# State Risk Profile Fact Sheets

GOVERNMENT OF WESTERN AUSTRALIA

SEMC
STATE EMERGENCY MANAGEMENT COMMITTEE

semc.wa.gov.au

State Risk Project

An Australian Government Initiative

# From the Minister

Hon. Stephen Dawson MLC
Minister for Emergency Services

The Western Australian Government is focused on ensuring that all Western Australians (WA) can live in a safe and secure environment. To this end, the WA government is committed to supporting the emergency services personnel and providing the required infrastructure to respond, prevent and mitigate injury and damage to property to meet the needs of our diverse communities. However, given the vastness of our State, this is by no means an easy task.

To better protect our communities, economy, environment and cultural heritage, information on the State's hazards and the risks they pose must be systematically collected, analysed and communicated to identify and reduce specific community vulnerabilities. Over the past several years, the State Risk Project, under the auspices of the State Emergency Management Committee (SEMC), has been a critical driver of this work, conducting extensive research and consultation across all of the State's prescribed hazards. This project has helped to enhance our hazard understanding and awareness, highlighted knowledge gaps, prioritised investment to reduce vulnerability and identified a pathway forward for developing risk treatment strategies.

This suite of fact sheets provides an overview of the project findings. They are intended to present a high-level summary of risks identified through stakeholder workshops and information on what is presently being done across the emergency management sector to mitigate these risks.

I am delighted to see the positive contributions the State Risk Project has made to the understanding and mitigating hazard risk across the State. I look forward to the significant body of work that underpins this suite of products assisting the emergency management sector in further strengthening its culture of hazard risk reduction, awareness, and action.

Hon. Stephen Dawson MLC
Minister for Emergency Services

# From the SEMC Chair

Dr Ron F Edwards
Chair, State Emergency Management Committee (SEMC)

Living in Australia's largest State, Western Australians (WA) are familiar with many natural and man-made hazards and their associated risks. Many natural hazardous events are becoming more frequent and intense, and as our population and economy grow, more people and assets are likely to become increasingly exposed and vulnerable.

Currently, there are 28 hazards prescribed under WA legislation.
The impacts of each hazard on the community, economy, infrastructure, and environment can vary greatly, challenging the capabilities of communities and emergency responders to respond and recover.

In 2013, the State Emergency Management Committee (SEMC) initiated the State Risk Project to understand better the risks the prescribed hazards pose to the WA community. In the following years, the project team facilitated workshops helping the emergency management sector at the state, district and local levels to establish a shared understanding of the strategic risks associated with each prescribed hazard.

The work underpinning the State Risk Project was extensive, spanning almost ten years and involving stakeholders from across State Government agencies, the private sector and the majority of WA's 137 local governments.

The State Risk Fact Sheets are an essential output of the State Risk Project and summarise the key risks identified for each of the prescribed hazards in WA. The fact sheets detail strategies in place to reduce risk to the community.

As the Chair of the SEMC, I encourage all Western Australians to consider the valuable information contained within the fact sheets.

I thank all involved in the State Risk Project for their contributions to hazard risk reduction and look forward to their ongoing contributions as the sector's risk culture matures.

Dr Ron F Edwards
SEMC Chair
January 2023

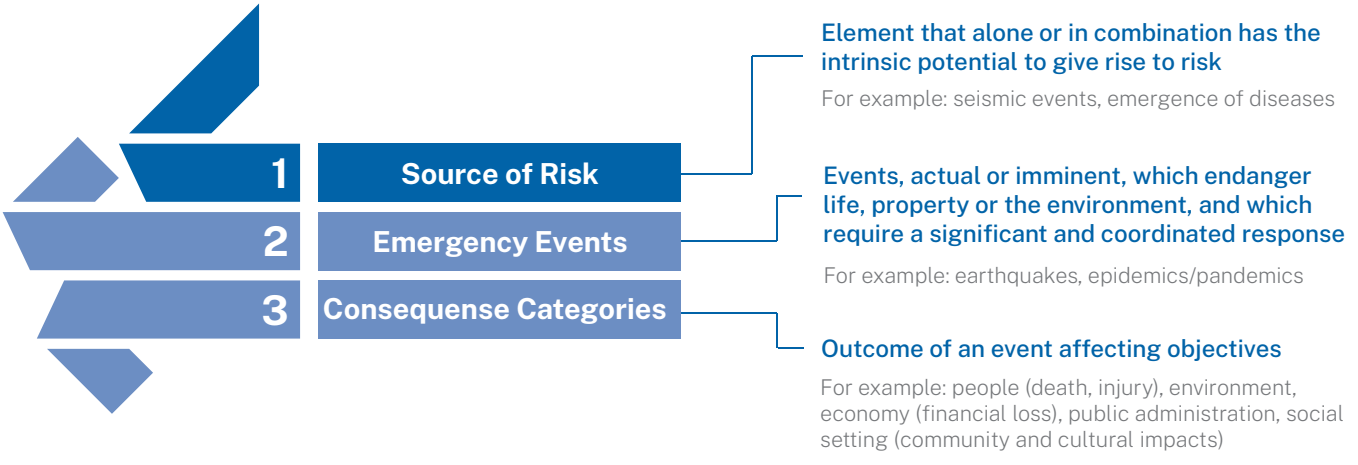
# Introduction

Western Australia's State Risk Profile (the Profile) has been developed from an assessment of 28 hazards prescribed under state emergency management legislation. The work forms part of the State Risk Project, which aims to systematically assess the risks posed by prescribed hazards, including natural and anthropogenic incidents. The assessment followed the risk management standard ISO 31000:2009 and the methodology outlined in the *National Emergency Risk Assessment Guidelines (NERAG),* first published in 2010.

The Profile was developed in phases, with the initial phase assessing 26 prescribed hazards. An additional phase evaluated two further prescribed hazards - Hostile act and Terrorist act. The same risk assessment methodology was applied to the evaluation of the two additional hazards, with a fact sheet for Hostile act produced and no fact sheet for Terrorist act due to associated sensitivities.

To assess state-level risk, subject matter experts developed hypothetical scenarios to assess the credible, most significant impact. The project objective was to examine large-scale scenarios for planning and risk reduction activities. It would also capture the requirements for smaller events, even if they were more likely to occur. Two scenarios were developed for several prescribed hazards for different locations or degrees of severity.

The assessments were conducted from the perspective of the entire State, not just those directly impacted by the event. The scenarios assessed determined the likelihood of occurrence and the severity of the consequences in collaboration with relevant experts in the workshop. Existing prevention measures were considered when determining the scenario's risk level. The threshold levels of consequences are set through the NERAG 2010 and scaled to the State's population and gross domestic product (GDP).




Modified from the National Emergency Risk Assessment Guidelines (NERAG)

# State Risk – a high-level summary

A high-level summary of the Western Australia State Risk Profile Fact Sheets is a product of the SEMC's State Risk Project, which has assessed the risks posed to the State by all prescribed hazards consistently and comprehensively.

A series of workshops examined credible worst-case scenarios for 26 hazards and the outcomes used to inform the fact sheets. These scenarios were developed and assessed by relevant experts to determine the potential consequences of the scenario, taking current prevention measures into account. Six areas were considered: people, economy, public administration, environment, infrastructure and social setting. It is a state-level assessment; therefore, the results are from the perspective of the ***entire*** state community, not just those directly impacted by the event.

Below is an overview of key high risks identified against the six consequence categories.

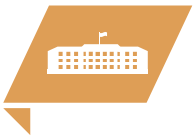
## People

- Earthquake and air crash scenarios could cause proportionally greater fatalities than human epidemic (flu), HAZMAT (chemical), structural fire, passenger rail crash, road crash, heatwave and tsunami.
- Simultaneous structural fire and human epidemic scenarios could push the health system beyond its ability to cope.

## Economy

- There were twelve high risks with economic consequences greater than $10 billion.
- The risks originate from animal biosecurity, earthquake, utility supply disruption, human epidemic, plant biosecurity, structural fire and storm scenarios.
- These scenarios are widespread and would impact significant industries like mining, manufacturing, and agriculture.

## Public Administration



- High risks related to response and recovery from earthquakes, marine oil pollution, human epidemic, bushfire and electricity supply disruption.
- Thousands of homes could be destroyed by the earthquake scenario, leading to significant displacement of people.
- Haemorrhagic influenza epidemic would put a considerable strain on general practices and suppliers of medical goods to health facilities.

## Infrastructure

- High risks relate to damage to aviation assets and infrastructure from storm and air crash scenarios.
- The greatest risks to utility services come from large events that cause widespread damage, like earthquakes and floods.
- The loss of electricity would result in cascading failure of other utilities such as water, wastewater and communications.

## Social Setting

- More than half of the high risks are from a haemorrhagic influenza epidemic.
- The three remaining high risks are related to the evacuation and displacement of people from the HAZMAT, structural fire and bushfire scenarios.

## Environment

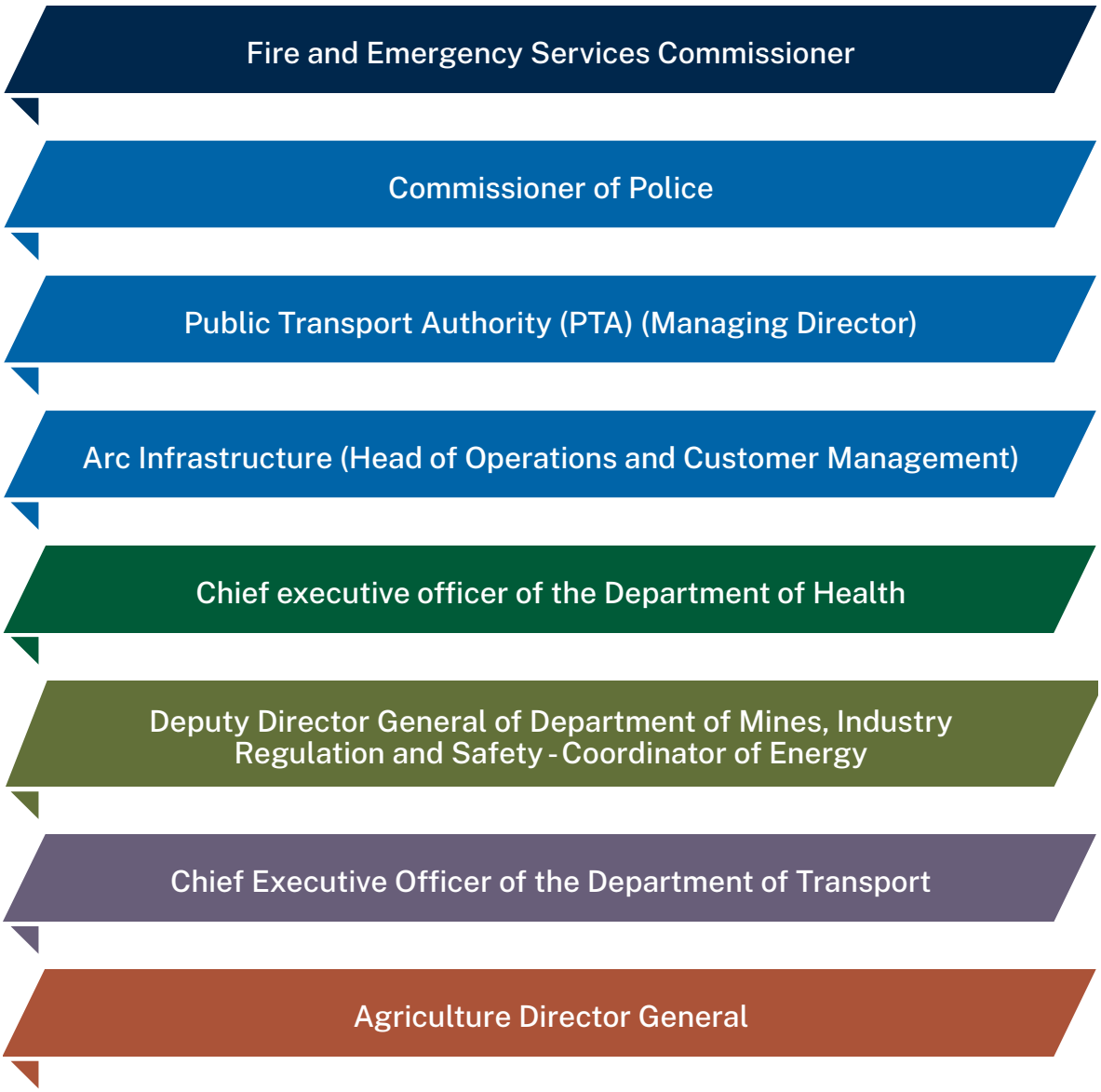
- High risks stem from oil pollution, rail crash and plant biosecurity scenarios.

# Fact Sheets by Hazard Management Agency (HMA)

A key delivery of the State Risk Project is to provide information on state level risks and a set of hazard fact sheets have been produced which includes this information. The fact sheets are designed to inform the general public, local governments, and other organisations with an interest in the state level risks and controls.

