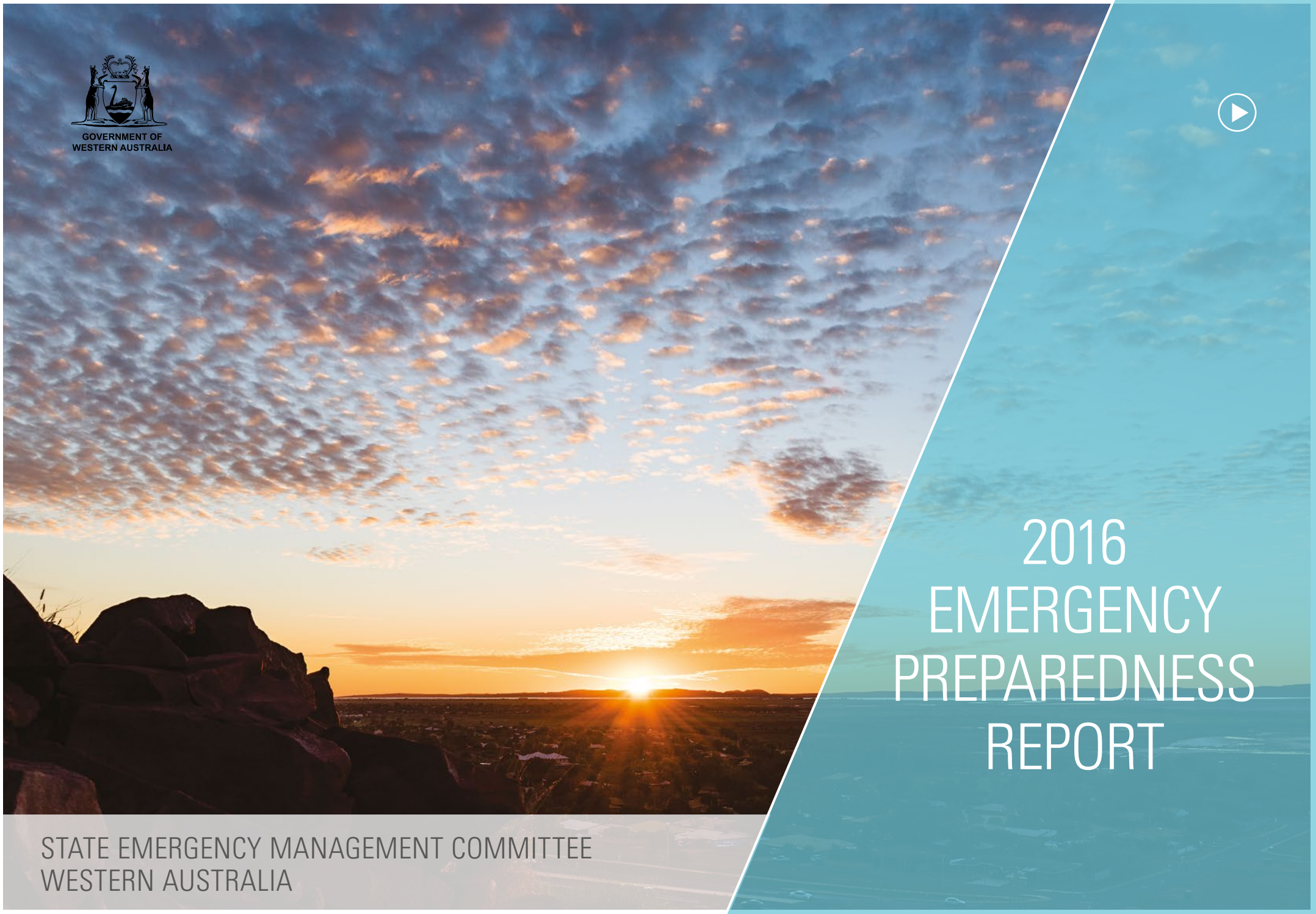


GOVERNMENT OF
WESTERN AUSTRALIA

# 2016 EMERGENCY PREPAREDNESS REPORT

STATE EMERGENCY MANAGEMENT COMMITTEE
WESTERN AUSTRALIA

Image credits:
Cover photo – Sunset over Karratha, Western Australia. Image: Grant Wilson.

Images on the divider pages represent the SEMC's six state core objectives: people, economy, infrastructure, social setting, government and environment.

Page 5, *People* – Perth, Western Australia. Image: Andrea Izzotti
Page 11, *People* – Bather's Beach, Fremantle, Western Australia. Image: EA Given
Page 25, *Economy* – Port Hedland, Western Australia. Image: Lisa Allison
Page 41, *Infrastructure* – Highway over Murchison River, Western Australia. Image: Rob Bayer
Page 105, *Infrastructure* – Railway line between Mullewa and Wubin, Pintharuka, Western Australia. Image: Grant Wilson
Page 113, *Social Setting* – WA Police and Frontier Services West Nullabor Patrol set up a road block during the 2015 Esperance fires. Image: Grant Wilson.
Page 123, *Government* – Supreme Court of Western Australia. Image: Robert Paul Van Beets
Page 127, *Environment* – John Forrest National Park, Western Australia. Image: Peter Caruso
Page 133, *Environment* – Southern brown bandicoot, John Forrest National Park, Western Australia. Image: Peter Caruso

# Contents

# Foreword

The possibility of severe weather, bushfires and geological events is a constant reality in Western Australia. Whether the events are annual or less frequent, we will inevitably be affected.

The economic cost of natural disasters in Australia exceeded $9 billion in 2015 and is predicted to rise to $33 billion by 2050, unless we take steps to increase resilience.

Saving lives is – and always should be – the primary concern during an emergency. Emergency Management (EM) planning can save lives, preserve the environment and protect property by raising the understanding of risks and contributing to a safer, disaster-resistant and resilient society in Western Australia.

All the pieces need to fit together smoothly and efficiently and – more importantly – they must do so in times of crisis.

This year's *Emergency Preparedness Report* will concentrate on the major events that stretched us, the notable example being the Waroona fire that devastated the town of Yarloop. The report allows us to learn the lessons of the past so we can better prepare ourselves for the challenges that await.

While opportunities for improvement in the EM sector remain, it is clear that most agencies are actively working together to resolve them. The strategy set down by the SEMC and the focus upon understanding risk, capability and impact, has laid the path towards a promising future.

I urge you all to read beyond the executive summary and recommendations. The risk and capability sections of this report contain a great number of meaningful and tangible projects occurring throughout the EM sector. They detail excellent examples of the actions and initiatives that are better equipping the state of Western Australia to face our future challenges.

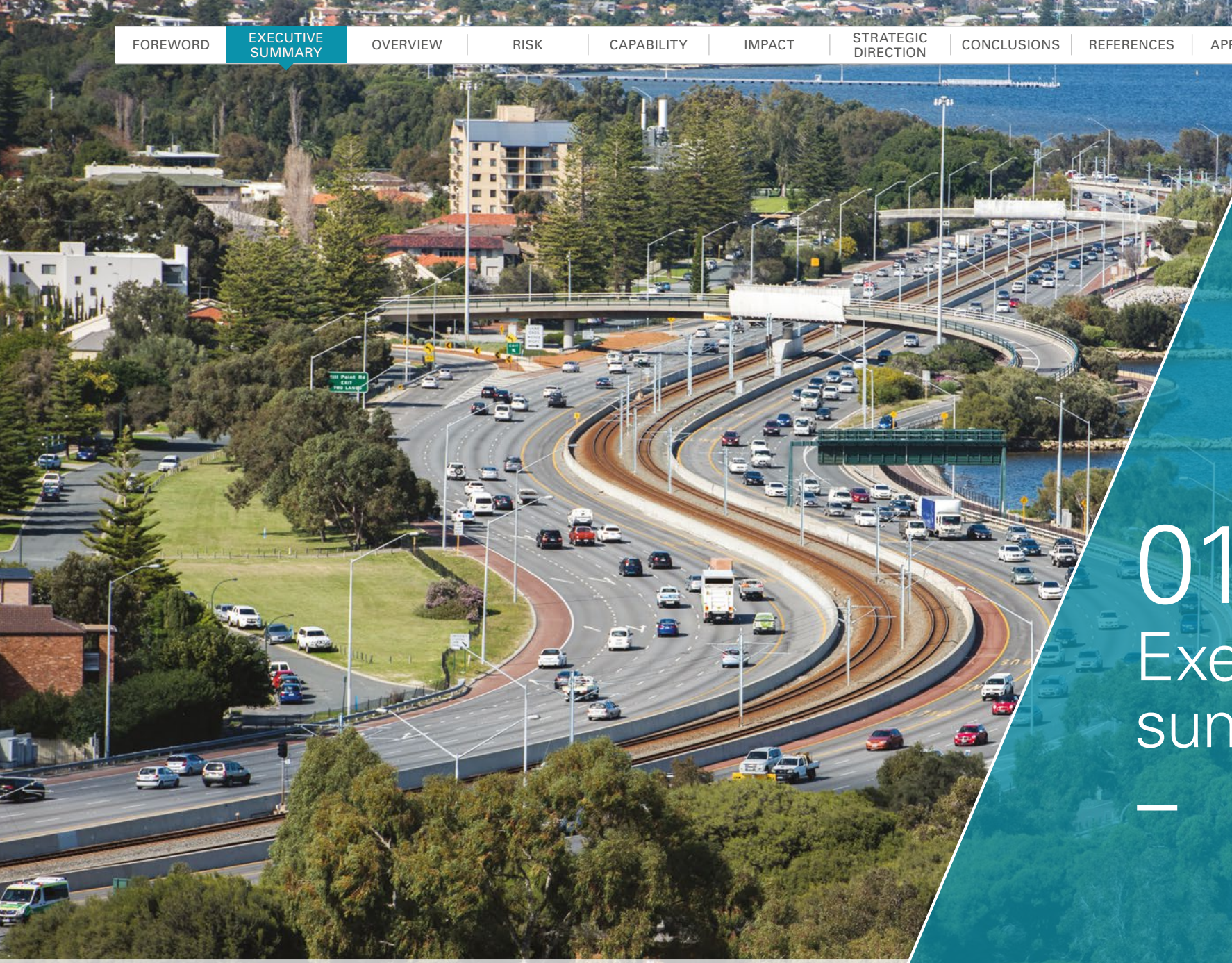
What also became apparent in 2015–16 was that while Western Australians are aware of some hazards in their environment, they generally do not have adequate knowledge of the risks and how to mitigate them. This is despite extensive information being made available by the numerous EM agencies and organisations.

Unfortunately, this is compounded by a growing expectation in some sections of the community that 'someone else' will come and save them. Hard experience has taught us this cannot be the case. The EM agencies will do their best. But the public must embrace their responsibility and play their role as best they can.

There is a subtle but key difference between being 'at risk' and being 'vulnerable'. In times of crisis, people tend to fall within three broad categories. Most people mitigate and treat their risks effectively, doing exactly as society would and should expect. The next group comprise our most vulnerable citizens – those who are unable to reduce their own risk and who truly need our support and protection. The last group are people who are generally complacent and who, at worst, ignore their responsibilities.

This last group is the one of greatest concern as these are capable people who are failing to take responsibility, address their risks or act upon the alerts and warnings that are issued by the EM agencies. Engaging with these individuals and reversing the expectation that 'someone else' will come and save them will be an important challenge into the future.

**Frank Edwards CSC**
CHAIR
STATE EMERGENCY MANAGEMENT COMMITTEE
31 October 2016



# 01 Executive summary

PEOPLE – TO PROTECT THE LIVES AND WELLBEING OF PEOPLE

# 01 Executive summary

The events of early 2016 brought three main issues to the fore:

- structure
- recovery
- shared responsibility.

The Ferguson Review into the Waroona bushfire raised serious concerns about the structures in place for managing bushfires in Western Australia. The primary recommendation called for large-scale structural change, creating an alternative model to deliver rural fire management.

Consideration and discussion of this primary recommendation is not included within this report.

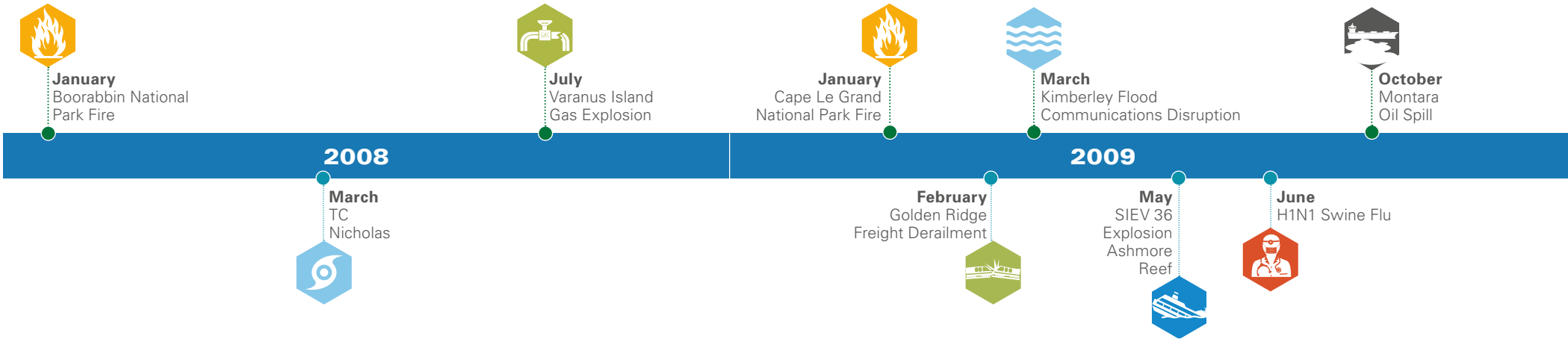
Following the last major reviews in 2011–12, EM agencies began looking at emergency preparedness through a response lens, the belief being that better training, staff and equipment would provide a more effective response. And it has.

This led to improvements in training, more staff, better equipment and the realisation that these elements should be in place well before an incident. This natural progression morphed the focus of EM towards preparation, leading to a large body of work that has been occurring over recent years to improve coordination and interoperability.

Cultural, structural and systemic barriers were met along the way but a universal commitment by those involved saw a path being navigated and considerable improvements being made. This work forms a major component of the ongoing work plans of all EM stakeholders here in Western Australia.

Emergency service organisations can only do so much in times of disaster.

Recovery was an area of EM that, until the events of 2016, was largely considered in the context of the individual incidents. Emergency events over the past decade or more, while devastating to those involved, have led to damage that could be managed effectively on a case by case basis. Support services and funding could be mustered and affected communities could commence healing from the incident.



The loss of almost an entire town in early 2016 brought the issue of recovery to the fore. Before the destruction in Yarloop, recovery generally meant rebuilding. Reconstruction presented few challenges when the impacts were on a relatively small scale. The destruction of over 180 homes along with most of the community infrastructure necessitated a much more comprehensive and exhaustive recovery operation than had been the case in recent memory.

