, stone fruit and grain crops in the Riverland.

December 2016, a storm caused $200,000 worth of damage, brought down trees and caused minor flooding.

4. EXTREME HEAT

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

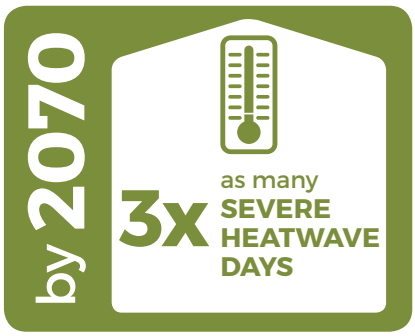
Extreme heat, also known as a heatwave, is defined as three or more days of high maximum and minimum temperatures that are unusual for that location.

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

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 the Rockleigh fires in 2013 and 2014 and the Riverland Complex fires in 2014.

The bushfire risk assessment showed that the main risks to people were death and injury resulting from last minute evacuations, traffic accidents, 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, loss of earnings, and loss of tourism.

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 recovery process 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

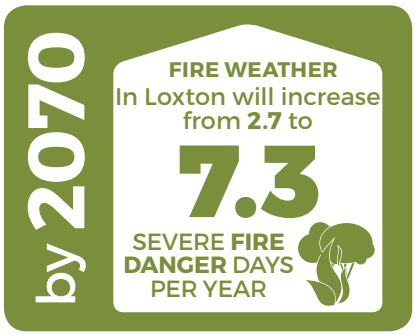
To understand the impact of bushfire on the Zone, the following scenarios were considered as part of the risk assessment:

Scenario 1 - Riverland Complex Fires - January 2014

- 128,495ha burnt,
- 1 house and property destroyed

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

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

Lake Bonney, South Australia

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

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

your local radio station (ABC Radio 891 AM, ABC Classic FM 103.9FM, ABC Digital Radio 206.352MHz)

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

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