The fact sheets are not intended to be all-encompassing and aimed to direct people via hyperlinks to further information.

Responsibility for emergencies arising from the state's 28 prescribed hazards is assigned to various hazard management agencies (HMAs). The fact sheets are presented and grouped by HMA in the below order.



# Bushfire

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## What is a bushfire?

A bushfire is an unplanned or uncontrolled fire, burning in vegetation, that may require a response. This includes fires burning in trees, bushes, plants, stubble, scrub, and undergrowth. Bushfires may start naturally or from human activity. The most common natural ignition source is lightning strikes. Human activities that lead to bushfires include arson, escapes from campfires and planned burns, and industrial activity such as timber harvesting, mining, farming, and sparking powerlines.

Bushfires are a natural part of the Australian environment and can occur year-round. In WA, there are typically two main bushfire seasons: the northern bushfire season in winter and spring and the southern bushfire season in spring and summer. Between 2012 and 2022, an average of 975 bushfires, over 1 hectare, were responded to each year in WA.

The primary drivers of bushfire behaviour are fuel, topography and weather. A combination of high temperatures, low humidity, and strong winds leads to elevated bushfire risk. The changing climate will likely result in more frequent and higher-intensity bushfires and extend the increasingly overlapping bushfire seasons.

## What is the risk of bushfires for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To develop an understanding of bushfire risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that the bushfire hazard poses a high risk to people, the economy and public administration. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Bushfires can cause injuries or fatalities. Early evacuations can reduce these impacts by minimising people's exposure during emergencies. Smoke resulting from bushfires can disperse some distance from the main impact area and may impact people's health.

### Economy

Bushfires can cause significant damage that may negatively impact the State's economy. This includes damage to homes and other buildings, disruption to services, restrictions on transport routes, and impacts on various industries. Bushfires commonly occur during peak tourism seasons and can negatively impact the tourism industry.

### Public Administration

It is not uncommon to have multiple large bushfires occurring at one time in WA. This may require the involvement of a wide range of state agencies, volunteers, and in some cases, support from interstate or overseas.

### Infrastructure

Bushfires can damage critical infrastructure such as roads, rail, communications, power, and water. These impacts could cause short-term and localised supply disruptions (one week to one month).

### Social setting

Bushfires often result in temporary impacts on communities, including displacement of people and disruption to services such as schools, child care, rubbish collection and other social services. These often become the focus of recovery efforts.

### Environment

Bushfires can have various environmental impacts, including spreading contaminants such as heavy metals or asbestos, soil erosion, releasing debris and pollutants into waterways, impairment of ecosystem function, and increased pressure on endangered species.

# What is being done to manage bushfire risk for WA?

To help protect the community from the adverse impacts of bushfires, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions, and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Partnership in emergency management

In accordance with the Emergency Management Act 2005 and Emergency Management Regulations 2006, the Fire and Emergency Services Commissioner is the Hazard Management Agency (HMA) responsible for preparing for and managing the adverse effects of bushfires. A wide range of agencies, organisations and individuals assist in bushfire response and mitigation practices, including DBCA, Local Governments, volunteers and land owners and managers. Planned burning and other methods of vegetation modification are implemented to reduce the risk and impact of bushfires to communities, and the built and natural environments.

## Land use planning and building regulations

Considering bushfire risk at the earliest stages of planning is one of the most effective methods for reducing the impacts and risk of bushfires on human life and assets. Additional planning and building requirements apply in areas designated 'Bushfire Prone' by the FES Commissioner. Consequently, any development plans need to consider the State Planning Policy 3.7 – Planning in bushfire-prone areas and AS3959 – Construction of building in bushfire-prone areas.

## Bushfire Risk Management Plans

Bushfire Risk Management Plans (BRMPs) are documents prepared by a local government, supported by the DFES Rural Fire Division, that identify assets at risk from bushfire, assign them a risk rating and treatment priority, and set out a broad program of proposed coordinated, multi-agency treatment strategies to help reduce the risk to an acceptable level. DFES coordinates the distribution of the Mitigation Activities Fund (MAF) to local governments to fund treatments identified in BRMPs.

## Private land preparation

Preparation of private property before the high-risk period significantly contributes to reducing the impacts of bushfires. Local governments can issue notices under section 33 of the Bush Fires Act 1954, which requires private landowners and occupiers to establish fire breaks and undertake property mitigation before and throughout the high-risk period. DFES's Burn SMART guide can help private landowners to prepare their properties.

## Bushfire mitigation activities

DFES coordinates bushfire mitigation activities across unallocated crown land (UCL) within gazetted townsites. Mitigation activities include planned burning, mechanical clearing or management of fuels, and other strategies such as strategic firebreaks and weed control. DBCA undertakes broader scale planned burning in land it manages, which supports the management of bushfire risk and biodiversity across the State.

## Community education and information

Communities that understand bushfire risk are more likely to be better prepared and more resilient in the face of a bushfire event. DFES, DBCA, and local governments run a diverse range of community engagement activities throughout the year and immediately before high-risk periods to ensure the community is engaged and aware. Emergency Alerts and Warnings are issued through EmergencyWA to ensure that the community is aware of fire events and appropriate actions. In addition the Australian Fire Danger Rating System (AFDRS) was released in 2022, and provides a nationally consistent and easy-to-understand set of ratings to communicate bushfire likelihood and severity to the community and industry stakeholders, along with corresponding actions.

For more information on how bushfire risks are managed in WA, see the SEMC State Hazard Plan - Fire.

# Collapse

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## What is collapse?

A collapse emergency arises when there is injury or threat to the life of persons trapped by the collapse of a structure or landform, including any collapse involving a trench, bridge, building or structure. While a collapse may occur without any apparent external trigger, a collapse emergency may be caused by other hazards such as earthquakes, tsunamis, transport accidents, landslides, fires, severe weather, floods and explosions. While isolated incidents of structural and landform collapse are unlikely to have significant impacts at the State level, an earthquake that causes multiple, widespread structural and landform collapses may significantly impact the State and stretch response capabilities.

Approximately 51 landform collapse incidents were recorded in WA before the end of 2018. These incidents have occurred in many parts of the State, from the South West to the Kimberley regions. The greatest concentration of recorded landform collapse incidents in WA has been in the Metropolitan, South West and Great Southern regions. According to available data, about 73 per cent of landform collapse events were considered “landslide” and 24 per cent “heavy erosion”. Just one cave-in and one mine-related collapse event have been recorded.

## What is the risk of collapse for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To gain an understanding of the collapse risk, the SEMC’s State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that collapse hazard poses a medium risk to people. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Collapse can cause a significant number of fatalities and injuries. Most fatalities would result from people being unable to escape rather than the collapse itself. Some casualties may result from restricted access.

### Economy

The collapse of natural landforms or built infrastructure could result in substantial economic loss to the tourism industry, community, and local businesses. It is projected that costs associated with recovery efforts could exceed $100 million.

### Public Administration

A response to a significant collapse incident is likely to demand a multi-hazard approach, requiring expertise in a range of areas, including urban search and rescue (USAR), structural engineering and hazardous materials (HAZMAT).

### Infrastructure

Damage to infrastructure and services (including electricity, gas, telephone, internet, water, sewage, road, and rail) could cause localised service disruptions. It could take several months to restabilise water and wastewater networks.

### Social setting

Collapse events can result in psychological and emotional stress for the community. The loss of archaeological interests and damage to heritage and cultural buildings may impact the community’s identity. Media coverage would have a large part to play in how the community responds to such events.

### Environment

Structure and landform collapse can cause significant environmental impairment due to airborne contamination from collapsed buildings. Damaged wastewater systems and runoff from chemical spills may contaminate rivers and the marine environment.

# What is being done to manage collapse risk for WA?

To help protect the community from the adverse impacts of collapse events, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Building regulations

Building construction standards are set by the State, usually in reference to the National Construction Code. Local governments and registered building surveyors are responsible for ensuring adherence to building construction standards. Application and enforcement of building standards for new buildings and redevelopments can contribute to a reduced risk for community buildings.

## Emergency management

In accordance with the Emergency Management Act 2005 and Emergency Management Regulations 2006, the Fire and Emergency Services Commissioner is the Hazard Management Agency (HMA) responsible for preparing for and managing the adverse effects of collapse. The Department of Fire and Emergency Services (DFES) develops and maintains a USAR capability to rescue people trapped in buildings, landfalls or slippages that have collapsed due to industrial accidents, explosions, natural disasters or terrorist activity. The USAR Advisory Group ensures the USAR Task Force maintains clear operational planning and direction and adheres to an informed operational resource capability and allocation approach. The USAR Advisory Group convenes quarterly.

## Training for response

A safe and coordinated response to a collapse emergency requires specialised knowledge and specific operational techniques. Individual organisations are responsible for training specific to their tasks. Organisations operating within the "Hot Zone" of a collapse emergency have their personnel trained to a minimum USAR Category 1 qualification. DFES may require further support from appropriate personnel from other agencies, either from within WA or interstate, which are not USAR qualified. Under these conditions, DFES must ensure they are provided with a thorough briefing on their allocated tasking within the Hot Zone. The briefing must identify all known hazards and mitigation measures for the allocated task.

## Alerts and warnings

DFES aims to provide timely and accurate information to the community in the event of a collapse. This information helps the community to understand other associated hazards (e.g. HAZMAT or fire) and what actions they should take. Providing the community with trusted information also helps to reduce the circulation of misinformation and community anxiety during an event. Emergency alerts and warnings are all issued through EmergencyWA.

For more information on how collapse risks are managed in WA, see the State Hazard Plan - Collapse.

# Cyclone

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## What is a cyclone?

Cyclones are low-pressure systems that form over warm tropical waters. In the southern hemisphere, these systems rotate clockwise and can grow in intensity over the ocean. Cyclones can generate extreme winds, heavy rainfall with flooding and damaging storm surge in exposed locations. Cyclones can continue for many days, even weeks, and their paths can sometimes be erratic, posing challenges for emergency responders to alert and evacuate communities.

A cyclone will dissipate once it moves over land or cooler oceans. However, strong winds and heavy rain can persist as the remnants of a system move inland, at times causing widespread damage a long way from where the cyclone made landfall.

On average, five cyclones occur during each cyclone season (November - April) in the waters off the northern coast of WA. While each season is different, generally, two systems make landfall, one of which tends to be severe. Although rare, cyclones can sometimes impact the southwest of WA bringing strong winds, flooding rains and lightning that can ignite bushfires. It is predicted that the changing climate will result in more cyclones impacting southern parts of the state.

## What is the risk of cyclones for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To gain an understanding of cyclone risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that the cyclone hazard poses a medium risk to people, economy, public administration and environment. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Cyclones and the dangerous conditions they produce can cause injuries or fatalities. Early evacuations can reduce these impacts by minimising people's exposure to the storm. Historical events, however, have shown that evacuations are challenging and may result in other effects, such as community dispersal.

### Economy

Cyclones may result in damage that negatively impacts the State's economy. This includes building damage, financial losses to the mining industry and associated ports, and transport route disruptions.

### Public Administration

During cyclones, it may be challenging to maintain the sustained provision of support services for displaced people. In severe events, support services may be overwhelmed by the number of families requesting assistance.

### Infrastructure

Cyclones can damage critical infrastructure such as roads, ports, power and water networks. These impacts could cause short-term and localised supply disruption (one week to one month).

### Social setting

Cyclones may reduce the availability of essential products and services, and the remote location of some communities is likely to present challenges to resupply. Gas production and price may be impacted, but the domestic consumer is not expected to feel such impacts.

### Environment

Cyclones can cause significant impairment to ecological function, particularly in vulnerable plant and animal communities close to the coast. Cyclones can also result in the release of debris and pollutants into the marine and estuarine environments.

# What is being done to manage cyclone risk for WA?

To help protect the community from the adverse impacts of cyclones, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Partnerships in emergency management

In accordance with the Emergency Management Act 2005 and Emergency Management Regulations 2006, the Fire and Emergency Services Commissioner is the Hazard Management Agency (HMA) responsible for preparing for and managing the adverse effects of cyclones. The Bureau of Meteorology (the Bureau) monitors and forecasts tropical cyclones. The Bureau is responsible for cyclone, storm surge, rainfall and flood forecasting and warning services and for providing time-critical information to the community and emergency managers. The Department of Fire and Emergency Services (DFES), the Bureau, other State government departments, local governments, and industry partners work together in annual pre-season emergency preparedness workshops to raise community awareness and prepare for the cyclone season.

## Research and investigation

The historical record of cyclone tracks and numerical modelling are used to identify areas where future cyclone emergencies may occur. Information products supporting the understanding of cyclone hazards include the Australian Tropical Cyclone Hazard Assessment (Geoscience Australia), cyclone track and intensity forecasting (the Bureau), and DFES storm surge inundation mapping.