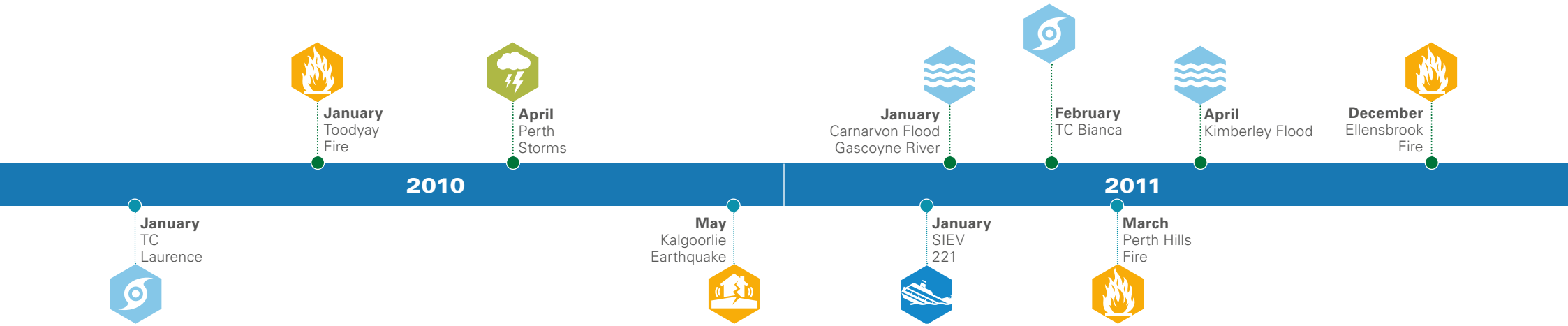
In last year's report, out of scope events were raised as it became clear that extreme events were both unstoppable and inevitable. Here in Western Australia, risk is assessed against credible worst-case scenarios. But thus far training, exercising and planning takes place against known or likely events. This difference has started to be addressed. However, these extreme events tend to lie outside the dominion of common experience. The Ferguson Review noted that 'planning should be driven by imagination and foresight' identifying 'the potential for a future that is different, unseen, and unimaginable'.

As a state, much work has been done as we **prepare to respond** to an emergency. The events of 2016 proved that it is just as important that we **plan to recover**. It is suggested that the same level of maturity that goes into planning and preparing for an emergency response should also exist when planning and managing the recovery from such an incident.

This however has also raised some discussion about what is, and should be, the role of the state in recovery.

The final issue that came to the fore in 2016 is that of shared responsibility, which is based on the principle of mutual obligation. This in essence means that the responsibility for community safety during emergencies is shared by the state, municipal councils, individuals, businesses, household members and the broader community.

This has been included within the Western Australian EM Framework for quite a while. In fact, the inaugural SEMC *Emergency Preparedness Report* in 2012 cited that '*Across the range of capabilities considered in this report, the concept of shared responsibility has emerged as central to the challenge of creating a more prepared Western Australia*'.



The report went on to conclude that '*the best outcomes in terms of community safety, environmental protection and asset preservation are likely to come from self-reliant communities with a high level of preparedness based on a clear understanding of risk*' (State Emergency Management Committee 2012).

For the most part in Western Australia this is true. In many sections of society this concept of shared responsibility has been firmly embraced. Responses received indicate that there remain pockets of society that believe that '**it won't happen to me**' or that '**somebody will come and save me**'. Despite the best efforts of EM stakeholders to provide education to empower communities, such attitudes remain.

The inactivity or complacency of such people creates impacts broader than just to themselves and may affect the entire community.

Forming an effective strategy to engage with this group and reverse this attitude will be an ongoing challenge for EM stakeholders.

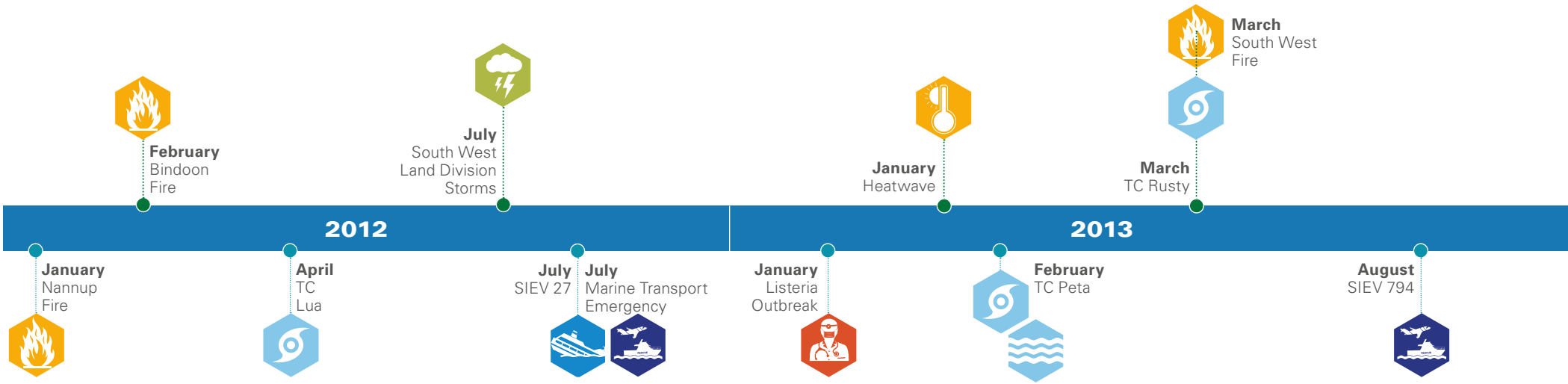
## Current position

The 2016 *Emergency Preparedness Report* finds that Western Australia has a largely committed, engaged, equipped, capable and cooperative EM sector. They actively strive to deliver the best outcomes for the state.

EM structures and mechanisms are in place to support the agencies in fulfilling their roles which also encourages sharing of information, skills and experience across the entire sector.

They broadly assess the risks that they may face, plan for them and where possible pre-deploy appropriate assets and personnel to combat them. They proactively seek to mitigate the risks to reduce loss and damage caused by hazards, thereby lessening the likely impact upon the Western Australian community.

While there is work still to be done, some of this is already incorporated within the forward work plans of those involved. Strategies are being developed to address known shortfalls and research is being conducted to examine areas where not enough is known.



This maturity is occurring at all levels of EM with considerable input and engagement from the majority of stakeholders. While this engagement and commitment is broad and deep it is still not universal. The long interval between emergencies in some areas has led to complacency and engagement has dropped off.

There is a perception among EM stakeholders that, except for people who have been directly impacted by an event, public understanding of risk and their engagement remains relatively low. Moreover, they believe many individuals do not change their behaviour even when faced with an emergency. This is despite extensive information and education materials being issued from a broad range of agencies in a variety of formats.

Remoteness will remain an issue in Western Australia.

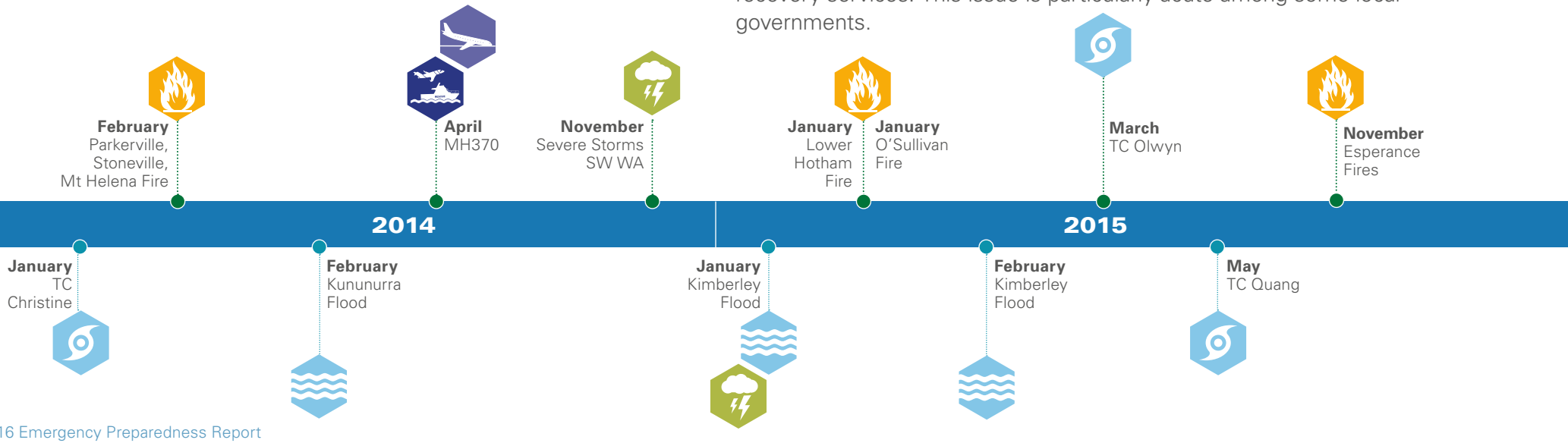
Traffic management is an ongoing issue. There is clearly a need to have an effective system of controlling access to emergency impacted areas, both to facilitate effective response and recovery and to protect lives.

The key will be in finding the balance between protecting lives and carrying on essential daily activities.

A number of stakeholders have raised funding and resourcing as an issue of concern. It has been noted—particularly by local governments—that while EM responsibilities are expected to be met, dedicated funding does not exist.

Further, some agencies are drawing funds for core business functions from supplementary funding schemes such as Royalties for Regions. The resourcing issue is likely to be an enduring concern as funds are finite and there are many competing priorities. For most of the contributing stakeholders, EM is an element of unfunded core business. There is a need for the development of a sustainable funding model for EM that will allow for an emphasis to be placed upon prevention and mitigation.

Despite this, resourcing limitations in some areas have been identified as adversely impacting the ability to provide: proactive mitigation, asset betterment, recruitment of appropriately skilled staff and response and recovery services. This issue is particularly acute among some local governments.



## Future challenges

It is clear that there is room for improvement in the way in which the EM sector engages with:

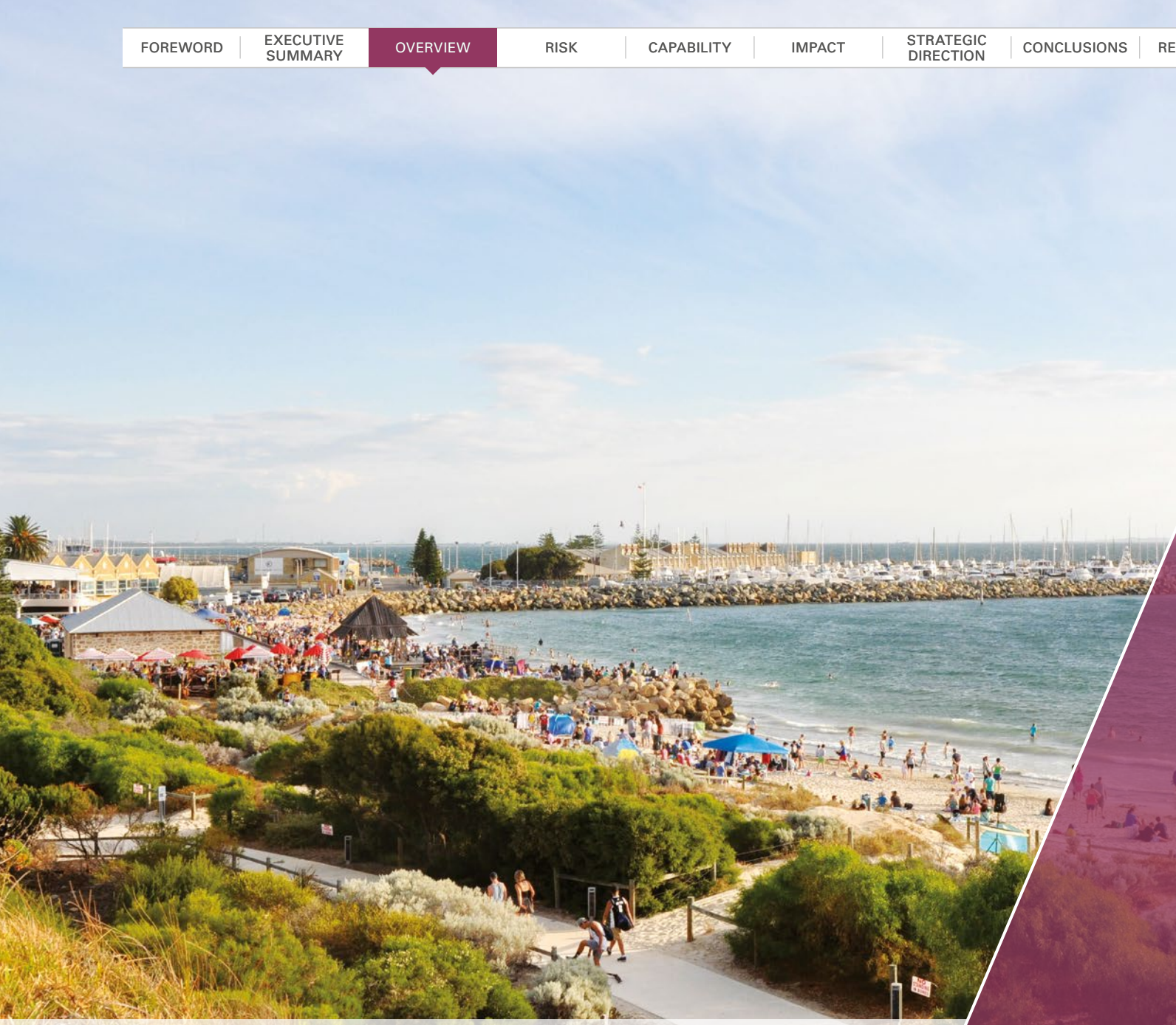
- the public
- community groups
- business and industry.

While a large volume of quality information is being provided and made available to the public, the effectiveness of delivery or of the message must be questioned given the perception by EM agencies that the understanding and uptake is low.

Very little information was gathered in data collection for this year's *Emergency Preparedness Report* to indicate that community groups were sufficiently engaged in the EM process. These groups represent a standing resource that may be highly beneficial in assisting preparation, support and recovery efforts. Community groups are considered to be a largely untapped resource and greater engagement in this area is expected to prove fruitful in enhancing resilience.


At the highest level a strategy is being developed for greater engagement with critical infrastructure owners and providers to better capture the all-hazards approach of EM. This will seek to build upon the significant engagement that has already taken place within a security setting.

At the local level, consideration will need to be given on how best to engage with local businesses to encourage business continuity planning to increase preparedness and build resilience. Local Emergency Management Committee (LEMC) and District Emergency Management Committee (DEMC) structures may provide the appropriate vehicle to enhance and progress this engagement.



# 02 Overview

PEOPLE – TO PROTECT THE LIVES AND WELLBEING OF PEOPLE

# 02 Overview

## 2.1 National EM Strategy

Every year, Australian communities face devastating losses caused by emergencies that escalate into disasters. Bushfires, floods, storms, other hazards and their associated consequences have significant impacts on communities, the economy, infrastructure and the environment (Council of Australian Governments 2011).

The increasing regularity and severity of natural and human-induced emergencies means that a coordinated and cooperative effort is required to withstand and recover from such events.

Disaster resilience is a collective responsibility, including all levels of government, business, the non-government sector and individual citizens.

**A disaster-resilient community is one that works together to understand and manage the risks that it confronts.**

(Emergency Management Australia 2016)

The *National Strategy for Disaster Resilience* (NSDR) focuses on seven priority areas to build disaster-resilient communities across Australia:

- leading change and coordinating effort
- understanding risks
- communicating with and educating people about risks
- partnering with those who effect change
- empowering individuals and communities to exercise choice and take responsibility
- reducing risks in the built environment
- supporting capabilities for disaster resilience.

This strategy is the first step in a long-term, evolving process to deliver sustained behavioural change and enduring partnerships.

## 2.2 EM in Western Australia

Emergency management (EM) activity at the state level reflects the principles articulated at the national level.

In May 2016 the SEMC formally endorsed the following set of EM principles (full descriptions can be found in Appendix A):

- Risk management approach
- Shared responsibility for resilience
- All hazards approach
- Graduated approach
- All agencies coordinated and integrated approach
- Continuous improvement
- Community engagement
- Integrated information management.

Serious but routine incidents are managed on a daily basis by a range of agencies such as the fire service, police or local government. On occasion, such incidents may spread or affect more people and therefore require a greater response. This may include the deployment of numerous assets and emergency workers from a range of agencies at multiple sites.

In times of crisis, the State Emergency Coordination Group (SECG) is called together (under s. 26 of the *Emergency Management Act 2005)*. They ensure the provision of a coordinated EM response across the whole of government and across the 27 identified hazards prescribed within EM legislation (see Appendix B). These hazards stem from natural and human-induced origins.

The State Emergency Management Committee (SEMC) brings together the state's experts and some community representatives to further efforts for coordination and to champion continuous improvement.

It aims to develop the best EM arrangements in Western Australia through planning and preparedness.

EM planning in Western Australia follows a three-tiered structure – at state, district and local level. These committees (the SEMC, DEMCs and LEMCs) are in place and designed to establish EM arrangements in preparation for the next emergency.

The SEMC has developed six **core objectives** considered of critical importance to the wellbeing of the state—people, social setting, economy, infrastructure, public administration and environment.

When hazards are examined individually, it becomes clear they will affect the six core objectives differently. A flood, for example, impacts most heavily upon infrastructure and economic components whereas the greatest impact of a heatwave is on people, due to illness and death associated with heat stress.

## People
To protect the lives and wellbeing of people.

## Economy
To maintain and grow the state's productive capacity.

## Infrastructure
To maintain key infrastructure such as transport and utilities.

## Social setting
To maintain public order, safety, sanitation, education, health and culture.

## Government
To maintain public administration, democracy and rule of law.

## Environment
To protect the ecosystem and biodiversity of the state.

Figure 1. Six state 'core objectives'

### 2.2.1 Structure

The *Emergency Management Act 2005* prescribes 27 potential hazards of particular concern within the Western Australian context.

These hazards are managed by over 170 agencies that come together to contribute in times of crisis, although few have EM as a core function or business. Rather, they have assets, skills and responsibilities that can be called upon to manage or contribute during an emergency.

The organisations may play a role before, during or after an emergency. Some are quite obvious, such as the police, fire and health departments. Others are the owners of critical infrastructure, including water, electricity or power. Still others are the local governments in affected areas and the remainder are groups that have particular expertise or skills that will prove vital in times of an emergency.

Each of the hazards has an assigned hazard management agency (HMA) that is responsible for leading the EM for that type of emergency.

### 2.2.2 Framework

The State EM Framework was developed to guide agencies in discharging their EM responsibilities. The framework articulates roles, responsibilities and the structure of overall collaboration between agencies responding to an emergency. It reflects the series of laws, regulations, policies, plans, procedures and guidelines that direct, guide and govern the actions of agencies involved in the EM environment.


Figure 2. State EM Framework

## 2.3 WA Preparedness Report

This *Emergency Preparedness Report* is the fifth of its kind. Each year, the report describes the ongoing efforts to build capacity, increase resilience and better equip Western Australians to handle emergencies. It provides a snapshot of our state of preparedness, highlighting strengths, weaknesses and areas for improvement.

### 2.3.1 Method

To compile the snapshot, the SEMC relies upon 170 individual agencies to self-report against criteria laid out in the State EM Capability Framework. These agencies include HMAs, Emergency Management Agencies (EMAs), service providers (SVP), critical infrastructure owners and operators, community organisations and local governments.

This type of data collection and analysis started in 2012 and has been increasingly refined to better capture the EM environment and keep the burden on contributing agencies to a minimum. In 2016 the data was collected online for the first time. It was also expanded to include interviews with senior representatives of contributing agencies. These interviews examined strategic issues within an agency and broader themes occurring across the EM sector.

### 2.3.2 Responses

Table 1. – Respondents' overview

| | HMA | EMA | SVP | LG |
|---|---|---|---|---|
| Sent | 8 | 15 | 8 | 139 |
| Received | 8 | 15 | 7* | 134 |

Note: HMA = hazard management agency; EMA = emergency management agency; SVP = service provider; LG = local government.

* Technical issues with the data collection tool did not appropriately capture contributions by the Forest Products Commission

## 2.4 Who is the SEMC?

The 11-member SEMC is Western Australia's peak EM body. Membership includes representatives appointed by the Minister for Emergency Services from organisations essential to the state's emergency management. The Committee champions efforts for continuous improvement of EM and coordination in Western Australia.

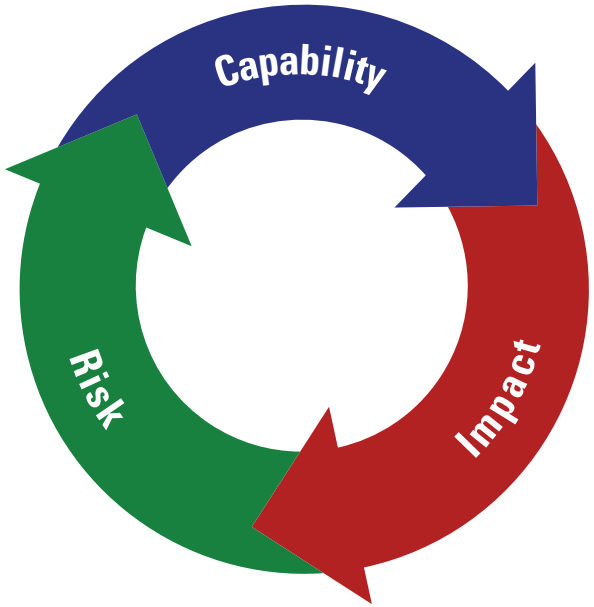
The SEMC has existed in various forms since the 1970s, changing names and adjusting focus. Current responsibilities are to:

- advise the Minister on emergency management and the preparedness of the state to combat emergencies
- provide a forum for whole of community coordination to ensure the minimisation of the effects of emergencies
- provide a forum for the development of community-wide information systems to improve communications during emergencies
- develop and coordinate risk management strategies to assess community vulnerability to emergencies
- arrange for the preparation of state EM policies and plans
- prepare an annual report on its activities
- monitor and review the *Emergency Management Act 2005* and its regulations.

### 2.4.1 The focus

In 2015 the SEMC embarked upon a three-year strategic plan (see Appendix D) to develop an understanding of the core pillars of EM—risk, capability and impact—across the state. The plan acknowledges the strong link between risk and capability.

As a result, the SEMC is building a strong evidence base from which informed decisions can be made. Progress on the State Risk Project and improvements in the way capability is assessed are building an understanding of both the risks and the capabilities available to be deployed against them.




The aim is to identify the highest risks in a given area, understand the trends, find the gaps and prepare for them, so as to increase the state's resilience to respond and thereby reduce the likely impact.

Communities that develop a high level of resilience are better able to withstand a crisis and to recover from residual impacts. They can even arrive on the other side of a crisis in a stronger position than before (Insurance Council of Australia 2008).

## 2.5 Climate trends

Hotter, drier conditions due to climate change, particularly in the South West, will have important consequences for EM. If climatic conditions continue along the current trajectory, the northern part of Western Australia will be increasingly cooler and wetter while the South West will be hotter and drier. This will increase the likelihood of floods in the north while heightening the threat of bushfires and heatwaves in the South West.

These scenarios greatly intensify the need for proactive mitigation (such as prescribed burning in the South West) and planning by EM agencies to ensure that sufficient numbers of appropriately trained personnel are available. In the absence of a significant increase in personnel and equipment, more effective treatment options should be sought and considered. The climate outlook for Western Australia is considered below.

### Temperature

Western Australia has seen a rising trend in temperatures since 1910, when the Australian Bureau of Meteorology (BOM) was formed and established standardised recording equipment in many parts of the country.

The state's mean temperature – the average of the maximum and minimum temperatures – over the past 15 years is the highest since records commenced. 2013 was WA's hottest year and 2015 was the second hottest (see Figure 3). The mean temperature for Western Australia has risen by about 0.9°C since 1910.

Daily minimum temperatures have also shown a similar rising trend, with 1998 recording the highest mean daily minimum for the state, and 2015 recording the third highest.

These trends are consistent with trends observed in similar geographic bands across Australia and around the globe. There is some minor regional variation in the state with temperatures in parts of the west rising more rapidly than parts of inland and northern Western Australia. Overall, however, the mean temperature has increased in all parts of the state over the past 100 years (see Figure 3.)

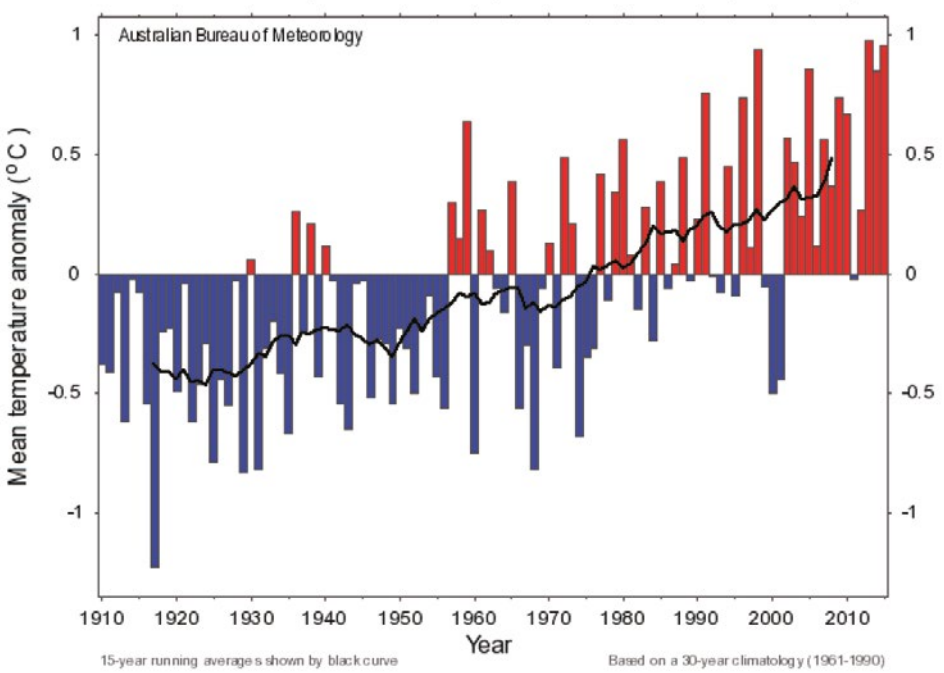



Figure 3. Annual mean temperature, Western Australia (1910–2015)

The rising trend has had an impact on daily extremes, with an increasing trend in the number of hot days and hot nights across most of the state. Similarly, a declining trend in the number of cold days and cold nights has been observed.

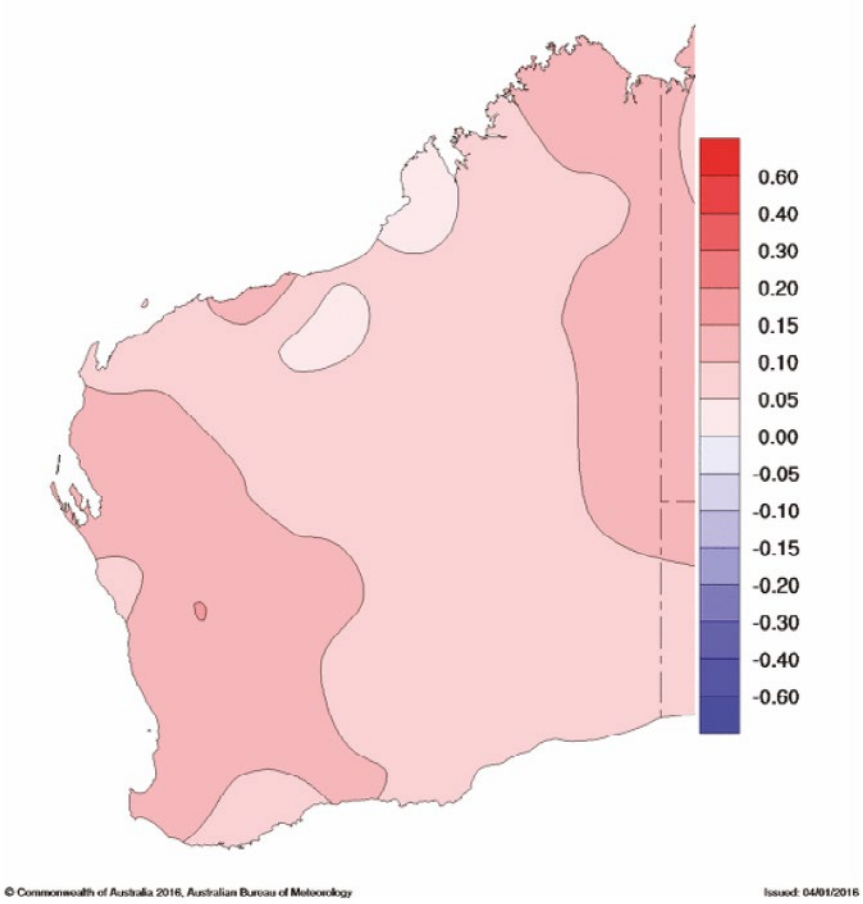



Figure 4. Temperature trends in Western Australia, 1910–2015

## Rainfall

Rainfall has increased in Western Australia since comparable records commenced in 1900, with increases most evident since the 1950s, and wet spells notable in the 1970s and late 1990s to early 2000s (see Figure 5).

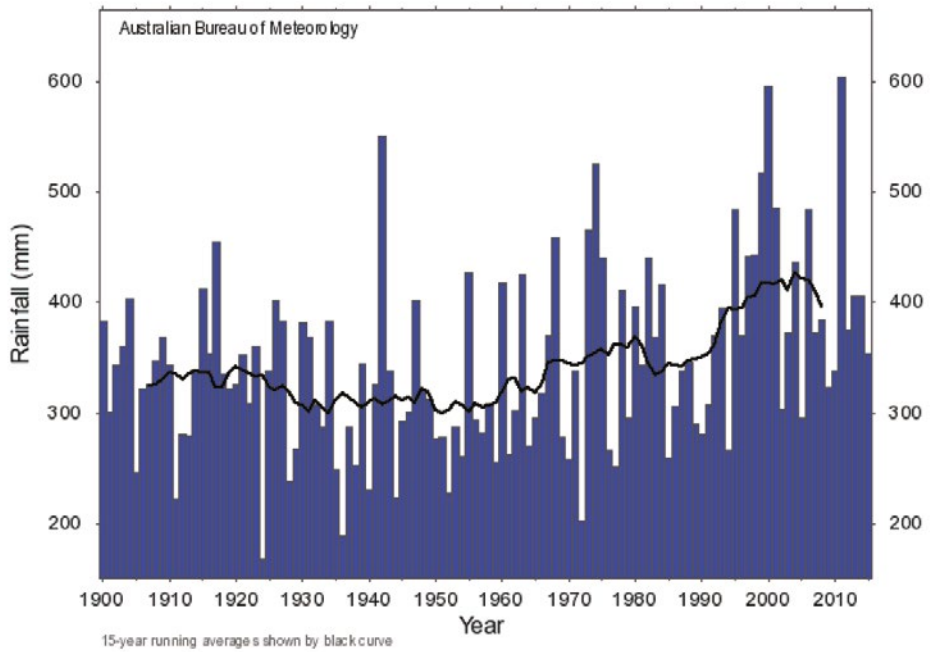



Figure 5. Annual rainfall in Western Australia, 1900–2015

The rainfall has not been equally distributed across the regions, however. The rainfall map of Western Australia is dominated by two distinctly different regions – the wet tropics in the north, dominated by summer rainfall, and the western and south-western area, dominated by winter rainfall. Thus, when one region is typically wet, the other region is typically dry.