## Building regulations

In WA, the Building Act 2011 and the Building Regulations 2012 introduce a comprehensive building control system and building standards for new and existing structures. The application and enforcement of building codes, building maintenance and informed land use planning effectively reduce impacts from cyclones.

## Alerts and warnings

DFES and the Bureau work together to inform the community about cyclone risk. The Cyclone Alert System includes four levels of alert reflecting cyclone risk and advises what communities need to do before, during and after a cyclone:

- Blue, start preparing for cyclonic weather;
- Yellow, take action and get ready to shelter from a cyclone;
- Red, go to shelter immediately;
- All Clear, the cyclone has passed but take care to avoid dangers caused by damage.

Emergency alerts and warnings are issued through EmergencyWA and the Bureau's Western Australia Weather and Warnings website to ensure that the community are aware of the situation and the actions they need to take during cyclones.

## Community education and information

Find out about actions helping to decrease cyclone impacts on your family and property in awareness products such as the SEMC State Hazard Plan for Severe Weather and the DFES Tropical Cyclone and flooding resources.

For more information on how cyclone risks are managed in WA, see the SEMC State Hazard Plan - Severe Weather.

# Earthquake

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## What is an earthquake?

An earthquake is the sudden release of energy and resulting ground shaking caused by movements within the Earth's crust. Earthquakes can be caused by a range of factors, including underground volcanic forces, the breaking of rock under the Earth's surface, and a sudden movement along an existing fault line. The intensity of an earthquake depends on many factors, such as the magnitude, distance from the epicentre, depth of focus, topography and the local ground conditions. The shaking can last from a few seconds to a few minutes and may be followed by a series of aftershocks. Earthquakes can trigger other hazards (such as fire or collapse) and have various impacts.

Despite sitting in the middle of the Australian tectonic plate, WA still experiences earthquakes due to forces exerted on the plate by the tectonic activity around its edges. In the 2021 Calendar year, Geoscience Australia (GA) recorded 177 events greater than Magnitude 2.5. The intraplate nature of WA's earthquakes presents challenges for emergency planning, as they are less common and do not follow easily identifiable patterns. Recent significant events include the 2010 Kalgoorlie Boulder Earthquake, the 2018 Lake Muir Earthquake, and the 2019 Broome Offshore Earthquake.

## What is the risk of earthquakes for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To gain an understanding of the earthquake risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that earthquakes pose a high risk to people, the economy, public administration and infrastructure. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Earthquakes can cause significant numbers of fatalities and injuries. Further casualties may arise during earthquake emergencies where damaged roads restrict access to incident locations and health facilities.

### Economy

Earthquakes can result in substantial economic loss to communities and businesses through damage to residential, commercial and industrial buildings. They can disrupt the supply chain (roads, trains, ports) and essential services (gas, water, power, petrol, communications).

### Public Administration

Evacuation centres may be overwhelmed, where many people are displaced and require temporary accommodation. Emergency management agencies could require interstate support to assist with service provision. Debris and waste management may also be challenging.

### Infrastructure

Damage to infrastructure providing essential services may take months to repair. Water and wastewater infrastructure may be badly damaged as their components are underground or in hard contact with the ground.

### Social setting

Damage to residential buildings could result in a significant number of displaced people. This displacement may, in turn, generate psychological and emotional stress within the community. Loss of heritage and cultural buildings may also impact the community.

### Environment

Environmental contamination may occur as a result of asbestos becoming airborne due to building collapse or through wastewater and chemicals entering rivers and the marine environment.

# What is being done to manage earthquake risk for WA?

To help protect the community from the adverse impacts of earthquakes, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Partnerships in emergency management

In accordance with the Emergency Management Act 2005 and Emergency Management Regulations 2006, the Fire and Emergency Services Commissioner is the Hazard Management Agency (HMA) responsible for preparing for and managing the adverse effects of earthquakes. The Department of Fire and Emergency Services (DFES) has a specialist response capability for structural collapse known as Urban Search and Rescue (USAR) Task Force.

The community can also support emergency management by submitting an earthquake Felt Report through Earthquakes@GA.

## Alerts and warnings

The National Earthquake Alert Centre (NEAC), facilitated by Geoscience Australia (GA), issues alerts to DFES for potentially damaging earthquakes (magnitude 3.5 and higher) occurring in WA. GA provides information to support emergency managers and first responders in identifying areas likely to have experienced significant ground shaking: FeltGrids (from community-based Felt Reports) and ShakeMaps (instrumental and numerical estimates of ground shaking). Emergency alerts and warnings are issued through EmergencyWA and Earthquakes@GA to raise community awareness and advise on actions to be taken during earthquake emergencies.

## Building regulations

In WA, the Building Act 2011 and the Building Regulations 2012 provide a comprehensive building control system and building standards for new and existing structures. Standards Australia building codes (AS 2121-1979, AS1170.4 – 2007, AS 2121-1979, and AS 1170.4-1993) present rules to manage earthquake impacts on buildings, including the design of buildings and fixing non-structural elements to reduce their damage during an earthquake.

## Research and investigation

GA and the Geological Survey of WA (GSWA) monitor earthquakes around the clock to improve the understanding of earthquake behaviour in WA. GA's National Seismic Hazard Assessment represents Australia's current understanding of earthquake hazards, showing areas prone to damaging ground shaking. Other information products developed in collaboration with GA, GSWA and several universities analyse structural integrity and inform retrofitting options for residential and heritage buildings (see Perth, York for examples).

## Community education and information

Simple actions can help reduce the impact of earthquakes on your family and property. Further information can be found on the DFES website. DFES Earthquake Preparedness Guides will be available in mid-2023.

For more information on how earthquake risks are managed in WA, see the State Hazard Plan – Earthquake and Collapse

# Flood

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## What is a flood?

A riverine flood occurs when water levels rise over the top of riverbanks due to excessive rain from weather systems producing widespread heavy rainfall. The flooding of rivers, creeks, lakes, and basins following heavy rain is the most common form of flooding in WA. Historically, floods have tended to be seasonal, occurring in summer in the north and winter in the south of the State. However, in recent years, southern WA experienced almost as many flood emergencies in summer as in winter. Riverine flooding in parts of WA can spread for thousands of square kilometres and may last for weeks.

In contrast, flash flooding is characterised by rapid rises in water levels within approximately six hours of rain, resulting from relatively short, intense bursts of rainfall, commonly from thunderstorms. While flash flooding can occur in any part of Australia, urban areas with poor drainage systems are particularly vulnerable. Flash floods are typically localised, rapid onset events and difficult to forecast. It is, therefore, difficult to provide adequate warnings against this type of hazard.

Flood water can be deep and fast, making it dangerous to cross. Most flood-related deaths have occurred when people have attempted to drive through, walk, swim, or play in floodwater. Flood water may also carry sharp or heavy objects and toxic materials which can injure or trap people.

## What is the risk of flood for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To develop an understanding of flood risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that the flood hazard poses a high risk to the economy, public administration and infrastructure. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Floods can cause fatalities, injury, illness and displacement of people. Most flood-related fatalities occur when people attempt to cross flooded rivers or enter flooded areas. Additional fatalities, injuries and illness can be caused by isolation, delayed medical treatment, waterborne disease, and increased vehicle accidents related to the weather event.

### Economy

Flooding can have a significant and prolonged impact on WA's economy. Repairing damage to roads and bridges can cost millions of dollars, with further losses coming through transport disruption and increased prices for the consumer. Mining, industry, and commercial sectors may suffer significant economic impacts due to the loss of production and recovery costs.

### Public Administration

Flood-related response and recovery activities can put significant pressure on emergency service workers, local governments, and agencies managing infrastructure, creating challenges for the continued provision of core services. Service provision in aboriginal communities may be reduced due to isolation.

### Infrastructure

Flooding can cause extensive damage to roads and bridges, making them unusable for long periods. Wastewater systems may require substantial repair across large geographic areas.

### Social setting

Flooding can result in isolated communities, income loss, and educational services disruption.

### Environment

Flooding can have a negative environmental impact through debris and pollutants entering riverine or marine environments. An increase in suspended sediment may result in large-scale fish kills by lowering oxygen levels in the water. Flooding can also cause significant soil erosion.

# What is being done to manage flood risk for WA?

To help protect the community from the adverse impacts of flooding, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Partnerships in emergency management

In accordance with the Emergency Management Act 2005 and Emergency Management Regulations 2006, the Fire and Emergency Services Commissioner is the Hazard Management Agency (HMA) for preparing for and managing the adverse effects of floods. The Bureau of Meteorology (the Bureau) is responsible for flood forecasting and warning services and providing time-critical information to the community and emergency managers, as prescribed in the Flood Forecasting and Warning Services Service Level Specification (SLS). WA also has a Flood Warning Consultative Committee, which provides DFES and other stakeholders with a consultation mechanism for the Bureau's flood forecasting and warning services.

## Alerts and warnings

DFES and the Bureau work together to inform the community about flood risk. The Bureau monitors weather patterns to identify the potential for flooding and, when necessary, issues warnings to the community. Based on the Bureau alert level, DFES uses the Community Alert System to advise the community to:

- Prepare for Flood when the Bureau issues Flood Watch alert;
- Take Action Now to encourage people to take action to remain safe when the Bureau issues a Flood Warning;
- Prepare to Evacuate or Evacuate now when the Bureau recommends evacuation.

Emergency alerts and warnings are issued through EmergencyWA and the Bureau Western Australia Rainfall and River Conditions website to ensure that the community are aware of the situation and the actions they need to take during floods.

## Research and investigation

The historical record of flood extent and numerical modelling are used to identify areas where future flood emergencies may occur. Flood mapping and advice on floodplain management are provided by the Department of Water and Environmental Regulation (DWER) and the Department of Planning, Lands and Heritage (DPLH). This assists the government, industry, insurers, and the community in preparing and responding before and during flood emergencies.

## Land use planning and mitigation strategies

A practical method of reducing flood risk is to restrict the construction of dwellings and other buildings in flood-prone areas. Where structures already exist, mitigation measures such as levees, embankments, and floodwalls can be employed. Management of local drainage networks is essential in controlling flash flooding in built-up areas.

## Community education and information

When a flood warning alert has been issued, people can take several actions to prevent damage at home. These include preparing and laying sandbags on doors and sliding doors, disconnecting electrical appliances and, if instructed, turning off electricity, water, and gas mains. If evacuation is advised, remember never to drive through floodwaters. Waters less than 15 cm deep can sweep a 1-tonne vehicle off the road. Find out more about how to prepare for floods at the DFES website.

For more information on how flood risks are managed in WA, see State Hazard Plan – Severe Weather.

# HAZMAT

GOVERNMENT OF WESTERN AUSTRALIA

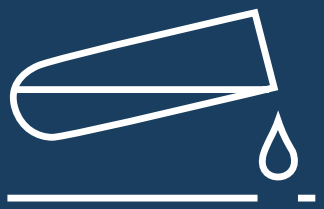
SEMC
STATE EMERGENCY MANAGEMENT COMMITTEE

## What is HAZMAT?

The term HAZMAT is an abbreviation for hazardous materials. Hazardous materials can be chemical, radiological, or biological in origin. HAZMAT events result from the actual or impending release of hazardous materials that have the potential to cause harm to people, property, or the environment. HAZMAT events may be the by-product of, cause, or occur alongside other emergencies such as collapse, transport accidents, fires, explosions, or health incidents.

HAZMAT events are common in WA. Between 2000 and 2022, an average of 140 HAZMAT events were recorded yearly. The most common HAZMAT incidents are caused by the transportation of fuel (petrol and diesel), ammonium nitrate, and other related products. It is also not uncommon for HAZMAT emergencies to be triggered by the mishandling of pesticides, chlorine, and various acids. Other common causes of HAZMAT emergencies are accidents in processing plants and burning toxic materials.

HAZMAT emergency response is also confounded by the size and remoteness of the State. The time required for assistance to arrive in the advent of a large-scale or remote incident means that WA requires a significant level of self-reliance for HAZMAT detection, response, and resolution from both DFES and Industry.



## What is the risk of HAZMAT for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To gain an understanding of HAZMAT risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that HAZMAT hazard poses a high risk to people, the economy and public administration. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Chemical HAZMAT events may cause injury or fatalities. Smoke or gases from HAZMAT events can spread away from the main impact area and affect people some distance from the incident. The emergency response must be carefully planned to ensure that first responders are not exposed to HAZMAT substances.

### Economy

HAZMAT events may cause disruptions to freight routes, impacts on WA's supply chain, loss of tourism, reputational damage, and financial loss through a reduction in economic activity. It is estimated that a significant HAZMAT event could cost the WA economy up to $1 billion.

### Public Administration

Responding to a significant HAZMAT event requires a wide range of state agencies and would reduce their ability to deliver core services. The WA health system will be the most highly impacted by a significant HAZMAT event and may require interstate and federal support as part of the response.

### Infrastructure

HAZMAT events may impact roads, rail, gas pipelines, and water infrastructure, requiring cleaning and inspection before use. Infrastructure may need to be replaced following a major event, resulting in protracted service disruption.