The trend towards increased rainfall over the past 50 years has been statistically dominated by the north, with particularly wet conditions recorded during the summer wet season. It should be noted that much of the remainder of the state has also seen a rising trend in summer rainfall, but not to the same extent as the north (see Figure 6).

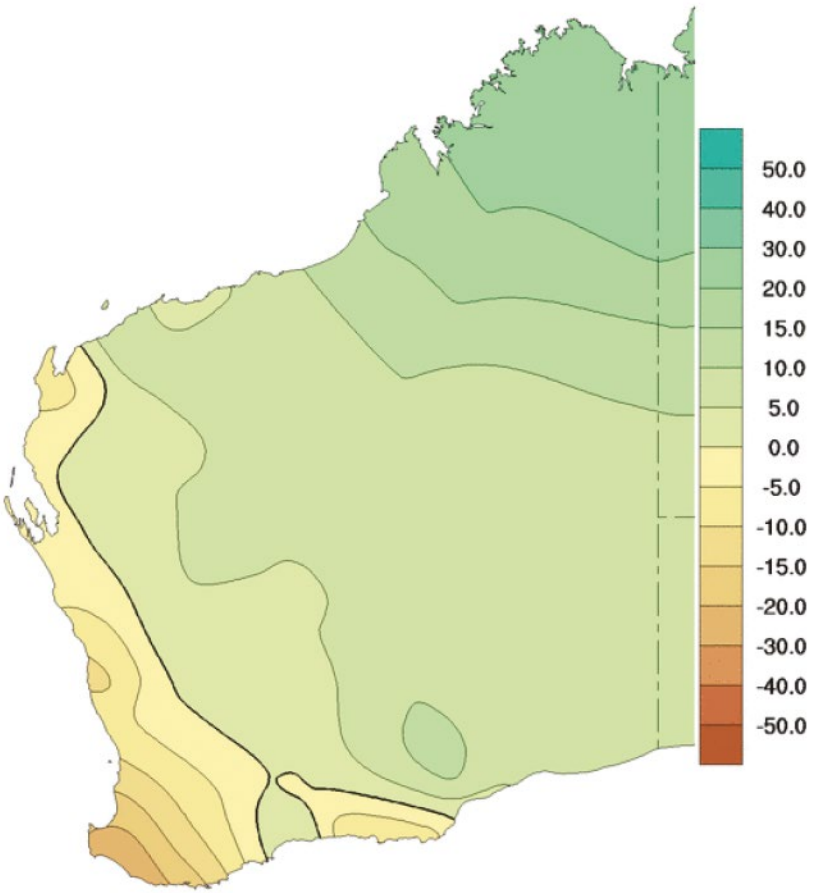



Figure 6. Rainfall trends in Western Australia, 1900-2015 (mm/10yr)

Significantly though, western parts of the state—including large parts of the South West agricultural region—have seen declining rainfall in areas that have been historically dominated by winter rainfall. The greatest decline has been observed near the west coast and in the South West corner. The decline has been most notable during late autumn and early winter. Associated with the general decline in rainfall is the reduced total number of wet days, consecutive wet days, and heavy rain days.

Declining rainfall in the South West has been characterised by downward 'step changes', first in the mid-1970s, and possibly also more recently around 2000. The South West Land Division recorded its driest year on record in 2010. However, in 2011 the state recorded its wettest year on record, although dominated by record high rainfall in the Kimberley and inland areas outside of the winter months.

## The future

Scientists warn that temperatures are virtually certain to continue rising, probably as a result of the greenhouse effect and global warming. Average temperatures in the current climate may even be considered below average in the second half of this century. (For climate projections for the South West Land Division, see Figure 7. Note: The graph is based on a high emissions scenario and includes observed temperatures (in blue), modelled temperatures from an indicative single global climate model (in red), and a plume of modelled temperatures from an ensemble of about 50 global climate models (in grey – lower edge of plume: 10th percentile, middle of plume: ensemble mean, upper edge: 90th percentile)).

For rainfall trends across much of the state, the future is less certain. Drying to the west is consistent with global circulation changes predicted as a result of global warming, including the increasing frequency of high-pressure systems over southern Australia and the contraction southward of winter storm tracks.

The enhanced greenhouse effect is considered to be at least partially responsible for the downward rainfall trend. Rainfall projections produced by global climate models suggest the declining rainfall trend in the South West is likely to continue for at least the remainder of this century.

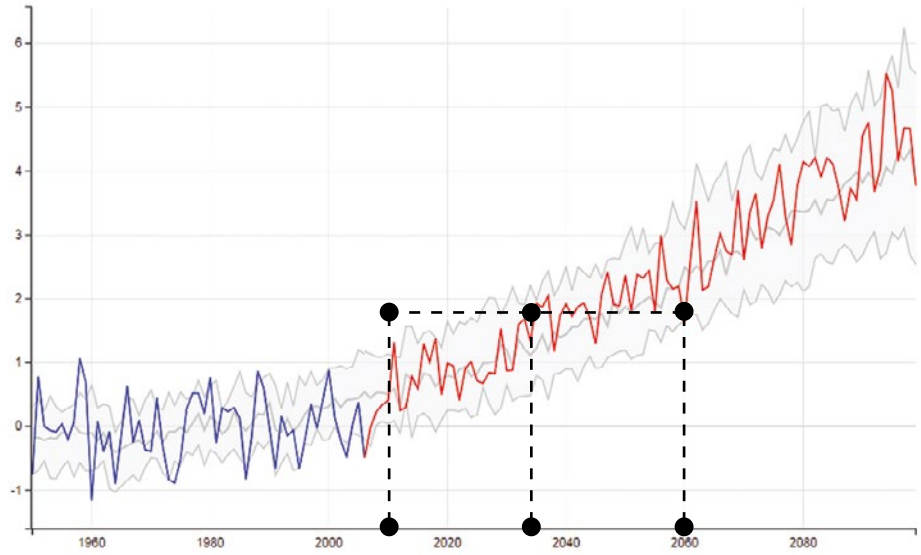



Figure 7. Climate projections in the South West Land Division of WA (CSIRO and Bureau of Meteorology, Climate Change in Australia website www.climatechangeinaustralia.gov.au, accessed 21 July 2016)

Climate models are much less confident about future rainfall trends across the north of the state, however, and have difficulty explaining the recent increasing trend. It is therefore uncertain whether the increasing trend is simply a result of natural variability—which may reverse at some point in the future—or is a long-term, seemingly permanent, change to the local climate.

## 2.6 It's not just the weather that is changing

It is important to understand that the increase in scale and frequency of extreme weather events is not the only factor creating greater EM impacts on individuals, businesses and the community.

Urban development and growth is literally changing the Australian landscape. Block sizes are getting smaller, communities are becoming more densely populated, construction and rebuilding costs are increasing, and the number and value of homes and assets that can be found within a given area are also increasing.

Data from the Urban Development Institute of Australia (WA) revealed that average lot sizes in Perth are declining, consistent with the national trend. Based on the National Land Survey Program survey of new residential land supply, 'the average median new lot size nationally is now 474 square metres, down 3.6 per cent over 2014, and down 11.4 per cent since 2009' (Urban Development Institute of Australia 2015).

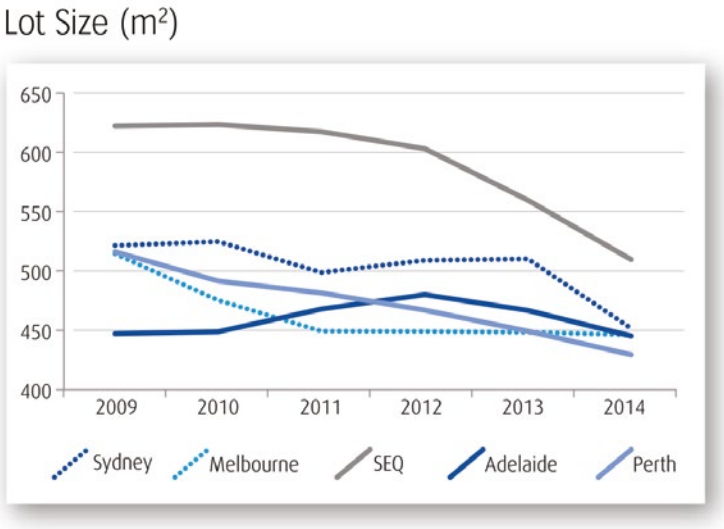



Figure 8. The size of residential lot sizes is declining across Australia

Rezoning, subdivisions, improved engineering and better building materials are evolving buildings from cheap simple structures to something much more elaborate. There is increased development on the peri-urban fringe onto 'lifestyle blocks' as people seek a 'tree change'. Once vacant tracts of land now support entire communities, including those with high value homes and assets. One analysis by the Department of Planning (2015) has found that since 1996 an average of 250 hectares of rural land has been consumed each year as rural living development in the City of Albany alone. This infill has primarily occurred around the fringe of the Albany urban area (DoP 2015).

The DoP maintains the *Urban Land Development Outlook*, which identifies land in the Perth and Peel metropolitan area that is expected to be developed over the next 20-plus years. The Outlook supports planning policies by giving a spatial context to future land development over the short, medium and longer term. It also informs infrastructure planning and priorities.

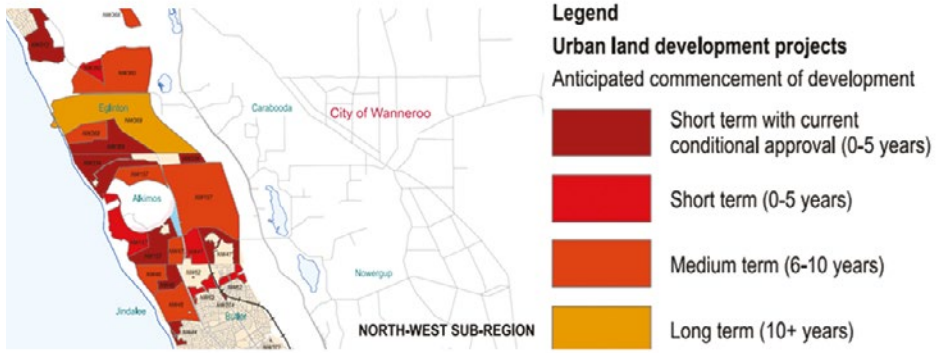



Figure 9. North Metropolitan Spatial Development Plan 2013–14.
Source: Department of Planning, Western Australia

Figures 10-12 show the evolution of a single area between 2002 and 2016. In 2002 the area 42 km NNW of Perth was primarily dune vegetation characterised by native banksia, scrubland and heath. By 2010 subdivisions and infrastructure such as major and minor road networks had been added along with a small amount of individual housing.

By 2016 the same area now contains the outer Perth suburb of Alkimos. This suburb holds at least three schools, extensive business development and residential housing along with a major infrastructure including road and rail networks. Equally as important, is that the suburb still adjoins large tracts of bushland and has kept some native green areas amid the development.

Figure 11. 2010 Aerial photograph of development 42 km NNW of Perth CBD

Figure 10. 2002 Aerial photograph of area 42 km NNW of Perth CBD

Figure 12. 2016 Aerial photograph of the Perth Suburb Alkimos 42 km NNW of Perth CBD

Increasing population and asset density, as shown by the Alkimos example, means that more things (people, property and assets) are likely to be impacted when an emergency occurs. This presents significant ramifications for the state and EM stakeholders alike. It means that more houses will be impacted, more people will require assistance and more assets will be in harm's way.

Heightened density increases potential losses significantly and also represents an increased demand on EM and support services. Further, the cost of proactive activities, particularly on the peri-urban fringes, is likely to rise accordingly.

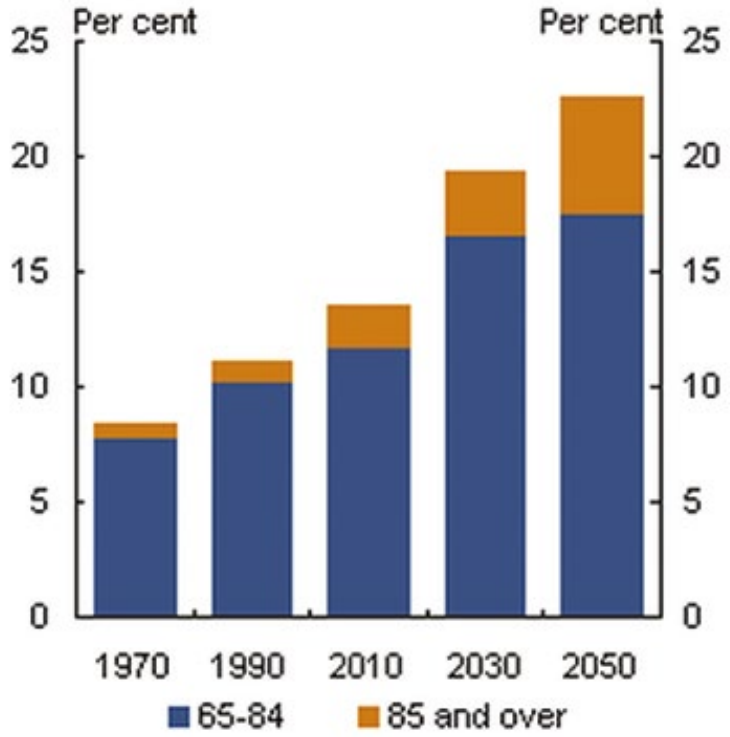
As well as increased population densities, all developed countries, including Australia, have ageing populations.

Many scholarly articles exist examining the impacts and social implications that the increasing aged populations will have on various aspects of society. While not specifically mentioned this trend is expected to impact upon EM in any number of ways. Some considerations may include:

- a reduced number or availability of volunteers
- hampered mobility of the community
- increased reliance upon support sectors
- reduced ability to adequately prepare properties
- lessened resilience.

An ageing and growing population

**Proportion of the Australian population aged 65+**




Source: Commonwealth Treasury (2010)

The introduction of the National Disability Insurance Scheme is changing the way services are delivered to aged persons and people with disabilities. This is changing the way that vulnerable people interact with their service providers. There is expected to be an increase in in-home services and a reduction of centre based care.

This change may make these persons more difficult to identify as their interactions with established community services may be reduced. Emergency response planning will need to adjust accordingly.

# 03 Risk

ECONOMY – TO MAINTAIN AND GROW THE STATE'S PRODUCTIVE CAPABILITY

# 03 Risk

We must fully understand risk to assess our preparedness.

## 3.1 The Sendai Framework

The Sendai Framework for Disaster Risk Reduction 2015–2030 was adopted at the Third UN World Conference in March 2015. It is the outcome of stakeholder consultations and intergovernmental negotiations, supported by the UN Office for Disaster Risk Reduction (UNISDR 2015) at the request of the UN General Assembly.

Australia engaged in the negotiation and development of this 15-year global blueprint to build the world's resilience to natural disasters.