### Social setting

HAZMAT events can cause psychological and emotional stress for the community due to health impacts and trauma associated with evacuation and displacement. These impacts and the nature of the HAZMAT event may result in some residents not wanting to return to the affected area.

### Environment

HAZMAT events may cause soil erosion and debris and pollutants release into waterways and marine environments, negatively impacting the environment and the health of wildlife in the area.

# What is being done to manage HAZMAT risk for WA?

To help protect the community from the adverse impacts of HAZMAT events, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Partnerships in emergency management

In accordance with the Emergency Management Act 2005 and Emergency Management Regulations 2006, the Fire and Emergency Services Commissioner is the Hazard Management Agency (HMA) responsible for preparing for and managing the adverse effects of chemical HAZMAT. DFES is part of the multi-agency HAZMAT Coordinating Committee (HCC) and the HAZMAT Emergency Advisory Team (HEAT). These are groups established to ensure an efficient emergency management capability for HAZMAT emergencies in WA.

## Legislation and controls

Legislation and regulations govern the purchase, storage, and transportation of hazardous materials. The implementation of strict record-keeping and signage is also mandated. Many hazardous substances are also classified as dangerous goods. Dangerous goods are substances and articles that have the potential to cause harm to people, property and the environment and are regulated by the Department of Mines, Industry Regulation and Safety through the Dangerous Goods Safety Act 2004 and relevant regulations.

## Inter-jurisdictional arrangements

Should a HAZMAT event response exhaust WA state resources, support may be requested from the federal government, other states or overseas. WA maintains a wide range of inter-jurisdictional arrangements, collectively known as the Arrangements for Interstate Assistance (AIA); these can be enacted if needed.

## Response plans

Sites that store large amounts of HAZMAT substances and dangerous goods are required to prepare Fire and Emergency Services – Emergency Response Guides (FES-ERG). These plans are prepared by site managers in consultation with DFES and contain an assessment of site risks, and a summary of essential information for responders should a HAZMAT event occur.

## Training for response

DFES and other responding agencies ensure that personnel are appropriately trained for managing HAZMAT events. This includes maintaining skills in managing Chemical Biological and Radiation (CBR) events and multi-agency training in Self-Contained Breathing Apparatus (SCBA) and Protective Equipment and Detection Equipment.

## Community education and information

Ensuring the community is aware of the actions they must take during a HAZMAT event is critical in reducing adverse impacts. DFES provides relevant information on the Emergency WA website.

For more information on how HAZMAT risks are managed in WA, see SEMC State Hazard Plan – HAZMAT.

# Structural Fire

GOVERNMENT OF WESTERN AUSTRALIA

SEMC
STATE EMERGENCY MANAGEMENT COMMITTEE

## What is a structural fire?

Structural fire refers to any actual or impending property fire that impacts and/or causes or threatens to cause injury, loss of life and/or damage to property that may require a response.

Structural fires mainly occur in residential, commercial, or community-based buildings. The speed at which such fires spread varies depending on the types of materials used in building construction. The type of building material also influences how much radiant heat is generated.

Even a small fire can engulf an entire room in two to three minutes, leaving little time to escape. The following safety actions are recommended by the Department of Fire and Emergency Services (DFES) to follow if facing a structural fire:

Evacuate immediately

Crawl low under smoke

Go to your safe meeting place

Call 000

Do not re-enter a burning house for any reason

Wait for firefighters to arrive.

Structural fires have the potential to cause serious injury or death, but most home fires are preventable. Find safety tips on the DFES hazard information website on how to prevent home fires.

## What is the risk of structural fire for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To develop an understanding of structural fire risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that structural fire hazard poses a high risk to people, the economy and public administration. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Structural fires can cause injuries or fatalities. Early evacuations can reduce these impacts by minimising people's risk of injury from burns, smoke inhalation and exposure to hazardous substances during emergencies. Smoke resulting from Structural fires can disperse some distance from the site of the fire and may impact people's health.

### Economy

Structural fires can cause significant damage that may negatively impact the State's economy. It includes damage to residential, commercial, or community-based buildings, and indirectly to service disruption, transport route restrictions, supply chain disruptions and impacts on various supporting industries.

### Public Administration

A significant structural fire may require the involvement of resources from a wide range of state and local agencies and volunteers both during and after the fire, which may impact regular government services.

### Infrastructure

A significant structural fire may disrupt transport networks, leading to supply chain disruption and impacts on service delivery.

### Social setting

Structural fires can cause psychological and emotional stress to individuals, families and the community. The loss or damage to heritage and cultural buildings may impact the community's identity. Media coverage would have a large part to play in how the community responds to such events.

### Environment

Structure fires can negatively impact the environment by spreading airborne contaminants and runoff into the surrounding natural environment and artificial water courses.

# What is being done to manage structural fire risk for WA?

To help protect the community from the adverse impacts of structural fires, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions, and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Building regulations

Building construction standards are set by the State, usually in reference to the National Construction Code. Local governments and registered building surveyors are responsible for ensuring adherence to building construction standards. Application and enforcement of building standards for new buildings and redevelopments can contribute to a reduced risk for community buildings.

## Emergency management

In accordance with the Emergency Management Act 2005 and Emergency Management Regulations 2006, the Fire and Emergency Services Commissioner is the Hazard Management Agency (HMA) responsible for developing, implementing, and revising the State Hazard Plan for Fire.

## Fire stations and appliances

There are 1125 Career Fire and Rescue Service (CFRS) firefighters in Western Australia (WA) who provide firefighting, fire prevention, safety and rescue services throughout the state 24 hours a day, seven days a week, to respond to a variety of incidents that threaten life and property. The state also has a large number of volunteers that are trained to respond to structure fire incidents.

## Smoke alarm legislative requirements

From 1 July 1997, the installation of mains-powered smoke alarms became mandatory for all new residential buildings (or residential building extensions) within Western Australia. On 1 October 2009, it became a legal requirement to fit mains-powered smoke alarms in all existing residential buildings before transferring ownership, rent or hire. The DFES website provides further information on the types of smoke alarms.

## Community education and information

Simple actions can help reduce the impact of structural fires on your family and property. These include:

- Supervise heat sources in the kitchen. One-in-seven home fires start in the kitchen.
- Remove ion-lithium batteries from the charger when fully charged. Overcharging may cause the battery to explode.
- Use a licenced electrical contractor to install, check and maintain your home's electrical needs and appliances.

Find further safety actions on the DFES website.

For more information on how Structural fire risks are managed in WA, see the SEMC State Hazard Plan - Fire.

# Storm

GOVERNMENT OF WESTERN AUSTRALIA

SEMC
STATE EMERGENCY MANAGEMENT COMMITTEE

## What is a storm?

There are two distinct types of storms in Western Australia: warm-season storms and cool-season storms. Warm-season storms are typically severe thunderstorms that occur between October and April across the State. Cool season storms mainly occur between May and September when cold fronts pass over the South West Land Division, particularly in coastal areas.

Storms can produce weather phenomena, including strong winds with gusts over 90 km/hr, heavy or intense rainfall, large hail (greater than 2cm), tornadoes and storm surges. Heavy rains and storm surges can result in flooding, and lightning from warm-season storms is a common cause of bushfires.

Storms are often very disruptive and costly and can have concurrent and compounding impacts. For example, a window broken by hail can lead to water damage from rain. A storm that hit Perth in March 2010 caused 1.34 billion dollars in hail and flood damage. Climate change will likely result in more frequent and intense storms and longer warm season storm seasons.

## What is the risk of storms for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To gain an understanding of storm risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that the storm hazard poses a high risk to the economy. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Storms can cause building damage, lightning strikes, and road crashes, sometimes resulting in fatalities or injuries. Service provision can also be disrupted through power outages.

### Economy

Storms can result in economic losses to the State that may reach up to $10 billion. Common causes include damage to commercial and private buildings by hail, strong winds and flooding. Airports are unable to operate during storms resulting in disruptions to air transport and further contributing to financial loss.

### Public Administration

Storms are often widespread, impacting large areas, resulting in a high number of requests for assistance. Maintaining the provision of core services may require interstate assistance. The transport sector may need to modify routes while road damage is repaired.

### Infrastructure

Storms often damage power lines and other critical infrastructure, disrupting electricity supply, communications, water, and road networks. Impacts are usually short-term, though when damage is widespread, it can take longer to repair and restore these services.

### Social setting

Storms can temporarily impact facilities for vulnerable people (aged care, disability care) through emergency services being unable to attend. Culturally significant facilities may be damaged, and although repairable, temporary loss of access can cause disruptions to community cohesion.

### Environment

Storms can increase the volume of chemicals such as fertilisers and hydrocarbons entering the marine and estuarine systems. They may also result in mudslides, soil erosion and excessive siltation, impacting freshwater ecosystems.

# What is being done to manage storm risk for WA?

To help protect the community from the adverse impacts of storms, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Partnership in emergency management

In accordance with the Emergency Management Act 2005 and Emergency Management Regulations 2006, the Fire and Emergency Services Commissioner is the Hazard Management Agency (HMA) responsible for preparing for and managing the adverse effects of storms. The Department of Fire and Emergency Services (DFES) and the Bureau of Meteorology (the Bureau) produce storm surge inundation mapping for emergencies, and the Department of Water and Environmental Regulation (DWER) provides advice on floodplain management.

## Alerts and warnings

DFES and the Bureau work together to inform the community about impending storms through storm alerts and warnings. The alerts and warnings can be found on the Emergency WA website and have four levels reflecting how long till storm impacts are expected:

- Prepare: a storm is more than 24 hrs away. Start preparing.
- Get Ready: a storm is 6-24 hrs away. Prepare now.
- Take Action: a storm is less than 6 hrs away. Stay indoors and unplug electrical items if there is lightning.
- Cancellation: the storm threat has passed. Proceed with caution as dangers such as fallen trees and powerlines may be present.

## Building regulations

In WA, the Building Act 2011 and the Building Regulations 2012 provide a comprehensive building control system and building standards for new and existing structures. Informed land use planning, regular building maintenance, and the application and enforcement of the building codes, including the National Construction Code of Australia, effectively reduce storm impacts.

## Design and maintenance of critical infrastructure

Ensuring that the critical infrastructure is sited and designed to minimise the exposure and impacts of storms helps to reduce critical service disruption through storm damage. Regular maintenance of existing infrastructure helps to ensure structural integrity and continued service provision.

## Community education and information

Helping the community understand storm risk and advising on how they can prepare their properties before a storm improves community resilience and reduces levels of storm damage. DFES's Storm Smart guide can help people to prepare their homes and properties for storms.

For more information on how storm risks are managed in WA, see State Hazard Plan – Severe Weather.

# Tsunami

GOVERNMENT OF WESTERN AUSTRALIA

SEMC
STATE EMERGENCY MANAGEMENT COMMITTEE

## What is a tsunami?

A tsunami is a series of waves generated by a sudden movement or displacement of the ocean surface. The most common source of tsunamis is an undersea earthquake. For WA, the most likely source for such earthquakes is the oceanic trench in the Indian Ocean near Sumatra, Indonesia. Other triggers for tsunamis include underwater landslides, volcanic eruptions, and meteor impacts. Tsunamis may inundate coastlines causing property damage, injury, and loss of life. They are especially dangerous to swimmers, surfers, and boats in harbours.

While onshore inundation from tsunami events in WA has been minimal in recent history, there are accounts where people have found themselves in harm's way. During the 2004 Indian Ocean Tsunami, more than 100 people required rescuing along the WA coastline. While the impacts were mostly minor, this event left its mark across many areas in WA, including boats being damaged or sunk.

Once a tsunami has been triggered, the arrival time of the waves to WA can range from minutes to hours. If you are near the coast when an alert is issued, prepare to move at least 1 km inland. Identify the best route and consider going by foot or bicycle. Do not drive, as roads may become congested should an evacuation be required.

## What is the risk of tsunami for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To gain an understanding of tsunami risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that the tsunami hazard poses a medium risk to people, the economy and public administration. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

A tsunami may cause a significant number of fatalities and injuries close to the coastline. Factors exacerbating tsunami impacts include limited access to warnings and a lack of knowledge of tsunami hazards.

### Economy

A tsunami may result in substantial economic impacts on commercial and industrial activities, with the potential for billions of dollars in losses. Multiple ports may be affected, impacting the ability to divert shipping to other facilities.

### Public Administration

Tsunami incidents in regional and isolated areas may overwhelm emergency services by diverting resources used to manage regular activities. Waste management may present challenges, including the management of hazardous and asbestos-bearing materials.

### Infrastructure

Infrastructure close to the coastline may suffer substantial damage. Damage to roads in some areas of WA may lead to the isolation of communities. Although localised, damage to essential services infrastructure may require significant recovery time.

### Social setting

Tsunami damage to residential property is likely to impact some community members, particularly those with underinsured properties. Facilities for vulnerable people in isolated towns may temporarily lose functionality. Psychological and emotional stress may adversely affect some community members.