The Sendai Framework emphasises disaster risk management as opposed to disaster management. It identifies four priority areas:

- understanding risk in all its dimensions – exposure, vulnerability and hazard characteristics
- strengthening risk governance
- investing in risk reduction for resilience
- enhancing preparedness for effective response and to 'Build Back Better' in recovery, rehabilitation and reconstruction.

In addition, the scope of risk reduction has been broadened to cover both natural and human-induced hazards and related environmental, technological and biological hazards and risks. Health resilience is also strongly promoted throughout.

The core concepts of the Sendai Framework have been included in Australia's EM strategy.

## 3.2 The price of success

In 2015 the total economic cost of natural disasters in Australia – including insured costs, social costs and financial obligations of all levels of government – was estimated at over $9 billion (about 0.6% of GDP). This figure is predicted to double by 2030 and to reach $33 billion per annum by 2050 (Australian Business Roundtable 2016). And it could reach higher still, as the current forecast does not include impacts of climate change.

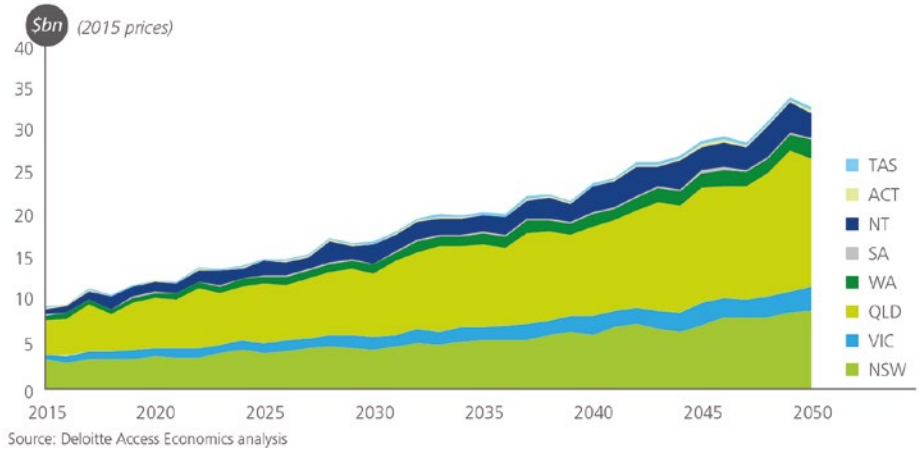



Figure 13. Forecast of total economic cost of natural disasters: 2015–50.

Source: Deloitte Access Economics (2016)

Even so, improved long-term planning and preparation could bring that number down. A study by the Australian Business Roundtable for Disaster Resilience and Safer Communities shows investment in pre-disaster resilience measures could save the country up to 50 per cent on the forecast natural disaster costs by 2050 (Australian Business Roundtable 2013).

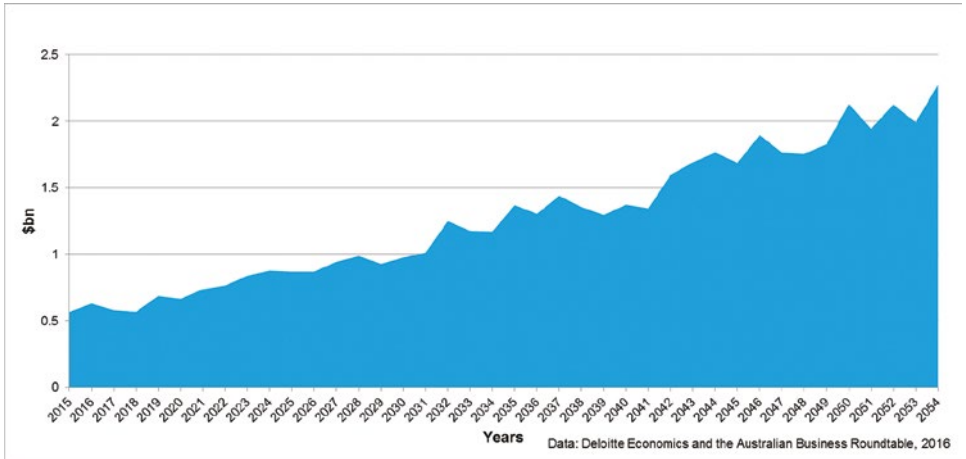



Figure 14. Forecast of total economic cost of natural disasters for WA 2015–50.

Source: Deloitte Access Economics (2016)

To achieve these savings, government and the community must plan and implement mitigation measures together. In addition, individuals must take responsibility for increasing their own resilience, including by ensuring they have appropriate levels of disaster insurance.

According to the Insurance Council of Australia (2007), 23 per cent (1.8 million households) out of Australia's 7.7 million households did not have a building or contents insurance policy in 2007. The exposure level would increase dramatically if under-insurance was also factored in. Under-insurance means that if a family loses all their belongings in a fire or flood, they will not be able to replace everything in their home. It should be noted that expenditure on insurance may not be financially viable for many low income households.

It is hard for people to comprehend that disasters can happen at any time. Between November 2015 and January 2016, Australia faced four major natural disasters within seven weeks. They were South Australia's Pinery bushfires (November 26), the Sydney tornado (December 17), the Great Ocean Road bushfires in Victoria (December 26) and the Waroona fire in Western Australia (January 8). According to the Insurance Council (2016), these four catastrophes led to insured losses of over $515 million.

For the Waroona bushfire alone, insured costs are estimated to be over $70 million, and when the costs of suppression, losses, damage and recovery are included, the figure rises to $155 million (Government of Western Australia 2016).

Figure 15 shows that over the past 10 years, insured losses in Western Australia have totalled over $1.75 billion. If those people making claims had not been insured, their suffering would have been worse.

The primary responsibility of government after a disaster is to assist the community to recover but it is essential that individuals take responsibility for insuring and protecting their personal assets in case losses do occur.

Agencies around the state have resources available for informing and teaching communities and individuals how to mitigate their risks in the face of disaster. However, uptake and proactive actions are thought to be low.

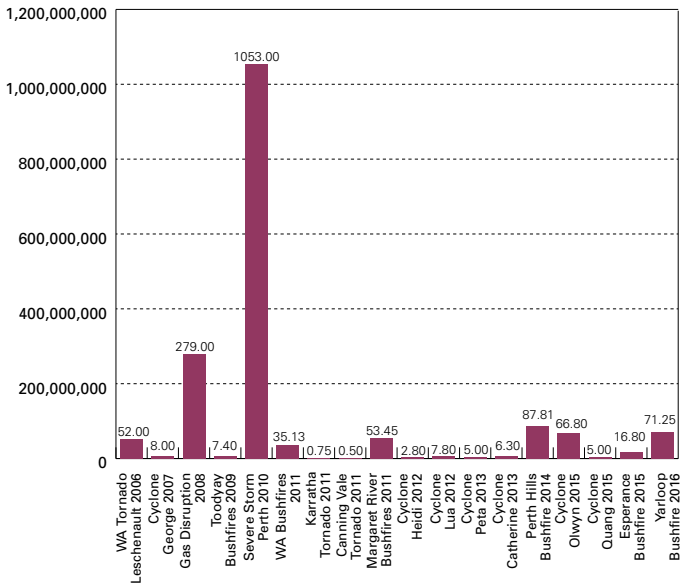



Figure 15. Estimated insured losses due to the major disasters in Western Australia between 2006 and 2016. Source: Insurance Council of Australia

### 3.2.1 Risk tolerance and benefit to cost

**Emergency service organisations can only do so much in times of disaster. The consequences of a major bushfire on a community may be mitigated by the community's appreciation of, and ability to act on, their own risk.**

(Ferguson 2016)

As the State Risk Project has evolved, attention has turned towards treating the risks that are being identified. In some cases this work has already commenced. During the risk assessment measurement process, the use of a worst-case scenario has led individual agencies to identify possible failings or shortcomings that do not become apparent in day to day activities or during minor events.

The additional stress created by simulating extreme conditions allows them to critically examine the readiness and appropriateness of their assets and systems. Several stakeholders are known to have immediately followed through on the scenarios, increasing their capabilities, furthering collaboration and sharing knowledge or expertise.

When discussing how to treat risks, two key questions come to the fore. What is an acceptable risk? How is the concept 'benefit to cost' involved?

Risks exist in every action and society effectively assesses and manages some of them every day – car crashes, for example. Accidents could be avoided by simply banning cars but the benefits and convenience of driving outweigh the potential 'costs'. Other, more pragmatic, mitigation strategies are put in place to limit our vulnerability, such as road rules, education campaigns, speed limits, insurance and general law enforcement. These strategies ensure that the risks posed by driving are managed to a level deemed broadly acceptable to society.

At the other extreme, as a society, we've decided that firearms pose an intolerable risk and therefore should not be readily accessible. This risk is seen as unjustified, so significant steps are taken to limit and control their access.

### What is 'tolerable risk'?

Our tolerance of risk depends on the thresholds set – the boundaries between what risks are acceptable, tolerable and intolerable.

In reality, we do not have the resources to treat every risk and so a key component of risk tolerance is the likelihood of something happening. Since nothing is risk free, the treatments applied will reflect how often society is willing to tolerate the impacts or losses of an event.

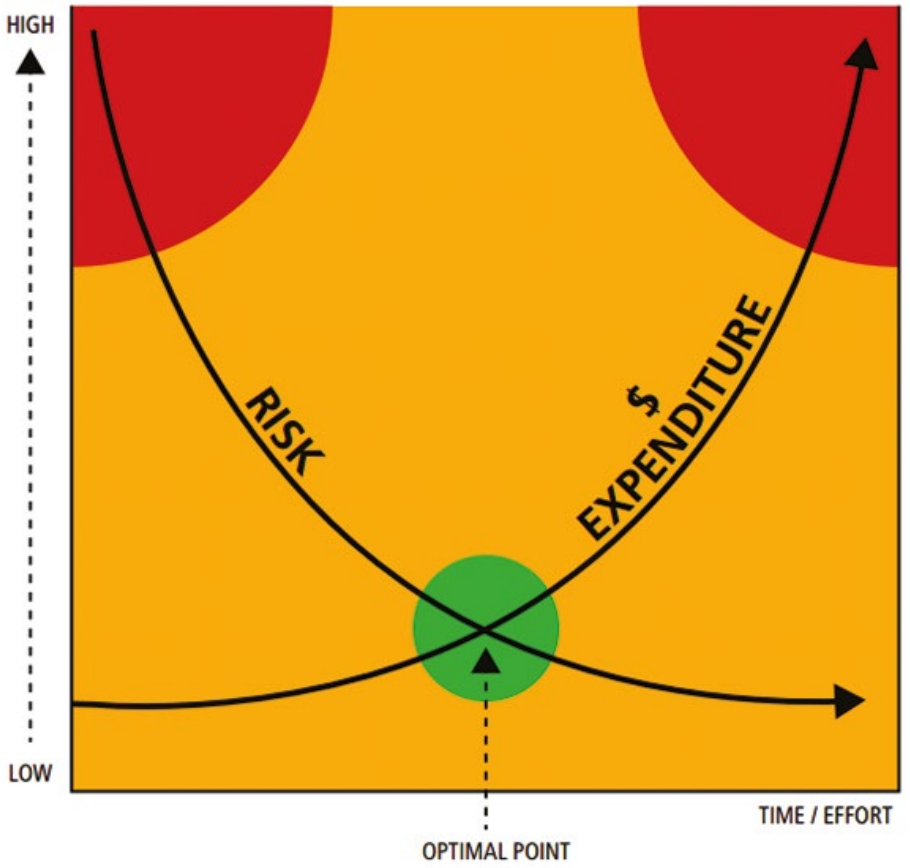
For example, history tells us that cyclones will threaten some towns in their path almost every year. As such, these towns are built to higher building standards to be able to withstand intense conditions, but this comes at an additional cost. This additional cost is considered more 'tolerable' than the loss of an entire town annually.

If the community decides to retain some risk because the cost of reducing it is too high (either economically or morally), this too is treating the risk through informed consent.

### What is benefit to cost?

A key element to consider when treating risk is 'benefit to cost'– this is an assessment of the relative strengths and weaknesses of alternatives. In essence, within an EM treatment setting it is the point where the value of mitigating a risk is disproportionate to the cost of doing it. This is also known as the ALARP principle (As Low As Reasonably Practicable).

For example, we consider it sensible to apply building codes and construction standards to houses built in cyclone-prone areas. However, requiring these standards to apply to every house in the state is unreasonable. The treatment should be commensurate with the risk posed.




Similarly, there is more than one method of mitigating the risks posed by a particular event. Determining the level of risk tolerance, identifying treatment options, and choosing the ones that are appropriate continues to be the challenge for individual agencies and the community alike.

## 3.3 State Risk Project

The SEMC State Risk Project, which was initiated in 2013, started by assessing and reporting on seven sudden-onset natural hazards – bushfire, tsunami, earthquake, storm, heatwave, cyclone and flood. These were state-level assessments that fulfilled the initial requirement of the National Partnership Agreement on Natural Disaster Resilience. These assessments will need to be repeated by 2017.

State-level assessments for human epidemic and marine transport emergency (MTE) followed and during 2016 air crash, animal and plant biosecurity, HAZMAT and rail crash (passenger) were completed.

Regional-level risks have also been assessed, with five or six priority hazards specific to each district evaluated. Workshops for the EM districts of the Kimberley, Wheatbelt and Great Southern were completed in 2015. Workshops for Goldfields–Esperance, Metropolitan, Midwest–Gascoyne, Pilbara and the South West are planned for later in 2016.

With state and regional risks addressed, attention will now turn to local-level risks.

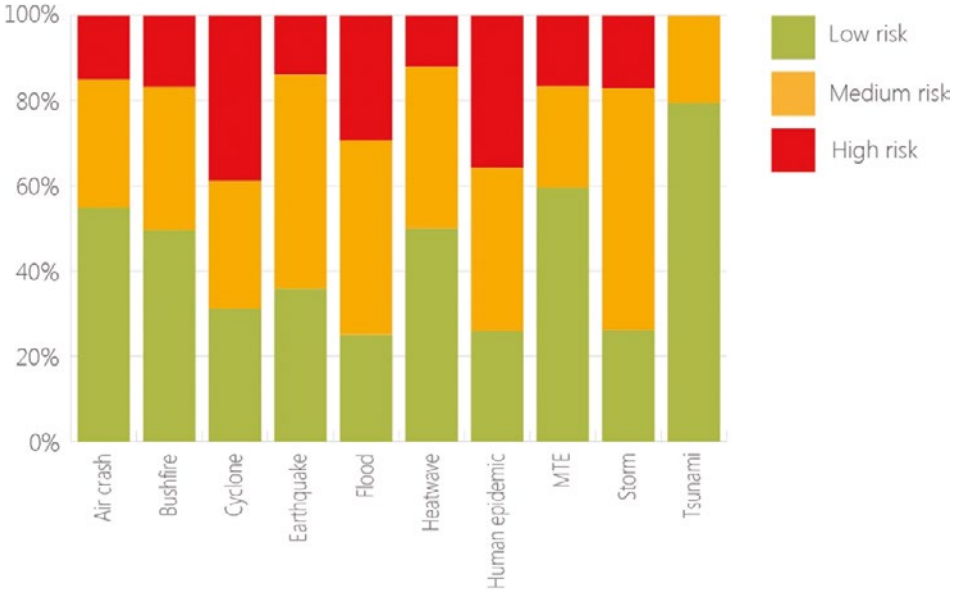



Figure 16. State risk profile: summary of risks levels by hazards

### 3.3.1 The scenarios

In order to assess risk, credible 'worst' case or 'near-worst' case scenarios (simulated incidents or events) are developed and used at all three levels of the process – state, district and local.

These realistic scenarios test the level of risk that the state faces, providing a solid understanding of the systems, processes and interdependencies that exist.

The criteria of impact measurement in the scenarios are scaled to take population size and gross area product (a measure of industry and commerce) into account. The criteria allow risks at state, district and local levels – as well as hazards – to be compared. This scalability means that the impact of a flood in the Pilbara can be compared to a storm in Perth and a fire in the South West.

Workshop participants consider scientific fact, the opinions of experts, historical events and previous experience as they work through nominated emergency scenarios. It is not uncommon for participants to recall potential catastrophes that have been narrowly avoided in the past. These 'what ifs' provide useful insights for the development of worst-case scenarios.

The aim is to produce a scenario that overlaps the hazard, with those things we want to protect (i.e. the state core objectives). Such events invariably require multi-agency responses and could involve a detailed and protracted recovery.

Credible worst-case scenarios are seen as the most efficient method of identifying capability gaps that may exist in EM arrangements. By measuring the risk on situations that will stretch (and likely overwhelm) existing capabilities, shortcomings can be identified and prepared for.

If planning and risk reduction activities are completed for the largest event, then it is likely they can be adapted usefully to smaller events, even if those events are more frequent.

### 3.3.2 Vulnerable places and people

Places (and people) can be more or less vulnerable to disaster. A key issue in EM preparation is identifying those 'vulnerable elements', assessing how a hazard might affect them, and planning an effective response.

For example, a town in a cyclone-prone region is more exposed to disaster than another town far inland. While the cyclone hazard cannot be avoided, there are things residents can do to reduce their vulnerability, such as strengthened building to codes. While their exposure to the hazard has not changed, their vulnerability to it has, thereby increasing the town's resilience.

Similarly, there are people in all communities who are more likely to suffer when an emergency strikes. These may include the young, elderly ill or people with disability – or those otherwise incapable of protecting themselves.

If we know where these places are (and who these people are), we can make plans to provide the greatest help. This will improve community resilience.

### 3.3.3 Single points of failure

A single point of failure is a part of a system that, if it fails, will stop the entire system. These are those areas where no backup (redundancy) exists (Business Dictionary 2016).

So far, the single points of failure that have been identified through the State Risk Project have largely been within an individual organisation. These have highlighted the need to improve business continuity planning. Other single points of failure have intermittently come to light during post-emergency reviews.

For a road network, this may be a single road or bridge servicing a community. The single road or bridge may leave residents trapped or isolated during an emergency or hamper the ability of responders to enter to protect that community.

At an individual level, organisations may concentrate knowledge or resources in a single person. If that person is unavailable or is affected by the emergency, then the entire organisation and potentially the community lose that capability.

The next element to consider will be the interconnectedness of systems and how these single points of failure will affect the broader system.

Knowing well in advance of an emergency where these single points of failure may exist is vital for effective preparedness.

# Case study – A smarter grid

The electric power system ranks among the most critical of all infrastructures.

In recent years, Western Power has significantly enhanced its business resilience with a particular focus on how personnel work together to prevent, prepare and respond to emergencies, with safety paramount—for both the community and staff.

The Western Power Network extends from Kalbarri in the north to Albany in the south and from the west coast to Kalgoorlie in the east. This area covers five major regions that are divided into 15 load areas for planning power transmission. Distributed across this vast area, the bulk power system comprises 261,000 km of power lines plus electricity generators, transformers and digital controls.

There is crucial recognition of the importance of managing the risks inherent in a network that spans most of the south of the state. Western Power has formed specialist teams to manage corporate crises, network emergencies, emerging threats and site emergencies. In an emergency, these teams draw on personnel from across the business to ensure they have the skills needed to respond effectively to power outages and other incidents.

As they work to restore power after an outage as quickly and as safely as possible, the teams manage the power supply to affected areas, coordinate fault and repair crews, and keep customers up to date.

In addition to supporting internal collaboration, the corporation maintains strong relationships with external stakeholders, who are often the key to efficient and prudent actions in an emergency. For instance, it maintains links with the federal Trusted Information Sharing Network (TISN) for infrastructure resilience as well as other state and local emergency services and organisations.

Keeping the electricity network safe and reliable requires the proactive management of risk.

**Figure 17. Western Power crews working in Lesmurdie**

Western Power has embedded risk management through a comprehensive Enterprise Risk Management Framework. This framework includes a risk assessment tool that calculates individual risk scores for over four million assets, including poles and transformers.

Information such as maintenance records, local environment, proximity to the public and number of customers supplied is used to calculate risk scores that are undertaken on a monthly basis.

These scores provide a powerful planning tool that is critical to understanding the risks and requirements of energy security in the twenty-first century.

## 3.4 District profiles

District-level risk assessment workshops follow the process and criteria outlined in the SEMC's *Western Australian Emergency Risk Management Guide 2015*.

Credible worst-case hazard scenarios are used to look at the impacts that they will have upon the state core objectives. An abridged version of the scenarios used and a full breakdown of profiles within each district have been included in Appendix C.

EM risk is established through an assessment process where the sources of risk and the elements at risk are identified, intersected and assessed.

This section summarises the risk profiles of three districts that have completed the workshop process – the Kimberley, the Wheatbelt and the Great Southern.

### 3.4.1 Kimberley

Table 2. Summary of risk profiles for the Kimberley district

| Hazards assessed | | | | | |
|---|---|---|---|---|---|
| Human epidemic | Road crash | Risk level | Cyclone | Fire | Flood |
|  |  | |  |  |  |
| **Percentage of risk statements* assessed as:** | | | | | |
| 13 | 3 | **Extreme** | 0 | 0 | 0 |
| 33 | 39 | **High** | 72 | 27 | 19 |
| 18 | 32 | **Medium** | 17 | 23 | 46 |
| 36 | 26 | **Low** | 11 | 29 | 19 |
| 0 | 0 | **Very low** | 0 | 21 | 15 |
| **For a summary of scenarios for the Kimberley, see Appendix C.** | | | | | |

*A statement identifying the hazard, element at risk and source of risk.

Of all hazard scenarios assessed in the Kimberley so far, the one that posed the greatest risk to the community was the spread of a human epidemic (a novel avian influenza virus) – with 13 per cent of the risks assessed as 'extreme'. It was predicted that a human epidemic would overwhelm the health system and that people with existing medical conditions would be adversely affected. People would stay away from work due to illness. This, combined with the relative isolation of the region, would likely undermine the economy. The resulting productivity losses and potential for limited staff redundancies were identified as 'extreme' economic risks.

Cyclone represented another significant hazard – with 72 per cent of the risks assessed as 'high'. The loss of commercial and residential buildings was expected to cause permanent displacement, especially for the more transient worker population, as well as an overall reduction in the quality of life.

As the hub of the Kimberley, Broome is the headquarters for most public agencies in the district. The potential destruction or impairment of the Broome town site (identified in more than one scenario) would severely hamper the delivery of services in the entire region. If the whole or a large part of Broome were destroyed by cyclone, services and emergency staging points would need to be redirected to an alternative centre such as Derby or Kununurra.

Another high-risk area of impact across all hazards was the Kimberley transport network. The district's heavy reliance upon the road network and the high cost of building 'redundancies' (back-ups such as bypasses) were identified as having the potential to cause significant economic loss during a disaster. These losses would stem from:

- damage to the physical road infrastructure
- delays to industry
- disruption to the supply of essential goods to communities
- isolation of towns
- interruption to the flow of tourism.

Across all hazards assessed, environmental impacts and risks to the social setting were considered to be 'low' to 'very low'. The exceptions were dune erosion and localised pollution caused by the simulated disaster.

There was a perception that community ties within the region were so strong that none of the assessed hazards was expected to adversely affect the social fabric. On the contrary, some participants believed the community was more likely to band together in the face of adversity. This perception was especially prevalent for Aboriginal communities.

### 3.4.2 Wheatbelt

Table 3. Summary of risk profiles for the Wheatbelt district

| Hazards assessed | | | | | |
|---|---|---|---|---|---|
| Rail crash | Storm | Risk level | Fire | Flood | Earth-quake |
|  |  | |  |  |  |
| **Percentage of risk statements* assessed as:** | | | | | |
| 0 | 0 | **Extreme** | 0 | 0 | 0 |
| 30 | 25 | **High** | 25 | 17 | 13 |
| 4 | 34 | **Medium** | 27 | 28 | 60 |
| 37 | 36 | **Low** | 28 | 31 | 20 |
| 30 | 5 | **Very low** | 20 | 25 | 7 |
| **For a summary of scenarios for the Wheatbelt, see Appendix C.** | | | | | |

*A statement identifying the hazard, element at risk and source of risk.

Of the five hazard scenarios chosen in the Wheatbelt, four were natural hazards and the other was a rail crash. Rail crash was chosen as a priority hazard due to the extensive rail network existing within or transiting through the region, hauling both goods and passengers. The greatest percentage of high risk statements across all five hazards stem from the rail crash scenario (30%). In terms of 'consequence' the rail crash scenario was also determined to be able to generate catastrophic and major impacts (Appendix C, Figure C3).

Catastrophic and major impacts were also generated by the earthquake scenario. In fact 73 per cent of the risk statements analysed fell in the major or catastrophic impact category (Appendix C, Figure C3).

Due to the way risk is calculated, the lower likelihood of an earthquake (long return intervals) means that most of the risks are rated 'medium'. This is despite the fact that the Wheatbelt includes one of the more seismically active areas of Australia.

Catastrophic consequences from both rail crash and earthquake were primarily related to likely deaths and injuries and the corresponding demands on health and emergency services. These impacts are expected to outstrip the resources of the district, requiring rapid surge responses (i.e. from Perth).

The natural hazards evaluated in the Wheatbelt were all assessed as posing high risks to the economy. This was primarily accrued through damage to infrastructure, particularly power supply systems, roads and rail (from washouts) and buildings. In addition, significant losses were expected through the loss of commercial buildings and likely damage to agricultural, pastoral and horticultural activities.

In terms of social fabric, fire and earthquake were expected to have the greatest impact. The social and emotional impacts from the loss of heritage buildings and permanent loss of culture and history were predicted to extend beyond financial implications and even cause some people to leave the district permanently.

### 3.4.3 Great Southern

Table 4. Summary of risk profiles for the Great Southern district

| Hazards assessed | | | | | | |
|---|---|---|---|---|---|---|
| Fire | MTE | A&P biosec-urity | Risk level | Flood | Storm | Earth-quake |
|  |  |  | |  |  |  |
| **Percentage of risk statements* assessed as:** | | | | | | |
| 3 | 0 | 0 | **Extreme** | 0 | 0 | 0 |
| 11 | 36 | 22 | **High** | 20 | 15 | 9 |
| 25 | 34 | 31 | **Medium** | 27 | 27 | 33 |
| 61 | 25 | 22 | **Low** | 42 | 53 | 26 |
| 0 | 5 | 25 | **Very Low** | 12 | 6 | 32 |

**For a summary of scenarios for the Great Southern, see Appendix C.**

*A statement identifying the hazard, element at risk and source of risk.

The 'extreme' risks identified in the Great Southern came from the fire scenario. Damage to private and commercial buildings and contents was expected to lead to economic losses of a potentially catastrophic level.

Each of the hazard scenarios chosen in the Great Southern were assessed as posing a risk to human life. Earthquake and MTE scenarios, in particular, were assessed as potentially catastrophic. In these two instances, the health system would be stretched. In addition, emergency services would struggle to reach individuals involved in a marine incident in time.

In addition to the health impacts of the marine transport emergency scenario, there was also a high risk of an oil spill or other pollutants entering the marine environment.

The animal and plant biosecurity scenario also produced a significant number of 'high' and 'medium' risk statements. Mostly, these relate to significant economic loss, particularly in the agriculture and pastoral sectors. An event of this type would have national and international implications and the impacts would affect a broad spectrum of the industry for many years.

Natural hazards (bushfire, earthquake, flood and storm) typically received higher percentages of medium risk statements due to their likely impacts on buildings and infrastructure.

The greatest risks to the district related to:

- loss of agricultural reputation
- long-term displacement from the area
- impact on culturally significant areas (such as the marine environment) and buildings
- loss of income
- associated emotional stress.

The community fabric was rated strongly and none of the hazard scenarios were judged likely to cause long-term damage to the social setting.

## 3.5 Local-level implementation

Risk assessments are not new to local government. However, applying them consistently across all 139 local governments in Western Australia does present a challenge.

The SEMC has committed to a trial local government rollout. This will include a system involving groups of local governments to maximise resources, reduce imposts and build capability. If the trial succeeds, local-level assessments will be implemented statewide during 2017.

The SEMC plans to use the National Emergency Risk Assessment Guidelines (NERAG) to help local governments fulfil their legislative EM requirements while collecting valuable information to aid future planning and risk reduction.

The proposed trial follows consultation with a wide range of stakeholders including local governments, consultants, the Western Australian Local Government Association (WALGA), the Office of Bushfire Risk Management (OBRM) and the SEMC Secretariat.

## 3.6 Bushfire risk management

The OBRM is an independent office within the Department of Fire and Emergency Services (DFES) that promotes the efficient and effective management of bushfire risk in Western Australia.

Since its establishment in 2012, the role of the OBRM has broadened to better reflect the complexity of bushfire risk management, the range of activities and the number of stakeholders that contribute to bushfire prevention and preparedness.

The OBRM continues to inform the cultural change of government, industry and the community with the aim of transitioning from a focus on fighting bushfires to a balance between prevention, preparedness and response.