### Environment

A tsunami may cause significant environmental impairment due to contamination, soil erosion, and debris entering the marine and estuarine systems. Waves may cause substantial damage to coral reefs, mangroves and salt marshes.

# What is being done to manage tsunami risk for WA?

To help protect the community from the adverse impacts of tsunamis, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Partnerships in emergency management

In accordance with the Emergency Management Act 2005 and Emergency Management Regulations 2006, the Fire and Emergency Services Commissioner is the Hazard Management Agency (HMA) responsible for preparing for and managing the adverse effects of tsunamis. The Department of Fire and Emergency Services (DFES) is also an active member of the Australian Tsunami Advisory Group (ATAG), a national group of Commonwealth and state and territory stakeholders established to reduce the risk to the community through the implementation of effective community education and emergency management responses for coastal hazards caused by tsunamis.

## Alerts and warnings

The Joint Australian Tsunami Warning Centre (JATWC) is the agency responsible for detecting, monitoring, verifying and warning the community about tsunami threats in Australia, utilising the Tsunami Warning system:

- No threat: earthquake detected elsewhere, but Australia has no tsunami threat.
- Marine and immediate foreshore threat: potential dangerous rips, waves and strong ocean currents in Australian coasts.
- Land inundation threat: potential major land inundation, flooding, dangerous rips, waves and strong ocean currents in low-lying coastal areas.

Emergency alerts and warnings are issued through the Joint Australian Tsunami Warning Centre to ensure that the community is aware of the situation and the actions they need to take during tsunami alerts.

## International cooperation

Tsunamis know no borders. International cooperation is essential in developing and implementing effective warning systems. The Indian Ocean Tsunami Information Centre (IOTIC) supports tsunami risk assessment and reduction for 28 countries around the Indian Ocean, including the west coast of Australia. IOTIC maintain tsunami detection, warning and information dissemination services, with Australia, Indonesia and India being the member countries responsible for spearheading tsunami watch efforts for the organisation.

## Research and investigation

The Probabilistic Tsunami Hazard Assessment (PTHA) from Geoscience Australia (GA) estimates the frequency with which earthquake-triggered tsunamis of any given size occur in deep waters around the Australian coastline. Complementing this information, by 2024, GA and DFES will have completed tsunami evacuation maps based on tsunami inundation and impact modelling for key population areas. Modelling will continue for the remainder of the WA coastline beyond 2024.

## Community education and information

Tsunamis may arrive as quickly as a matter of minutes or be delayed for hours after their trigger. Learn about tsunami hazards on the Bureau of Meteorology and GA websites, and find recommendations on preparing for emergencies on the DFES website

For more information on how tsunami risks are managed in WA, see the State Hazard Plan - Tsunami.

# Crash Emergency

GOVERNMENT OF WESTERN AUSTRALIA

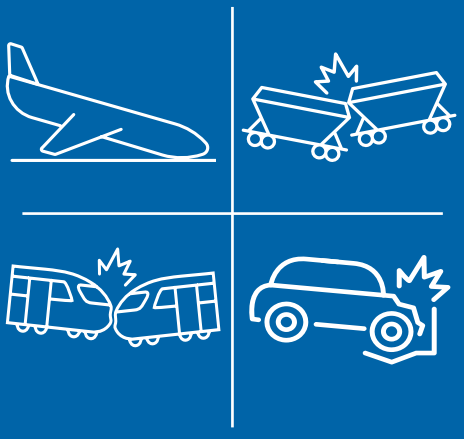
SEMC
STATE EMERGENCY MANAGEMENT COMMITTEE

## What is a crash emergency?

A crash emergency is a collision or imminent collision of a vehicle with a structure, terrain, water, another vehicle, or another object. Due to their nature or magnitude, crash emergencies often require a significant and coordinated response. These emergency events include air, rail (freight or passenger), and road crashes.

Fatalities related to crash emergencies are common in Australia. While casualties from air and rail crashes occur an average of 35 times per year, fatalities related to road crashes are much more numerous.

In WA, the number of fatalities and seriously injured people due to road crashes can reach nearly 1,900 people a year. In the Metropolitan area, over half of people killed or seriously injured result from multi-vehicle crashes at intersections. In regional WA, most fatal road crashes involve single vehicles on roads with a 110 km/h speed limit.



## What is the risk of crash emergencies for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To develop an understanding of crash emergency risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that crash emergencies pose a high risk to people, the economy, public administration, infrastructure and the environment. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Crashes commonly cause injury or fatality. Hazardous materials spilled or released in the incident may result in a lockdown of the crash site and can delay emergency responders.

### Economy

Crash emergencies may have a substantial economic impact, especially air or rail crashes. The agricultural and mining sectors may face significant financial losses if rail lines are interrupted. Airlines operating in WA may suffer extensive economic losses due to reputational damage after a passenger aircraft crash.

### Public Administration

Crash emergencies may challenge responding agencies in sustaining the provision of core services. Remote crashes may overwhelm the response capacity to fly or transport patients from the crash site to hospitals. Disruptions to railways may require buses to replace trains, significantly delaying services.

### Infrastructure

Crash emergencies may involve damage to infrastructure at the crash site. This can range from minor road or track damage to major impacts, such as damage to bridges or airport runways and instrument landing systems. Major damage to infrastructure can take months to repair.

### Social setting

Crash emergencies may impact the emotional and psychological wellbeing of survivors, response workers, spontaneous volunteers, and event witnesses. There may be temporary reductions in the availability of essential commercial products in the case of a freight rail crash.

### Environment

Crash emergencies can cause significant contamination of the surrounding environment through the release of hazardous substances.

# What is being done to manage crash emergency risk for WA?

To help protect the community from the adverse impacts of crash emergencies, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions, and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Air safety

In accordance with the Emergency Management Act 2005 and Emergency Management Regulations 2006, the Commissioner of Police is the Hazard Management Agency (HMA) for air crash. The Civil Aviation Safety Authority (CASA) regulates civil air operations in Australian territory. They define the baseline for maintaining, enhancing and promoting the civil aviation Safety Regulations Manual of Standards. They also establish the requirement for aerodromes to have an Aerodrome Emergency Plan (AEP).

## Freight rail safety

The head of Operations and Customer Management of Arc Infrastructure is the HMA for freight rail crash in WA. Arc Infrastructure is also responsible for ensuring that the rail systems are accredited by the Office of the National Rail Safety Regulator (ONRSR). In addition, they monitor weather across the rail system and patrol the rail line to identify faults and maintenance issues.

## Passengers rail safety

The Managing Director of the Public Transport Authority (PTA) is the HMA for passenger rail crash. They are responsible for passenger rail safety and maintain rail systems, track, and signal infrastructure in line with ONRSR requirements to mitigate rail crash risk. As a part of this role, the PTA implemented an $11.8 million Automatic Train Protection System upgrade in 2019. They also ensure that fire and emergency services have appropriate infrastructure access and adequate buffer zones along rail transport routes.

## Road safety

The Commissioner of Police is the HMA for road crash. Road safety is a multi-agency task with input from groups including:

- The Road Safety Council of WA - identify and implement measures to improve road safety, thus reducing injury, fatality, and damage to property through road crashes.
- The Road Safety Commission of WA - within the WA Police Force, supports reducing road trauma on WA roads by sustaining the State Government's Driving Change – Road Safety Strategy for Western Australia 2020-2030.
- The Department of Planning, Land and Heritage (DPLH) – implement planning guidelines to ensure appropriate land use adjoining roads, adequate buffer zones along transport routes, and appropriate infrastructure design, including ensuring access for emergency response services.

## Community education and information

The TrackSAFE Foundation focuses on reducing fatalities, injuries, and near hits on the Australian rail network from suicide, trespass, and human error. They work with communities and schools to increase awareness of safety on and around the rail corridor.

To help reduce the number of accidents on our roads, laws are in place that imposes penalties for dangerous driving. Being aware and making small changes can improve your safety on the road. Find WA Police Force advice on a range of road safety matters via the traffic and your safety website.

For more information on how crash risks are managed in see SEMC State Hazard Plan - Crash Emergency

# Hostile act

GOVERNMENT OF WESTERN AUSTRALIA

SEMC
STATE EMERGENCY MANAGEMENT COMMITTEE

## What is a hostile act?

A hostile act is a deliberate act by an individual designed to cause harm to another person, people or animals, or cause damage or destruction to property or the environment, such that a significant and coordinated response is required. Examples of situations that might constitute a hostile act are a hostage situation, siege, escape of a person from lawful custody, kidnapping, hijacking of a vehicle or aircraft, or the deliberate harmful use of an explosive, hazardous substance, firearm, or weapon. No emergency declarations of a hostile act have occurred in WA since it became a prescribed hazard in April 2020.

Unlike terrorist acts, hostile acts are not motivated by a political, ideological, or religious ideology/ agenda.

## What is the risk of hostile acts for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To develop an understanding of hostile acts risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that hostile acts pose a high risk to people, the economy, public administration, infrastructure, and the social setting. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Hostile acts may cause injuries and fatalities. A high-impact or large-scale event may overwhelm medical services and lead to further impacts. Trauma and stress may impact people's health in the long term.

### Economy

Hostile acts can negatively impact the State's economy through costly repairs, loss of revenue from business activities, and costs associated with response and recovery activities. The tourism sector may see a decrease in activity due to safety concerns or reputational damage.

### Public Administration

Responding to a high-impact hostile act may stretch emergency services in the initial response. Challenges may arise in dealing with a high number of requests for information from local and international media agencies.

### Infrastructure

Hostile acts may damage critical infrastructure, including road, rail, gas, power, water, wastewater/sewerage, and telecommunications networks. These impacts may cause short-term supply disruptions.

### Social setting

Psychological and emotional stress could deeply affect the WA community following a high-impact hostile act. The event may lower community morale if culturally significant locations are impacted. Media coverage of the event may result in widespread mental health impacts.

### Environment

Toxins and debris may be released into the environment during a hostile act. This contamination would need to be controlled and contained during recovery operations.

# What is being done to manage hostile act risk for WA?

To help protect the community from the adverse impacts of hostile acts, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions, and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Partnerships in emergency management

The Commissioner of Police is the Hazard Management agency (HMA) for a hostile act, as per the Emergency Management Act 2005 and Emergency Management Regulations 2006. The response to a hostile act would be managed by the WA Police force and supported by a wide range of other groups, including ambulance services, firefighters, and urban search and rescue (USAR) teams. Resources (ANZCTC) to assist in the prevention and mitigation of a terrorist act (established through the Australia-New Zealand Counter-Terrorism Committee) may be made available to the WA Government and the WA Police Force during a hostile act emergency.

## Security Protocols

In some instances, counter terrorism strategies (including some of the arrangements put in place through the ANZCTC may be applicable to a hostile act scenario,. The aviation and maritime transport industries, critical infrastructure owners and private security providers have specific legislation, regulations and protocols to enhance security and reduce the risks and impacts of hostile acts. Further information on these matters, can be found on the WA Police Force website.

## Crime prevention and community engagement

Hostile acts are prevented or mitigated by the WA Police Force using both proactive and reactive strategies. All police officers receive training in general conflict de-escalation and harm minimisation strategies. Police officers are also trained to identify and refer at-risk people either to specialist areas within the WA Police Force or to a relevant government or non-government agency for further pro-active support. Police Officers may also use their powers under a variety of state and federal legislation to neutralise or deescalate an incident.

The WA Police Force also draws on the expertise of a number of specialist business areas to: drive agency strategy on the prevention and mitigation of hostile events, conduct specialist training and information sharing, and proactively engage with at-risk people and groups. These business areas include: Family Violence, Community Engagement, Aboriginal Affairs, Custodial Services & Mental Health and Protective Security.

The WA Police Force also uses its website to share with the community a comprehensive library of guides and links to support services for a variety of topics relating to personal safety and harm reduction.

For more information on how hostile act emergencies are managed in WA see the SEMC State Hazard Plan - Hostile act

# Marine and Land Search and Rescue

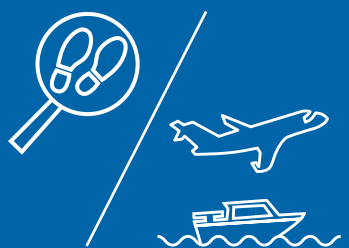
GOVERNMENT OF WESTERN AUSTRALIA

SEMC
STATE EMERGENCY MANAGEMENT COMMITTEE

## What are marine and land search and rescue operations?

Marine and land search and rescue operations requiring significant coordination are needed when people find themselves in distress or become lost on land or water. SAR operations occur frequently in Western Australia (WA), with the WA Police Force responding to over 640 land SAR and 250 marine SAR incidents in 2020-21. WA Police Force are supported by other agencies, and by volunteers including the State Emergency Service, Volunteer Marine Rescue Services and Surf Life Saving Western Australia.