During 2015–16, the OBRM worked with its stakeholders to:

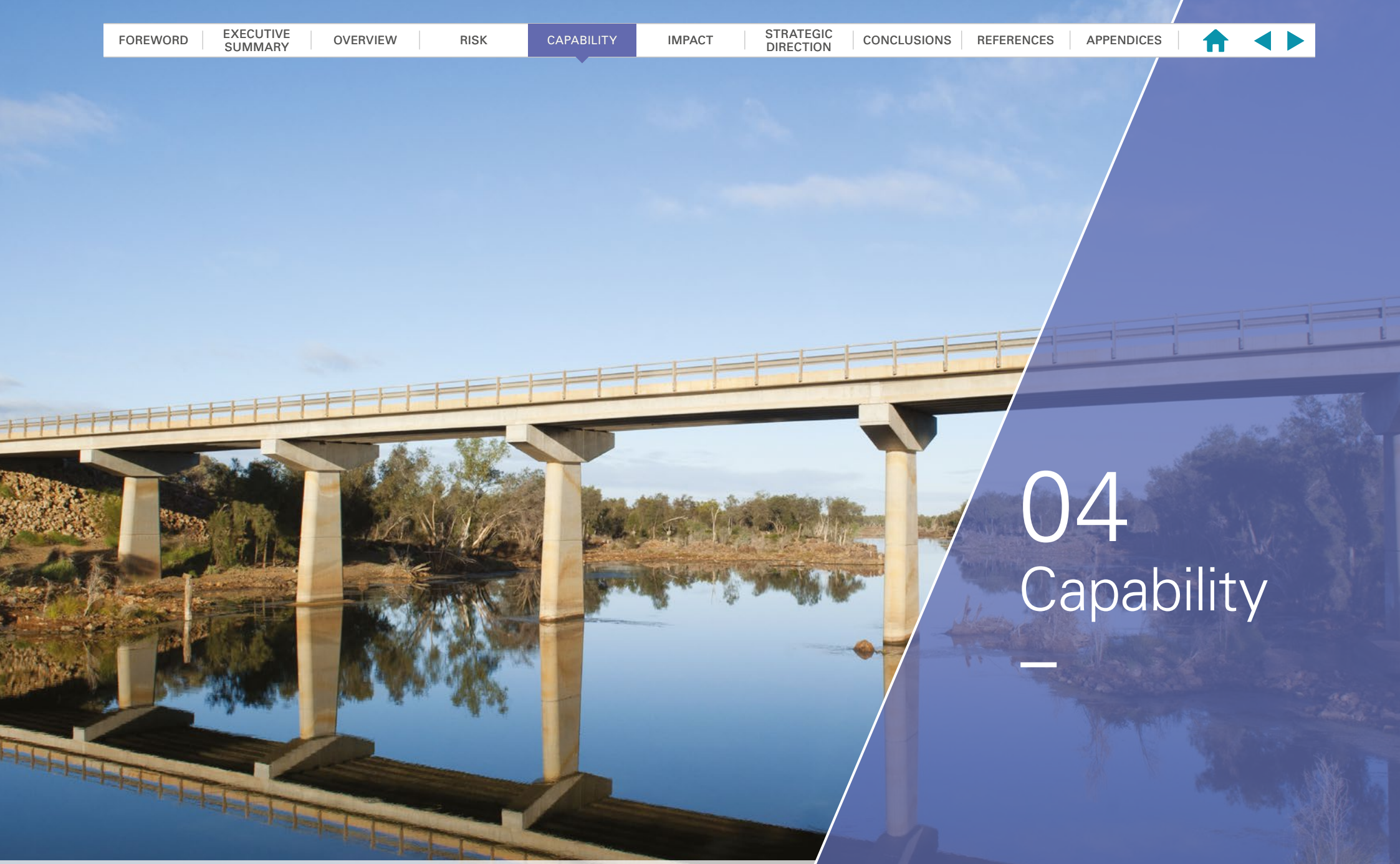
- implement the first two editions of the *Map of Bush Fire Prone Areas*, underpinning the consistent application of strengthened planning and building requirements to new residential developments in risky areas
- create the first statewide standard for bushfire risk management planning, titled *Guidelines for Preparing a Bushfire Risk Management Plan*
- support a coordinated best-practice approach to the management of bushfire risk at local government level
- ensure that government-regulated agencies conducted prescribed fire activities in accordance with international risk management standard ISO31000
- conduct three agency-level audits and one investigation of an escaped prescribed burn

- support non-government agencies to align their prescribed fire activities to international risk management standard ISO31000
- engage with the Kimberley Land Council and other representative groups in the Kimberley and Pilbara
- establish a consultation framework to review the local government system for issuing permits for planned burns
- publish audit protocols for government-regulated agencies.

Bushfires have been a fact of life in Western Australia for centuries. But a report released by the Climate Council of Australia (2015) identifies some complicating factors that add to recent concern:

- climate change is increasing the intensity of heatwaves in Western Australia and driving up the likelihood of very high fire danger
- recent fires in Western Australia have been influenced by record hot dry conditions
- longer fire seasons are being experienced in Australia and globally, reducing opportunities for controlled burning and increasing pressure on firefighting resources
- economic, social and environmental costs of increased extreme heat and bushfire activity are likely to be immense
- tackling climate change is critical to protecting Western Australia's prosperity.

Both the prevention of bushfires and effective response to bushfires when they occur will continue to be major preoccupations of Western Australians. But the likelihood of high fire danger is increasing, and unless the risk is appropriately managed and mitigated, the need for improved response services will increase accordingly.



# 04 Capability

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INFRASTRUCTURE – TO MAINTAIN KEY INFRASTRUCTURE SUCH AS TRANSPORT AND UTILITIES

# 04 Capability

Nationally, EM is focused on developing a more resilient Australia. The NSDR particularly notes that 'a disaster-resilient community is one that works together to understand and manage the risks that it confronts' (Emergency Management Australia 2016).

Since 2015 the SEMC Strategic Plan has refocused EM activities on developing a real understanding of risk, capability and impact across the state. In 2016 this prompted a review of the existing State EM Capability Framework to ensure it reflected the intent of the plan.

The SEMC Secretariat reviewed the major capability assessment tools in use both within Australia and in highly capable nations such as the US and New Zealand. In particular, the Secretariat reviewed:

- Australia's EM Capability Assessment Tool (NEMCAT)
- America's Threat and Hazard Identification and Risk Assessment (THIRA) model
- New Zealand's Civil Defence EM (CDEM) model.

The review assessed and merged core capability areas (rationalised for the Western Australian context) and then recalibrated them against the six state core objectives – people, economy, infrastructure, social setting, government and environment—to ensure they included all elements at risk. Finally, they were assessed against the state's 27 legislated hazards to ensure all potential hazards were considered.


Figure 18. 2016 Western Australian Emergency Management Capability Framework

The revised framework maintains the critical elements of the previous framework while increasing the level of detail of measurement. It aligns the state with national projects and reflects the national intent of an enhanced focus upon resilience. It does not diminish the importance of response but rather elevates proactive measures ahead of an incident and recognises the importance of an effective recovery. The revised State EM Capability Framework:

- aligns with the *SEMC Strategic Plan 2015–2018*
- adds to the completeness of capability assessments
- improves incisiveness in reporting
- reduces imposts on contributing stakeholder agencies
- reduces duplication
- streamlines data collection and analysis.

The following section compares the state's progress against the individual achievement objectives of the Capability Framework. For the full framework, see Appendix E.

## 4.1 Governance

### Legislation

**Objective**

1.1 Comprehensive EM legislation that is current, appropriate and congruent with supporting legislation

**Key findings**

- For EM to be effective, it is vital that all relevant legislation works concurrently and there are no conflicts.
- Some gaps have been identified within existing legislation.

Western Australia's EM legislation, policies, plans and procedures form the cornerstone of the State's EM Framework. The intent of the *Emergency Management Act 2005* (the EM Act) is to provide a legislative framework, including special emergency powers, for major incidents that require a significant and coordinated response by EM agencies.

The EM Act was not intended to cover day-to-day or low-level incidents but only those that are of such a level as to require a signifcant coordinated repsonse. This may include the rapid movement of people, directed use of vehicles and property, and closure of public places, among other emergency powers.

It is also important to note that the EM Act and EM Regulations function alongside other significant State and Commonwealth statutes, such as the *Bush Fires Act 1954*, the *Health Act 1912* and the *Biosecurity and Agriculture Management Act 2007,* which provide EM agencies with authority and powers to prepare for and respond to emergencies.

For EM to be effective, it is vital that all relevant legislation works concurrently and that there are no conflicts.

In 2015–16 the majority of EM agencies reported that they had systems in place to ensure compliance with current EM legislation and that there were no issues or barriers to their compliance with the legislation. However, a number of agencies reported gaps within the existing legislation.

The Department of Transport reported a conflict between transport legislation and the EM Act and EM Regulations, specifically in regard to intervention powers of international ships. The Department of Health (WA Health) suggested that the EM legislation focused on natural disasters and was 'difficult to apply to other hazards'. The Department of Agriculture and Food, Western Australia (DAFWA) indicated that EM legislation was largely untested in their area of operation.

Local governments overwhelmingly reported no issues or barriers with the legislation. However, a number of local governments reported concerns about:

- clarity around the role of local governments
- limitations on resources and funding for EM activities, particularly around recovery
- recognition of local knowledge and experience
- recognition of capacity in remote areas due to lack of resources and inability to recruit volunteers
- onerous requirements for LEMCs, including reporting requirements
- the complexity and administrative nature of the legislation.

The Emergency Management Amendment Bill 2016 is progressing through Parliament. This Bill resulted from a statutory review of the *Emergency Management Act 2005*. It will address some of the issues and gaps identified above.

In the case of essential services agencies, no issues or barriers were reported. However, Australia's NBN Co Ltd identified the need for the national broadband network to be incorporated into state EM planning.

## Policies

### Objective

2.2 State-level policies are appropriate, useful, usable and used and the intent of these policies flows consistently through individual supporting agencies.

### Key findings

- A major achievement in 2016 was the review and rationalisation of the State EM Policy.
- EM policies must complement operational needs of agencies.
- EM agencies overwhelmingly reported that the state-level policies flowed through to their organisational policies and procedures.
- Local governments highlighted the issue of limited resources and funding for the 'onerous' roles placed upon them.

Under the EM Act, the SEMC is to arrange for the preparation of the State EM Policy, to provide a strategic framework, and to detail the roles and responsibilities of agencies. It is critical that the intent is consistent with the operational needs of agencies, including agency-specific policy, and that those agencies have measures in place to ensure compliance.

In 2015–16, EM agencies reported minimal issues with the Policy and, where issues were identified, it was noted that relevant agencies were directly involved in work to remedy those issues.

For instance, the Department of the Premier and Cabinet noted that a number of policies were out of date and in need of fundamental reform. However, they also noted that they were directly involved in the policy review groups established by the SEMC Secretariat.

Most local governments reported no issues with the Policy. However, a number highlighted the issue of limited resources and funding for the 'onerous' roles placed upon them.

Most stakeholders reported they had systems in place to comply with the State EM Policy, such as the DFES who have established a Regulation and Compliance Framework to identify compliance and controls. Many agencies reported that they had a formal review process in place to ensure continued compliance.

EM agencies overwhelmingly reported that state-level policies flowed through to their organisational policies and procedures. A number indicated that they specifically aligned their own policies to the state's.

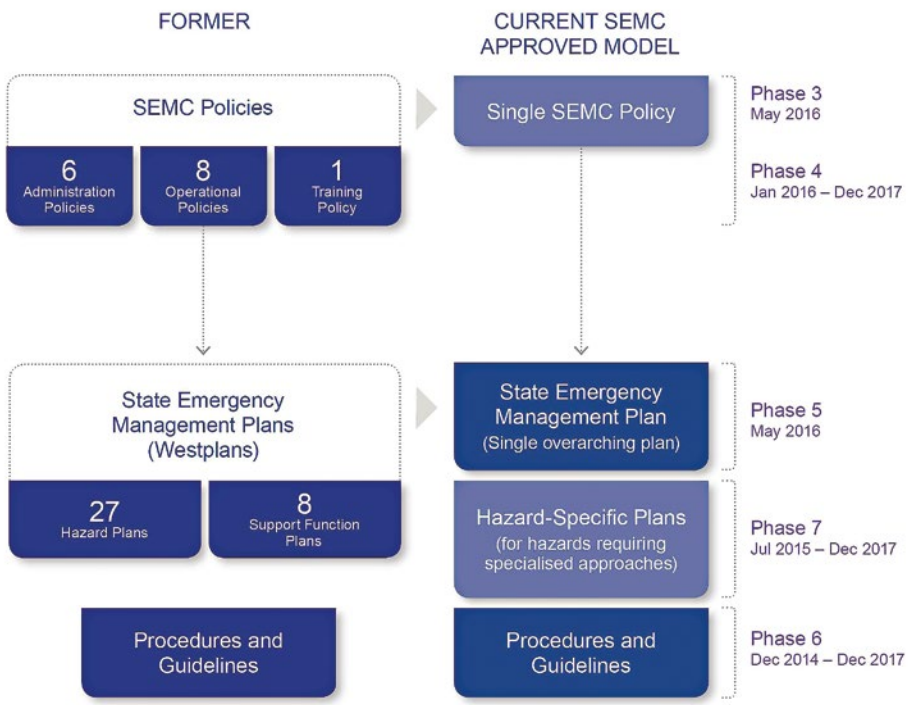
### Policy and Governance Review Project

As noted in the *Emergency Preparedness Report 2015*, the SEMC is undertaking a five-year project to review policy and governance. This is the first major review since the proclamation of the EM Act in 2005.

A major achievement in 2016 was the completion of phase 3 of the review project. This involved rationalising and amalgamating 15 individual EM policies into a single overarching State EM Policy.

Minor 'statement of fact' amendments were made to current Westplans, Procedures and Guidelines so they align to the new State EM Policy.

## 7-phase SEMC Policy and Governance Review Project



## EM plans

**Objectives**

1.3 EM plans (Westplans) are comprehensive and documented and predetermined processes and procedures are in place.

1.4 EM plans are regularly reviewed, exercised and tested.

**Key findings**

- A major achievement in 2016 was the creation of the State EM Plan.
- The state's level of preparedness for an emergency largely depends on the currency, accuracy and the general awareness of agencies to Westplans.
- Westplans must be regularly reviewed, exercised and tested.
- It is equally important that comparable planning and consideration at the district and local level support the Westplans.

The State EM Plan and the State Hazard Plans (Westplans) are established under s. 18 of the EM Act. These plans clearly document the roles and responsibilities of agencies in the event of a specific hazard or activation of a support service during an emergency. The level of the state's preparedness for an emergency largely depends on the currency, accuracy and the general awareness of agencies to these state-level plans.

A major achievement of 2016 was the completion of phase 5 of the Policy and Governance Review Project. This involved the creation of a single State EM Plan. Based upon the former Incident Management Policy 4.1, the new State EM Plan also incorporates the eight support Westplans.

Westplans are prepared and maintained by the HMA prescribed for each hazard, or the EMA delegated with responsibility for the support function.


To ensure continued improvement and best practice in EM delivery, Westplans must be regularly reviewed, exercised and tested. HMAs unanimously reported that their Westplans were comprehensive and documented, and that they had predetermined processes and procedures in place to review, monitor and exercise those plans. In 2015–16, HMAs reported that 24 of the 26 hazard Westplans had been reviewed in the past five years and that 25 had been exercised or recently tested during an actual emergency.

Equally important is that the state-level Westplans are further supported by comparable planning and consideration at the district and local level.

This year, all agencies were surveyed on whether they had amended their plans, processes or procedures based on the outcomes of incidents, emergencies and exercises.

The response was overwhelmingly affirmative, with many agencies citing specific instances where plans were reviewed to address lessons from actual incidents. For example, the Shire of Mundaring tightened protocols around mobilising personnel and services to aid response agencies after running their LEMC exercise (Exercise Plume).

A consistent theme of recent major incident reviews has been the need for all EM agencies and local governments to identify critical infrastructure at the state and local level, and to ensure that appropriate and effective plans are in place to protect these assets in an emergency.

# Case study – The road to resilience

In November 2015 the Australian Institute for Disaster Resilience (AIDR) website was launched. It is an innovative partnership between the:

- Australasian Fire and Emergency Service Authorities Council (AFAC)
- Australian Red Cross
- Bushfire and Natural Hazards Cooperative Research Centre (BNHCRC).


The website delivers products and services that lead to thinking differently about the EM landscape to better prepare for crises. It focuses on three key areas:

- professional development – growing and developing the current workforce
- connecting the dots – reducing duplication and sharing knowledge
- capabilities for the future – focusing on disaster resilience education in schools.

AIDR is developing an Emergency Management Body of Knowledge (EMBOK) and helping to guide research across the sector.

The first official professional development event was held in November 2015, with the former premier of Queensland, Ms Anna Bligh, presenting a master class on 'emergency management in the political interface'. Since then, the program has covered a range of issues, from conducting debriefs to providing leadership skills for volunteers.

The AIDR has formed high-level education strategy groups and are hosting local educators' forums to improve understanding of disaster resilience and embed that understanding in school curriculums to build lifetime resilience. The program is supported by the Disaster Resilience Education for Schools online portal.