SAR operations may require significant multi-agency collaboration. For marine SAR operations, 37 volunteer marine rescue groups are strategically placed along WA's coastline between Wyndham in the north and Esperance in the south. Volunteer marine rescue groups are heavily relied upon and are usually the first resource to be deployed for marine SAR operations. Land SAR operations are supported by the Department of Fire and Emergency Services (DFES), State Emergency Services (SES) and urban SAR (USAR) responders. SES and USAR Canine units support land SAR operations in a range of environments.



## What is the risk of SAR for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To develop an understanding of SAR operations risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that situations requiring SAR operations pose a high risk to people. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Situations requiring a SAR response may result in fatalities, injury, or illness. Access to events in remote areas may be challenging for first responders. In marine rescue cases, those suffering long periods of exposure while in the water may develop hypothermia, a high-risk health condition.

### Economy

SAR operations may have a moderate economic impact due to costs associated with response efforts, including vessel salvage and retrieval costs.

### Public Administration

In SAR operations where many people require rescue, the capacity of the Royal Flying Doctors and RAC rescue helicopters may be overwhelmed. Transferring people from remote areas to hospitals may require diverting resources to cover the incident.

### Social setting

Survivors and response workers may experience psychological and emotional stress. Psychological impacts may affect the wider community if the event has state-wide media coverage.

### Environment

SAR operations do not usually have an impact on the environment. However, contamination from damaged vehicles or vessels may result in the release of toxic substances (fuel and debris) into the environment.

# What is being done to manage SAR emergencies for WA?

To help protect the community from the adverse impacts of situations requiring a SAR response, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions, and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Partnerships in emergency management

The Commissioner of Police is the Hazard Management Agency (HMA) for marine and land search and rescue, as per the Emergency Management Act 2005 and Emergency Management Regulations 2006. Multiple agencies assist the WA Police Force in supporting searches, providing medical assistance, and facilitating evacuations during SAR emergencies.

## Marine radio communication

The Water Police Coordination Centre (WPCC) broadcasts safety information including regular weather forecasts, weather warnings and navigational hazard warnings. The WPCC is staffed by radio officers/call takers, police officers and nationally accredited SAR Mission Controllers. Specialised computer software assists in establishing search areas for marine SAR operations.

## Rural and urban land search

SES volunteers are trained for rural and urban SAR operations. They conduct searches on foot and may be supported by team members in motor vehicles, or the WA SES K9 unit. USAR responders are specialists in rescuing casualties trapped by buildings, landfalls or slippages resulting from industrial accidents, explosions, natural disasters, or terrorist activities. All DFES career firefighters are USAR trained for above-ground searches. Several other USAR technicians are prepared for underground searches. USAR operations can be supported by the USAR Canine team which is specially trained to locate live casualties trapped by building collapse.

## Airborne capability

The WA Police Air Wing unit utilises aircraft to assist in SAR operations including searching for missing persons, deploying officers and assets, and conducting rescue winching operations. The Remotely Piloted Aircraft System unit (RPAS), trains drone pilots which has significantly expanded WA Police Force's airborne capability. Increasing the areas that can be accessed with detailed aerial searching and, in some cases, allowing for an aerial view in conditions not favourable for conventional aircraft.

## Community education and information

Community information and education to prevent SAR incidents are provided by many agencies through their websites and other interactions with the community. Some examples include advice on staying safe while prospecting and fossicking, travelling the outback safely, and travelling safely in WA. Department of Transport (DoT) Marine Safety branch provides school and community-based education programs focused on boating safety. The "Safe and Found" program supports WA Police Force by ensuring they have immediate access to critical information about elderly people, those at risk of becoming lost, or those reported as missing.

## Beach safety - sharks

Shark mitigation strategies implemented in WA offer a range of tools and actions to help keep ocean users and coastal communities safe. These include beach and aerial surveillance, personal shark deterrents for surfers and divers, beach enclosures to protect swimming areas, and free first-aid training tailored for surfers. The SharkSmart website and app provide the latest research and safety information about sharks and include a near real-time shark activity map highlighting the latest sightings and tagged shark detections.

For more information on how SAR emergencies are managed in WA see the State Hazard Plan - Search and Rescue Emergencies

# Radiation Escape from a NPW

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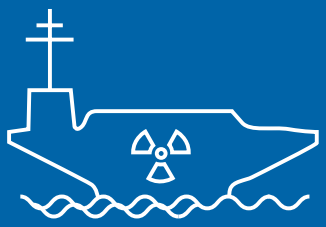
STATE EMERGENCY MANAGEMENT COMMITTEE

## What is radiation escape from a Nuclear Powered Warship (NPW)?

The hazard of radiation escape from a NPW relates to an emergency where a radiation leak from a vessel's nuclear reactor occurs, resulting in potential exposure to humans and the natural environment.

NPWs use nuclear energy for propulsion. The fission of uranium fuel in a nuclear reactor generates the energy for the steam turbine machinery in the warship. Thanks to the well-designed reactor core in NPWs, it is physically impossible for it to explode. The only mechanism by which nuclear products could be released is in an accident in which the fuel melts. Impacts of a potential radiation escape from a NPW may result from:

- direct gamma radiation from the vessel.
- gamma radiation from a drifting cloud or plume of radioactivity and material deposited on the ground.
- inhalation or ingestion of fission products from contaminated air, food or water.
- ingestion of fission products indirectly, particularly radioactive iodine in milk from cows grazing on contaminated pastures.



## What is the risk of radiation escape for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To develop an understanding of radiation leak risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that radiation leak hazards pose a low risk to people, the economy, public administration, infrastructure, the social setting, and the environment. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Radiation escape from a NPW may cause injuries or illnesses, particularly in the long term. The exposed population may face the risk of future thyroid cancer; though, this risk can be reduced by taking potassium iodide tablets. There may be challenges in meeting the demand for these tablets.

### Economy

Radiation escape from a NPW may negatively impact the State's economy. Business, ports, tourism, aviation, government activities and drinking water supply may all experience disruptions.

### Public Administration

The number of requests for assistance from people displaced by a NPW event may overwhelm support service providers. The Department of Water and Environmental Regulation (DWER) may struggle to provide critical services while cleaning, re-conditioning, sampling, and monitoring the water network.

### Infrastructure

The decontamination process may take months and may result in impacts on infrastructure. Roads and other paved surfaces may need to be removed and re-sealed, and roofs and outer walls high-pressure washed.

### Social setting

The long-term displacement may affect evacuees' mental health and community cohesion. Jobs may be lost due to port closures and other impacts are likely to cause psychological stress.

### Environment

A large clean-up effort may be required to decontaminate the soil in the affected areas. This would include topsoil removal and transport to a suitable waste disposal site. Rivers would require water quality monitoring to ensure they were safe for use.

# What is being done to manage NPW radiation escape risk for WA?

To help protect the community from the adverse impacts of a radiation leak, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions, and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Partnerships in emergency management

The Commissioner of Police is the Hazard Management Agency (HMA) for radiation escape from a NPW, as per the Emergency Management Act 2005 and Emergency Management Regulations 2006. The WA Police's State Hazard Plan – HAZMAT Annex A Radiation Escape from a Nuclear Powered Warship (NPW) details arrangements in place to safeguard the people and environment of WA from the radiation effects of a NPW reactor accident. WA Police Force also forms part of the Nuclear-Powered Warship Visiting Ships (Coordinating) Committee (NPW VS(C)C). This group links Federal and State agencies to prepare the plans and procedures necessary to deal with NPW visits and the potential threat they present to WA.

## Nuclear-powered warship visits plan

The Australian Government Department of Defence's Defence Operation Manual OPSMAN1 provides detailed information on the conditions, procedures and responsibilities associated with visits by NPWs to Australian ports. Visits are only permitted to those ports assessed and approved as suitable in terms of strict environmental and safety criteria. In WA, these are the Port of Fremantle and Cockburn Sound for visits of longer than two hours, and King George Sound in Albany for visits of a shorter duration.

The NPW visit plan includes a radiation monitoring system for use during each visit to provide early detection of a reactor accident that may cause the release of radioactive materials into the environment. A Radiation Monitoring Group (RMG) is formed for each NPW visit and is responsible for routine and emergency radiation monitoring.

## Medical management of radiation accidents

The Australian Clinical Guidelines for Radiological Emergencies is a comprehensive technical guide for use by clinicians and public health professionals in planning for the management of radiation incidents. The document provides specific therapeutic advice and protocols for clinical management of radiation dose assessment, contamination, injury, and prenatal exposure. The document includes arrangements for ambulances, hospitals, public health advice, laboratories and obtaining specialist advice.

## Distributing potassium iodide

Taking potassium iodide tablets in the hours following a NPW radiation leak can reduce the fraction of radioactive iodine taken up by the thyroid gland and lowers the risk of radiation damage to that gland. The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) guide for the issue of iodide tablets follows international recommendations, balancing the risks of a protective measure against the averted (prevented) radiation risks. In WA, the Radiation Health Branch of the Department of Health prepares and coordinates potassium iodide distribution in the State.

For more information on how NPW radiation risks are managed in WA see State Hazard Plan – HAZMAT Annex A Radiation Escape from a Nuclear Powered Warship (NPW).

# Space Re-entry Debris

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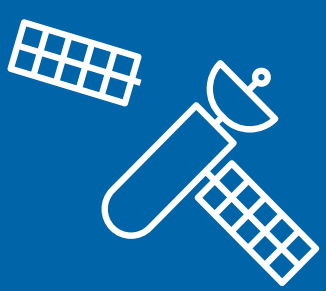
STATE EMERGENCY MANAGEMENT COMMITTEE

## What is space re-entry debris?

Space Re-entry Debris (SPRED) emergencies occur when man-made space objects re-enter the Earth's atmosphere. SPRED occurs when debris in low orbit re-enters Earth's atmosphere through natural orbital decay or controlled entry. Small pieces of space debris are destroyed during the re-entry process due to the atmosphere's extreme heat and forces. However, some parts of larger objects with higher melting points survive re-entry to make it to the earth's surface. There are an estimated 200-600 re-entries per year, with approximately 20% of these being large enough to have some part survive and impact the Earth's surface. Debris from a major SPRED event can be spread over an area around 1,000 km long and 40 km wide.

Prior to 1988, it was common for satellites in Earth's orbit to contain radioactive fuels. While this practice has been discontinued to limit potential contamination from SPRED, there are still nuclear-powered satellites in orbit. Currently, most satellites and space objects launched contain non-nuclear toxic materials, with a high probability of surviving re-entry. One of the major risks associated with SPRED events comes from the containment of hazardous materials. The probability of human casualties from direct impact is very low.



## What is the risk of SPRED for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To develop an understanding of SPRED risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that SPRED hazards were low across all consequence types. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

People are unlikely to die as a result of SPRED unless directly impacted by the falling debris (very unlikely) or as a result of handling contaminated debris. People may be evacuated to avoid exposure to hazardous material release, but most people will be safest sheltering in place.

### Economy

The major impact of SPRED would be the cost of clean-up activities, particularly for events involving radiation or harmful chemicals. Clean-up efforts may require crops and pastures to be cleared or destroyed, creating locally significant economic impacts.

### Public Administration

A SPRED event can generate significant sampling and testing requirements. ChemCentre and the Department of Water and Environmental Regulation (DWER) would manage this work which may impact service delivery. There may be an increase in people seeking health services due to concerns over radiation.

### Infrastructure

Impacts on major infrastructure are likely to be minimal, occurring only through direct impact. There may be some restrictions placed on transport networks where evacuation areas are established during the clean-up of hazardous materials.

### Social setting

There may be some psychological and emotional stress in affected communities due to concerns about hazardous materials. Providing clear community information would help reassure the community.

### Environment

Contamination of soils and water from hazardous materials contained in SPRED could be significant. Removal of contaminated soils would occur as part of the clean-up process. Clean-up of contaminated waterways would require significant resources.

# What is being done to manage SPRED risk for WA?

To help protect the community from the adverse impacts of SPRED, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions, and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Responding to a low-frequency hazard

The Commissioner of Police is the Hazard Management Agency (HMA) for SPRED. The nature of SPRED events means that they are hard to manage, with most actions occurring in the response and recovery phases. This is offset by the fact that SPRED events are low risk in WA due to their low frequency and, in most cases, limited impacts. As the launch frequency of satellites increases, the frequency of SPRED events will likely increase also. Monitoring will continue, and an observed increase in SPRED events will require a reassessment of the hazard in the future.

## Australian Government Space Re-entry Debris Plan (AUSSPREDPLAN)

The 2017 AUSSPREDPLAN outlines how the Australian Government will support the states and territories if space debris impacts their jurisdictions. Under AUSSPREDPLAN, the Department of Home Affairs through National Emergency Management Australia (NEMA) is the lead Australian Government agency responsible for coordinating an Australian Government response to a space re-entry debris incident. The plan contains five guiding principles and outlines how states and territories will work together during a SPRED event.

## Interjurisdictional arrangements

The Australian Government Planning Group is an interjurisdictional group providing evaluation, planning and advice on any operational and technical issues related to AUSSPREDPLAN activation and, if required, contributes to the development of a SPRED incident action plan. This group ensures that all states and territories are sharing best practices for SPRED.

## International monitoring

Understanding when items will re-enter the Earth's atmosphere and which are likely to make it to the ground is critical in managing SPRED events. The Japan Aerospace Exploration Agency (JAXA) runs the Space Situational Awareness program and NASA hosts the Orbital Debris Program Office. Both groups use radar, optical telescopes, other sensors, and analysis systems to monitor space debris. They record orbits, analyse approaching satellites, and, predict the re-entry of debris into the atmosphere. Sharing this information helps other countries including Australia to plan for SPRED events.

## Community education and information

Providing the community with timely and accurate information is important in a SPRED event. While the direct impacts of SPRED on people and buildings are uncommon, the risk from hazardous substances is significant. Community education regarding the risk of handling space debris, and proactively engaging with media to increase awareness and reduce the risk. Information is normally provided for any re-entries close to or likely to be visible from populated areas to reduce speculation and misinformation. The WA Police Force is responsible for providing public information.

For more information on how Space Re-entry Debris events are managed in WA see the State Hazard Plan – HAZMAT Annex B

# Heatwave

GOVERNMENT OF WESTERN AUSTRALIA

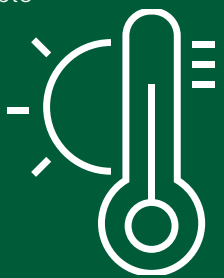
SEMC
STATE EMERGENCY MANAGEMENT COMMITTEE

## What is a heatwave?

Research shows that from 2000 to 2018, at least 354 people in Australia were killed by heatwaves: Heatwave fatalities in Australia, 2001–2018: An analysis of coronial records. On average, WA experiences two to three extreme heatwaves per year, the greatest number of which occur in the inland Mid-West region. Climate change is likely to result in a higher number of extreme temperature days and increasing daily temperatures throughout WA.

The temperature threshold for a heatwave in Australia depends where you live and is different for different localities throughout the State. The Bureau of Meteorology (BoM) defines a heatwave as three or more consecutive days when both daytime and night-time temperatures are unusually high compared to the local long-term climate and the recent past. Heatwaves can impact infrastructure and services, with people being highly vulnerable to their health effects. The groups at greatest risk during heatwaves are:

- The elderly, young children, and babies
- Women who are pregnant or breastfeeding
- People with existing physical/mental health conditions or on certain medications
- People exercising in the heat
- Socially isolated or homeless people



## What is the risk of heatwave for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To develop an understanding of heatwave risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that heatwaves pose a high risk to people. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Heatwaves can cause fatalities and illness. The elderly, children and pregnant women are particularly vulnerable, together with people with pre-existing health conditions that may be exacerbated by heat stress. Organisations and businesses with employees who work outdoors require additional precautions to prevent heat stress to their workforce.

### Economy

Heatwaves may result in economic loss, mostly through disruption to business activities. The agricultural sector may experience economic impacts due to the loss of livestock, crops and plantations affected by heat stress.

### Public Administration

During heatwaves, the provision of services for vulnerable people can be impacted due to high numbers of requests for support, particularly for in-home services. Ambulance services may be stretched in responding to heat stress cases, affecting their ability to maintain the provision of core services.

### Infrastructure

Heatwaves may result in electricity supply disruption due to the increased use of cooling systems. Sustained power outages are likely when there is increased demand for power systems. These outages can impact communications and water supply and can increase health impacts due to lack of access to cooling.

### Social setting

Heatwaves can affect the functionality of facilities for vulnerable people (aged, child, and disability-care), as their residents are often those most susceptible to heat stress.

### Environment

Heatwaves may impact flora and fauna, especially in water-dependent ecosystems. There is a potential for algal blooms to occur, and some vulnerable ecological communities may be adversely affected.

# What is being done to manage heatwave risk for WA?

To help protect the community from the adverse impacts of heatwaves, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions, and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Partnerships in emergency management

The Chief Executive Officer of the Health Department is the Hazard Management Agency (HMA) for heatwave, as per the Emergency Management Act 2005 and Emergency Management Regulations 2006. The WA Department of Health (DoH) works with BoM to inform the community about heatwave risks.

## Alerts and warning

BoM's Emergency Services Briefing provides predictions on imminent or ongoing heatwave events. The information provided will include the geographic area likely to be affected, estimated duration and corresponding temperature predictions, and associated weather conditions that may pose an additional hazard (e.g., storms, fire danger ratings, UV index). The triggers for declaring heatwaves in the Perth metropolitan area and regional WA, and alerts in regional WA, are defined in the State Hazard Plan - Heatwave.

Community alerts for heatwaves are published by the Emergency WA service. Community alerts for heatwave will follow the Australian Warning System with DoH issuing an Advice, Watch and Act, and Emergency Warning depending on the heatwave severity and impacts.

## Preparing your home for hot weather

There are many ways to prepare homes for hot weather and reduce the chance of residents being affected by heat stress.

- Shelter from heat in a cool place.
- Check that fans and air conditioners are working and that filters and air vents are clean. Replace or service them if needed before the summer season.
- Consider installing roof cavity insulation to decrease power usage and help keep the house cool in summer and warm in winter.

Concessions may be available on energy bills to support families during the hot months.

## Heat stress symptoms

Learning about signs and symptoms of heat stress may help save lives. Heat stress causes muscle cramps, pallor, dizziness, headache, nausea, increased heart rate, fainting, excessive sweating or no sweating with high temperature and hot, dry skin. Remember to drink plenty of water and fluids and seek medical attention if necessary. Find more recommendations on the HealthyWA website.

For more information on how heatwave risks are managed in WA see HealthyWA website.

# Human Epidemic

GOVERNMENT OF WESTERN AUSTRALIA

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STATE EMERGENCY MANAGEMENT COMMITTEE

## What is a human epidemic?

Human epidemics are naturally occurring and not the result of a deliberate act.

A human epidemic is the occurrence of more cases of an infectious disease than would be expected in the State's population, or a sub-group of the State's population, during a given period. Once the epidemic becomes widespread, it is defined as a pandemic. A disease is endemic when the level of the disease reaches a steady state in a community.

## What is the risk of human epidemic for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To develop an understanding of human epidemic risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that human epidemics pose a high risk to people, the economy, public administration, and the social setting. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Human epidemics can cause fatalities and illness, as well as having negative impacts on mental health. Within any population, there are subgroups of increased vulnerability.

### Economy

Human epidemics can result in substantial economic loss. Impacts include increased expenditure on medical resources by State agencies and extensive financial losses in the manufacturing, hospitality, and tourism industries, as well as threats to food security.

### Public Administration

Human epidemics result in significant impacts on the health system, with the increased volume of requests for assistance creating challenges in the continued provision of core services. The illness of government staff and their families may impact the sustained provision of core services

Structural adjustment may be required to respond to an epidemic. Overall responsibility for the preparation of WA Health media statements and coordination of media inquiries during an emergency event lies with the IC. Dissemination of alerts and public information are coordinated by the IC. The activation of the State Support Plan – Emergency Public Information may be considered as required.

### Social setting

The community is likely to experience psychological and emotional stress because of a human epidemic. Loss of life and long-term health impacts may significantly impact social well-being. The isolation experienced by people in quarantine may negatively impact their mental health. An outbreak may affect workplaces, community activities and support networks as people may be reluctant to gather. Disruption of the supply chain may lead to a reduction in the availability of basic needs such as food, fuel, and essential goods.

# What is being done to manage human epidemic risk for WA?

The WA health system routinely manages minor epidemics and disease outbreaks through its disease surveillance and reporting systems. These epidemics and outbreaks are not considered emergencies but are consistent with the definition of Level 1 incidents.

To help protect the community from the adverse impacts of human epidemics, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions, and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Partnerships in emergency management

The Chief Executive Officer of the Health Department is the Hazard Management Agency (HMA) for human epidemics, as per the Emergency Management Act 2005 and Emergency Management Regulations 2006. WA Health has membership on the Australian Health Protection Principal Committee and the Communicable Diseases Network Australia (CDNA) which provides national public health coordination and leadership around disease surveillance. Both organisations develop policies, strategies and advice on the prevention and control of diseases, and work to strengthen training and build capacity. They also engage with a range of national and international partners to prevent and control the spread of communicable diseases.

## Immunisation programs

Vaccines play a key role in reducing the burden of infectious diseases in our community. The WA health system maintains immunisation programs against vaccine-preventable diseases.

## Environmental health programs

Environmental health programs aim to minimise risk of disease transmission, such as those designed to ensure provision of safe food and water, and effective sewerage systems.

## Vector control programs

The WA health system undertakes programs to prevent the transmission of vector-borne diseases.

## Surveillance systems

Statutory and non-statutory surveillance systems are in place which alert health authorities to cases and clusters of preventable diseases, and lead to the initiation of control activities. Notifiable infectious diseases and related conditions are notifiable under the Public Health Act 2016 and the Public Health Regulations 2017. Any medical practitioner or nurse practitioner attending a patient whom he/she knows, or suspects has a notifiable infectious disease, or a related condition has a legal obligation to report the diagnosis to the Western Australian Department of Health. By alerting health authorities to cases and clusters of preventable diseases, impacts and further spread can be controlled.

## Community education and information

Campaigns promoting health education for both health professionals and the public are carried out by WA Health. Health promotion and education activities, targeting both health professionals and the public, assist in building awareness of infectious diseases.

## National and International collaboration

The WA health system ensures collaboration with national and international health agencies on disease prevention and control activities, including biosecurity measures at national borders.

For more information on how human epidemic risk is managed in WA see State Hazard Plan – Human Biosecurity.

# Energy Supply Disruption

GOVERNMENT OF WESTERN AUSTRALIA

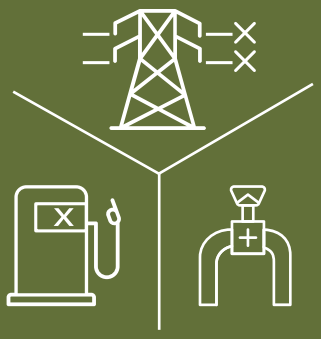
SEMC
STATE EMERGENCY MANAGEMENT COMMITTEE

## What are energy supply disruptions?

Energy supply disruption refers to the interruption of gas, liquid fuels, or electricity supplies which may negatively impact the economic and societal well-being in Western Australia. The three energy types are interconnected and interdependent with one another. The disruption of one energy type may result in the disruption of another. Disruption of all three energy types is considered a Total Energy Supply Disruption.

Liquid fuels are broken into two categories, primary and secondary, which helps the Hazard Management Agency to prioritise response to disruptions. Primary fuel types are the most relied upon fuels and include Diesel, Unleaded Petrol 91 (ULP91), Aviation fuels and Bunker (ships). Secondary fuel types that have been assessed are less relied upon at a state scale and include Premium Fuels (PULP 95, 98 RON), Ethanol and Biofuels, and Liquefied Petroleum Gas (LPG).

The nature of electricity networks means that frequent and intermittent loss of supply is unavoidable and a part of normal business. This being the case, not all disruptions to the electricity supply are considered an emergency and the response is guided by an alert warning system and State's core objectives.



## What is the risk of energy disruption for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To develop an understanding of energy supply disruption risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that energy disruption hazards pose a high risk to people, the economy, public administration and infrastructure. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

Energy supply disruptions are unlikely to directly cause fatality or injury. Indirect impacts such as lack of household heating/cooling, reduced cooking capacity, cold water dishwashing and loss of traffic signals may increase the occurrences of illness and accidents.

### Economy

Energy supply disruptions can have significant economic impacts through the loss of manufacturing production. Impacts would be felt throughout the State due to the breakdown of supply chains and subsequent price increases. It is estimated that a major disruption may result in upwards of $10 billion in losses state-wide.

### Public Administration

Major disruptions to energy supply may have significant impacts on public administration, including a reduction in service provision through the closure of government offices, reduced availability of medical consumables (including not being able to launder linen), impacts on public transport and reduced capacity in emergency services.

### Infrastructure

Much of the State's critical infrastructure is reliant on energy supply. Ongoing disruptions may impact water and wastewater networks, telecommunications, generation of other energy sources, transport and energy delivery systems (e.g. gas pipelines).

### Social setting

Energy disruptions may have community impacts including a reduction in the provision of some social services (e.g. meals on wheels) and an increase in requests for assistance. The major impact is likely to come from a reduction in meat and dairy processing in WA. This can significantly impact the cost and availability of basic food items and may cause psychological and emotional stress in affected communities.

# What is being done to manage energy disruptions risk for WA?

To help protect the community from the adverse impacts of energy supply disruptions, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions, and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## DIMRS Safety Divisions

The Coordinator of Energy is the Hazard Management Agency (HMA) for gas, liquid fuel, and electricity supply disruptions. The Department of Mines, Industry Regulation and Safety (DMIRS) works with the HMA to help reduce the risk associated with energy disruptions. DMIRS's Building and Safety business area is responsible for the safety regulation of all low-pressure distribution networks that supply gas to commercial and residential customers. This business area administers the safety regulation of supply system connections, ensuring transmission lines are built and maintained to a high standard, thus increasing the reliability of supply. This business area also looks after certifications of electrical works at the property level. This contributes to reducing the number of occurrences of electrical failure and accidents that may impact the supply of electricity to individual customers. DMIRS's Safety Regulation Group is responsible for flammable liquids once unloaded from ships and any facilities they pass through under the Dangerous Goods Safety Act 2004. These business areas help DMIRS effectively coordinate energy provision and reduce the risk of energy disruption emergencies.

## National coordination

The National Oil Supplies Emergency Committee (NOSEC) and National Gas Emergency Response Advisory Committee provide coordination between the Commonwealth, States / Territories and industry, to address widespread/inter-jurisdictional shortages that may lead to energy supply disruption. These groups work to ensure that any national or international disruptions are strategically managed to ensure fair and efficient distribution to minimise impacts.

## Planning for at-risk groups

During an incident, affected at-risk persons will be identified through consultation with the Operational Area Support Group (OASG). The OASG will include representatives from responsible agencies to ensure that there is planning and protection of at-risk sectors within the community, these include:

- customers with life support equipment
- customers with thermoregulatory disorders
- preschool and school children
- aged care recipients
- remote communities.

This will include collaboration with other relevant agencies and organisations to develop communication strategies to educate and advise the public to support their response to energy supply disruptions.

## Alert Warning System (AWS)

The AWS is a predetermined colour-coded system that organises incident indicators (descriptors) into four levels that help manage the required response and community information. The AWS details the incident levels for all three hazards as follows:

- Level 0 – Heightened Risk of Acute Supply Disruption
- Level 1 – High Risk of Acute Supply Disruption
- Level 2 – Acute Supply Disruption
- Level 3 – Critical Supply Disruption.

For more information on how energy supply disruption risk is managed in WA see the State Plan – Energy Supply Disruption.

# Maritime Environmental Emergencies

GOVERNMENT OF WESTERN AUSTRALIA

SEMC
STATE EMERGENCY MANAGEMENT COMMITTEE

## What is a maritime environmental emergency?

Maritime Environmental Emergency (MEE) is a collective term for Marine Transport Emergencies and Marine Oil Pollution in Western Australian state waters. This includes port waters and oil spills outside the state waters which may impact the WA coast.

Marine Transport Emergencies are actual or impending situations involving marine vessels which can cause:

- Physical damage to a vessel or vessels
- Death, injury, or damage to the health of a person
- Damage to property or the environment
- Hazards to navigation

This can include collisions, strandings, or a navigational incident. MEE covers a wide range of vessels including any craft capable of being used and navigated on water.

Marine Oil Pollution events include the actual or impending spill, release or escape of oil or oily mixtures that can cause loss of life, injury, or damage to the health of a person, property, or the environment.

## What is the risk of MEE for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To develop an understanding of MEE risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that MEE hazards pose a high risk to the economy, public administration and the environment. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

MEE can cause fatalities, injuries, and illnesses as a result of a collision between vessels, exposure to hazardous substances and/or exposure to the elements.

### Economy

MEE events often cause reputational damage and a decline in tourism. This may result in the closure of tourist operations and the loss of jobs. MEE events impacting ports are likely to cause economic loss through disruption of maritime trade. Large scale events will generate significant clean-up and remediation costs.

### Public Administration

MEE events are response intensive, involve multiple agencies and may stretch resourcing. Good communication and understanding of community concerns help to ensure that there is not a loss of confidence in government.

### Infrastructure

MEE events can damage marina and port infrastructure resulting in transport and trade disruption. Sometimes these impacts can be compounded. For example, in August 2014, a mooring failure due to strong winds at Fremantle Port, resulted in damage to rail infrastructure when the vessel collided with the rail bridge. This caused disruption to port operations and the rail network.

### Social setting

Impact on marine wildlife may cause psychological and emotional stress, potentially affecting community identity and lowering morale. This may be widespread due to media coverage of the event.

### Environment

Debris and pollutants entering marine environment negatively impact marine ecology. Pollutants may cause fatalities or injury to marine wildlife, and endangered species (including loggerhead turtles and whale sharks). It also impacts marine ecology, particularly within vulnerable ecosystems such as designated national parks.

# What is being done to manage MEE risk for WA?

To help protect the community from the adverse impacts of MEE events, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions, and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Incident management plans

The Chief Executive Officer, Department of Transport (DoT), is the Hazard Management Agency (HMA) for MEE events. DoT, Port Authorities and Port Operators write, review and exercise incident management plans, in the areas they are responsible for. These plans lay out how to appropriately respond to various marine transport emergencies. Pre-planning allows for the effective allocation of resources and ensures there is collaboration between the Hazard Management Authority (HMA), controlling agencies, emergency management agencies and stakeholders.

## National Plan for Maritime Environmental Emergencies

DoT and the five Port Authorities in WA manage the MEE Hazard in alignment with arrangements outlined in The National Plan for Maritime Environmental Emergencies (National Plan). The National Plan is administered by the Australian Maritime Safety Authority (AMSA) and is underpinned by the Intergovernmental agreement on the National Plan to combat pollution of the sea by oil and other noxious and hazardous substances. The plan is centred around a collective intergovernmental agreement with the Australian Government and Australian States and Territories characterised by willing and effective cooperation under mutual aid and support arrangements.

## Navigation tools

DoT help to reduce the risk of navigation-based MEE events by installing and maintaining aids to navigation, and by promoting safe navigation in State waters. Hydrographical surveys are conducted to produce navigational charts of the WA coast, inshore islands, and inland waterways. These actions help to ensure that marine vessels can safely move through State waters and that changes in conditions can be communicated.

## State Maritime Environmental Emergency Response Committee (SMEERC)

The SMEERC is a group comprising representatives from controlling agencies and other government and industry organisations. The committee engages in valuable cross-industry collaboration to bring together the key stakeholders and ensure information sharing. The SMEERC promote effective strategies for the prevention of, preparation for, response to and recovery from MEE. This group also have input into the State Hazard Plan – Maritime Environmental Emergencies.

## Oil spill contingency planning

DoT, Port Authorities, Port Operators, Maritime Facility Operators, Boat Harbour Operators and Petroleum Titleholders formulate, review and exercise Oil Spill Contingency Plans (OSCPs) and/or Oil Pollution Emergency Plans (OPEPs). OSCP/OPEPs are developed by controlling agencies based on an assessment of the identified hazard and risks. Consideration is given to available response resources, response arrangements, procedures, and reporting requirements.

## WA Oiled Wildlife Response Plan

Where a MEE involving the release of oil pollutants has occurred, the Department of Biodiversity, Conservation and Attractions (DBCA) lead the oiled wildlife response. This is coordinated through The Western Australian Oiled Wildlife Response Plan (WAOWRP). This plan provides guidance for the standard of response, addresses processes and procedures, and assists with community messaging and information. The plan is effective in reducing the impacts of a marine oil pollution event on wildlife.

For more information on how maritime environmental emergencies are managed in the State Hazard Plan - Maritime Environmental Emergencies (MEE).

# Animal and Plant Biosecurity

GOVERNMENT OF WESTERN AUSTRALIA

SEMC
STATE EMERGENCY MANAGEMENT COMMITTEE

## What is animal and plant biosecurity?

Animal and plant biosecurity events occur when an outbreak of exotic and endemic diseases, pests or weeds are detected in Western Australia (WA). These may impact the economy or environment at a regional or national level. These threats include emergency animal diseases, emergency plant pests, declared pests, and aquatic pests or pathogens. These are defined in Government and Industry Emergency Animal Disease Response Agreement, Government and Industry Emergency Plant Pest Response Deed, National Environmental Biosecurity Response Agreement and Biosecurity and Agriculture Management Act 2007.

"Endemic pests and diseases" are agents known to occur in Australia. Depending upon the agents, they may cause substantial loss to agricultural industries each year. The impost of significant endemic agents is managed through biosecurity measures and a range of management strategies, such as surveillance and vaccination. However, a sudden major outbreak of some endemic agents could constitute an emergency, if it resulted in the illness or death of large numbers of animals, or if public health was threatened by an agricultural pest/disease that could also affect human health, for example, a large outbreak of anthrax in cattle.

## What is the biosecurity risk for WA?

The SEMC is responsible for developing a robust understanding of risks in WA. To develop an understanding of biosecurity risk, the SEMC's State Risk Project conducted a collaborative risk assessment workshop that drew on the expertise of a wide range of relevant stakeholders. It was found that biosecurity hazards pose a high risk to the economy, public administration, the social setting, and the environment. Potential impacts are grouped into consequence types and summarised below. Overleaf is an overview of how some of these risks are managed.

### People

The impact of an animal and plant biosecurity event may be very significant to landowners and the farming community, particularly on people's mental health. The flow on impacts of such an event may include short-term dispersal of pockets of rural communities.

### Economy

The cost of a major animal and plant biosecurity event to the WA economy could be over $10 billion. The impact extends beyond the direct loss of production and export and includes flow-on effects such as the loss of valuable genetics, disruption to freight routes, cost of re-establishing markets, impacts on tourism and more.

### Public Administration

Responding to a prolonged animal and plant biosecurity event may require significant input and coordination across all levels of government and industry. This is likely to stretch resources and some agencies may have difficulty sustaining critical services. Mitigating the reputational impacts of the outbreak would require a cross-government strategy.

### Social setting

These events may cause psychological and emotional stress to farmers and growers and impact the community well-being. For many areas in WA, agricultural industries are part of the community identity (e.g., the SW wine region) and significant impacts on these industries can cause a loss of community identity and cohesion.

### Environment

Animal and plant biosecurity events may cause severe loss or impairment of ecosystem function and progressive environmental damage. The impact caused by many diseases and pests on the WA environment is not known and may include flow-on effects (e.g., increase in rabbits or foxes due to loss of control programs while production is disrupted).

# What is being done to manage biosecurity risks for WA?

To help protect the community from the adverse impacts of animal and plant biosecurity hazards, strategies and actions known as 'controls' are employed to neutralise or reduce an identified risk. A controlled risk may still present a potential threat to the community, but the associated dangers will have been significantly reduced. Controls may include legislation, research, actions, and agreements. Below is a current list of some of the State's controls, which are continuously reviewed and improved to treat risk appropriately.

## Boarder control and quarantine

WA has strict quarantine requirements which limit what can be brought into the state. This is supported by inspections carried out on fresh fruit and vegetables, flowers, seeds, honey, vehicles and machinery, and any other possible carriers of risk material. This occurs at state border checkpoints (road, rail, sea, and air), freight depots, post offices and other interstate entry points. Nationally coordinated inspections occur for international passengers, cargo, mail, animals, plants, and animal or plant products arriving in Australia.

## Emergency hotlines

There are national hotlines available for reporting animal and plant pest and disease outbreaks or suspected cases: the Animal Disease Watch hotline –1800 675 888, and the Emergency Plant Pest (EPP) hotline –1800 084 881. WA also has the Pest and Disease Information Service which supports the EPP. These helplines facilitate the early detection of animal and plant pests, weeds, and plant diseases and aim to reduce the impacts associated with delays in detection.

## Surveillance programs

Department of Primary Industries and Regional Development (DPIRD) undertakes several active and passive surveillance programs to verify biosecurity status and to assist in early detection. These programs provide ongoing support and engagement with the industry to encourage people to investigate early.

## Livestock tracking

Western Australia has a livestock identification system that requires all livestock in WA to be individually identified. This identification allows the control and recording of livestock movement. Procedures and protocols that identify livestock and record movement allow for any biosecurity outbreaks to be quickly tracked and contained.

## Plans and arrangements

The Director General of DPIRD is the Hazard Management Agency (HMA) for animal and plan biosecurity hazards in WA. The Emergency Plant Pest Response Deed (EPPRD), Emergency Animal Disease Response Agreement (EADRA) and the National Environmental Biosecurity Response Agreement are legally binding agreements between the Australian Government, all State and Territory Governments, and identified industries. These agreements cover the management and funding of emergency responses. In addition, AUSVETPLAN, AQUAVETPLAN, PLANTPLAN and Biosecurity Incident Management System (BIMS) are pre-agreed national plans which provide technical response and control strategies to ensure quick, best practice responses.

## Diagnostics

DPIRD operates Diagnostic Laboratory Services (DDLS) which identifies animal and plant pests and diseases. These services play an important role in identifying and reporting unfamiliar and potentially damaging pests, weeds, and diseases of agricultural and quarantine concern.

For more information on how animal and plant biosecurity hazards are managed in WA see the SEMC State Hazard Plan – Animal and Plant Biosecurity.

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