AIDR maintains the Disaster Resilience Knowledge Hub, which provides a central collection point for disaster-related news and information and publishes the *Australian Journal for Emergency Management*, which features research articles, news and new thinking in EM.

In 2016 the AIDR is contributing $1 million in scholarships for EM volunteers, targeting women, Aboriginal and Torres Strait Islander people, and regional and rural volunteers. These volunteers will be able to access $25,000 in funding for higher education and up to $12,000 for vocational education.

There is also a Future Leaders program that will develop young talent and provide young people with opportunities for professional development and networking.

The aim is to build resilience across all ages and sectors. The platforms, programs and events are designed to introduce a cutting-edge approach to delivering EM education, professional development and training.

## 4.2 Analysis and continuous improvement

### Risk assessment

**Objective**

2.1 Agencies have the ability to and regularly conduct relevant risk assessments, and the findings are implemented and shared with relevant stakeholders.

**Key findings**

- Understanding of risk among agencies throughout Western Australia is relatively mature.
- Almost half of local governments report being unable to conduct risk assessments compliant with international standard.
- Agencies and local governments use the findings of risk assessments to guide improvements.
- Little evidence exists with respect to sharing risk information with local businesses.

Understanding of risk throughout Western Australia is relatively mature. The broad and inclusive nature of the State Risk Project has introduced the concept and process of risk assessment widely across the state.

All relevant HMAs, EMAs and service providers report having the appropriate skills and abilities to conduct emergency risk assessments to the internationally approved standard (ISO31000). All HMAs can and do conduct risk assessments for relevant hazards. More importantly, their findings are used to guide improvements in processes or inform the development of treatment options. These findings are also shared with others who may be affected.

However, this ability drops off considerably (to 52%) among local governments. Despite being unable to conduct risk assessments compliant to the international standard, 63 per cent of local governments do the best they can and conduct risk assessments with the resources available to them. Over 90 per cent who do conduct risk assessments report using the findings to guide improvements and share the findings, mainly through LEMCs.

The City of Kalgoorlie–Boulder reported engaging a suitably qualified organisation to prepare their LEMA. However, the product did not achieve the City's desired outcomes and a gap analysis of the documentation followed. The City continues to work towards a process that both complies with EM legislation and contains an element of continuous improvement.

The Town of Bassendean reported that riverine flooding had been identified as the town's highest risk hazard. Considerable effort has been placed on raising community awareness and in developing and delivering mitigation treatments.

Most local governments reported sharing their risk findings with members of the LEMCs, local councillors or local agencies, or all three. However, very little mention was made about sharing the findings with the local community, and no mention was made of local businesses.

Sharing the findings of risk assessments with local businesses and industry is seen as a valid and useful method of broadening community involvement and encouraging shared responsibility. Opportunities exist to have greater engagement with businesses and industry and representative groups such as the Chamber of Commerce and Industry (CCI).

By sharing risk assessment findings more broadly, local businesses may embrace and mitigate their individual risks thus lessening the impact that an event may have upon the town or district. This will also potentially reduce the burden upon some of the more financially stretched local governments.

## Horizon scanning

**Objectives**

2.2 Organisations examine existing and ongoing hazard research.

2.3 Pre-emergency situational awareness occurs through examination of international and interstate events that may impact locally.

2.4 Implement best practice identified through hazard research and pre-emergency situational awareness.

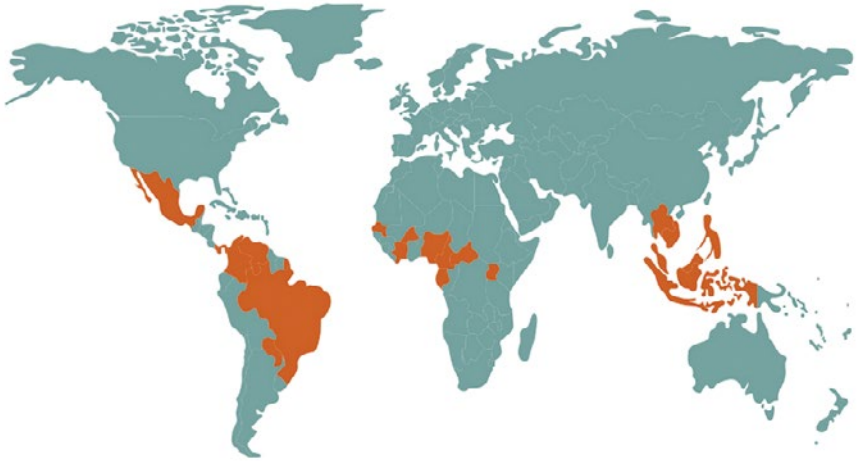
**Key finding**

- All HMAs and service providers and a large proportion of other respondents report that they regularly examine international and interstate events that may impact locally and amend their plans, processes and procedures as needed.

It is important for organisations to have a broad view of the world and the environment they operate in, which is why risk assessments are conducted. Given the ever-present possibility of disaster events, it seems self-evident that planning and preparation to mitigate the effects is essential.

Many critical events around the globe have the potential to impact upon Western Australia and should be anticipated. The most obvious examples of 'horizon scanning' can be found in the fields of health or animal and plant biosecurity. Major disease outbreaks interstate or overseas could simply be transposed to Western Australia by the movements of humans or animals.
Human diseases – such as the Ebola haemorrhagic fever, the Zika virus and foot and mouth disease or plant diseases such as karnal bunt – could easily impact upon Western Australia. It is crucial that agencies are alert to and prepared for such possibilities.

Whether for disease outbreaks, learning lessons from catastrophes or staying current with new hazard research, there is benefit in agencies constantly scanning the EM horizon.



The Zika virus has been found in 26 countries and U.S. territories.

Figure 19. Countries affected by the Zika virus

All HMAs and service providers and a large proportion of other respondents reported that they regularly examined such events and amended their plans, processes and procedures as needed. They also re-examined their own performance after an incident to ensure that the best possible service was delivered.

Websites contain alerts, warnings and travel advice to those going to disaster-affected areas, and quarantine zones and procedures are in place. Despite the proactive work being done by EM agencies in analysing and sharing the results of this horizon scanning, the likelihood exists that these messages may be ignored or discounted by the broader community.

## Lessons management

**Objective**

2.5 Performance is reviewed following an incident, emergency or exercise and appropriate treatments are implemented based upon the findings.

**Key finding**

- The respondents again demonstrated a strong commitment to continuous improvement across the entire EM sector.

The EM sector again demonstrated a strong commitment to continuous improvement. It is evident that conducting EM exercises is extremely important, especially for local governments who are not exposed to incidents as frequently as HMAs and EMAs. HMA, EMA and service provider respondents cited improvements made as a result of incident reviews. However, the examples cited by local governments largely related to exercises.

HMAs reported the highest levels for both assessing and amending plans, processes and procedures. These agencies recognise the importance of keeping up with emerging trends and are proactive in ensuring that plans, processes and procedures reflect best practice.

For example, the Public Transport Authority (PTA) reviewed security procedures for Transperth train operations following the Brussels terrorist attacks in March 2016 and aligned their internal procedures to the National Terrorist Alert Levels.

Almost all respondents indicated that post-incident or exercise debriefing is integrated with their operations. For example, in April 2016 ATCO Gas conducted a Field Emergency Response Unit exercise to test the capabilities of the business and personnel to swiftly respond to a significant gas leak. The structured learning debriefing that followed underscored the lessons learnt during the exercise.

EMAs and local governments (100% and 89%, respectively) reported they would make changes following incidents or events. However, fewer reported that they researched incidents outside their jurisdiction. Many respondents (over 90%) reported conducting research into hazards that may affect them; however, fewer reassessed their plans based upon the new data or research. Causes for this discrepancy are not clear at this stage and could be further investigated.

Local governments reported actively researching the risk relevant to their area and using that to update their plans:

- The Shire of Yalgoo included the information that elected members had gathered at the 2016 Floodplains Conference. This provides not just an example of actively incorporating research but the integration of EM across local government.
- The Town of Cottesloe developed a plan to determine coastal risks caused by changing weather. The final plan will list mitigation strategies should they be required.
- Following assistance provided during the Waroona fire (involvement in the Murray evacuation centre), the City of Mandurah reviewed welfare centre processes and the contents of welfare centre activation kits.

In addition, the City of Cockburn reported a comprehensive example of a post-incident review after a bushfire in Banjup. After the fire, the City reviewed management practices and adopted a 'tenure-blind approach' to monitoring bushfire risk and assigning treatments. This recognised that cooperation was needed across property boundaries, regardless of who owns or manages the land, in order to adequately address the threat of fire. The City also researched industry standards and the methodology used by the OBRM, and adopted a Bushfire Risk Management Plan. Further, they analysed whether the risk assigned to the area affected was in line with predictions made by the City's management plan and if the event had reduced the risk.

While this example is most exhaustive, many local governments reported regularly reviewing their LEMA and resulting improvements in capability or planning where deficiencies had been identified.

Recovery is an area requiring attention, particularly with respect to exercising and training. Most scenarios tend to terminate at the completion of the response phase. There are few instances identified during the 2016 collection of stakeholders conducting recovery-specific exercises.

# Case study – Marine oil spill

During May and June 2015, a national marine oil pollution readiness exercise, called Exercise Westwinds, tested the state's EM capabilities severely.

The exercise was led locally by the Department of Transport (DoT) as the agency responsible for ensuring an adequate response to a marine oil pollution incident in state waters. It exercised the National EM Plan's response arrangements for state and federal governments and members of the offshore petroleum industry.

Exercise Westwinds simulated a Level 3 oil spill emergency from an offshore petroleum facility off the coast near Exmouth, which had resulted in large quantities of oil coming ashore on the western tip of the NW Cape and extending south along the coast towards Coral Bay and beyond.

It severely tested the state's readiness and required the activation of Westplan – Marine Oil Pollution (MOP) and the standing up of the State Marine Pollution Coordinator and the assembled support team. This leadership structure guided and supported the (fictional) industry body's incident management team, forward operating base and numerous tactical response teams. It also involved DoT liaising closely with the Titleholders Crisis Management Team and the Australian Government Offshore Petroleum Incident Coordinator Committee.

Exercise Westwinds highlighted a number of areas for improvement, both within DoT and the existing Westplan – MOP. The most notable of these was the realisation that during an incident the role of Controlling Agency should be held by DoT and not the Petroleum Titleholder.

It prompted a review of the existing Westplan and incorporated key improvements in many of its component parts.
The revised Westplan – MOP was endorsed in October 2015 and reflects best practice in managing a major oil pollution emergency.

In addition, it led to the establishment of the DoT Maritime Environmental Emergency Response Readiness Project. This initiative coordinates the progress of 18 individual sub-projects aimed at delivering efficiencies in times of emergency. Some of the key benefits already achieved include:

- enhanced incident control centre facilities
- creation of a maritime incident management team
- training of 60 DoT personnel able to fulfil key incident management team roles during an incident.

The true benefit was the cradle-to-grave approach adopted by DoT. Arrangements were tested and evaluated and found to be wanting. The shortcomings were scrutinised, considered and planned against, and actions were developed and instigated to remedy any issues. This maturity of both thought and process will mean that the state will be better prepared should an emergency arise.

# Case study – Exercise APOLLO

In May 2016 DAFWA hosted a national emergency response exercise to assess its preparedness to lead a Level 3 (statewide) biosecurity incident.

The complex scenario involved a mock outbreak of foot and mouth disease in the South West region of the state. This exercise built on Exercise ODYSSEUS in 2014—a National Livestock Standstill exercise coordinated by the federal Department of Agriculture and Water Resources (DAWR).

APOLLO was the first large-scale functional exercise hosted by DAFWA in over 10 years. The exercise took 12 months to plan and prepare and involved personnel from three organisations—DAFWA, Animal Health Australia and the DAWR.

A State Control Centre and a Local Control Centre were established in Bunbury for the three-day operation. Over 150 federal, state and local government representatives and livestock industry delegates participated in the exercise.

APOLLO was a component of DAFWA's Boosting Biosecurity Defences project, made possible by funding from Royalties for Regions.

The exercise enabled participants to work through practical matters in a realistic and fast-moving simulated 'live' environment. It provided an opportunity to test and evaluate biosecurity policy, procedures and systems as well as to validate current departmental emergency response training initiatives and enhance the skills and experience of personnel.


APOLLO was recognised as a success nationally and gained good local media coverage (including live crosses to activity in the control centres). However, the real value will be realised through DAFWA's post-exercise evaluation and assessment process.
This process will inform future initiatives and continue building on and optimising the state's capacity, preparedness and capability to respond and effectively lead an emergency biosecurity incident.

DAFWA recognises the need to pursue the lessons and opportunities that have been identified, including:

- continue to deliver 'emergency incident management' and 'technical role' training across the department
- review, develop and implement procedures and plans for emergency and incident response that align with departmental and state EM frameworks
- continue investment in integrating communications and information systems across the department
- increase stakeholder engagement with industry and external agencies to clarify statewide responsibilities and expectations for biosecurity incidents.

APOLLO provided lessons of lasting importance as the department, together with industry, increased their capability to respond to a statewide outbreak of animal disease.

## 4.3 Community involvement

### Public information

**Objectives**

3.1 Messages to communities at all stages of EM are planned, coordinated, prompt, reliable and actionable.

3.2 The messages are clear, consistent, accessible and culturally and linguistically appropriate.

**Key findings**

- Agencies at all levels of EM endeavour to provide clear and accurate information to the public.
- There is a large variance in the way information is delivered to the public.
- Most respondents use a range of media to enhance penetration.
- The use of social media for EM agencies is growing.

**While emergency services do all they can to help, the person most responsible for your wellbeing before, during and after an emergency is you. And the people most likely to help you will be those you know.**

(Australian Red Cross Society 2016)

In 2016 the State Government released the *Information and Communications Technology (ICT) Strategy 2016–2020*. The strategy positions the public sector to use opportunities provided by current and emerging technologies.

It will inform the business strategies of individual agencies to encourage an integrated ICT system that provides the maximum possible benefit to the community. The main goals are to:

- simplify how agencies use technology to support and deliver services through common platforms, systems and standards as part of a unified government approach
- connect public sector agencies more closely with the community and each other through digital service delivery and integrated systems
- inform decision makers, frontline staff, the community and the private sector through easier access to reliable data and quality analysis.

This section considers all information provided to the public. Most notably this falls into two main categories:

1. educational or preventive information
2. warnings of imminent danger.

Outside of an incident, local governments draw heavily on HMA material (e.g. DFES for 'bushfire ready' information). Many reported they use only information that has been directly sourced from the relevant expert agency or thoroughly researched. Some reported they have dedicated personnel authorised to give information out – often the CEO or Chief Bushfire Coordinator. For example, the City of Joondalup reported that during the recovery phase of an emergency, the City has authority to issue public information. However, any advice would be drafted in consultation. The information would be drafted by the City's media officers and then authorised for release by the CEO.

A wide variety of funded information campaigns exist to inform the public of a range of hazards and actions that they can take to remain safe ('Are you bushfire ready?', Stay Water Wise, Storm Safe, Be aware of electricity, Dial before you dig, Make the safe call, etc.). The media, in turn, will often pick up alerts and distribute material such as warnings during an emergency as news stories.

In 2016 the SEMC's Public Information Reference Group was awarded an AWARE (All West Australians Reducing Emergencies) grant to produce an 'aide-memoire' for members of the media. The intent of this document is to further standardise media management during emergencies to ensure that information shared by the media is prompt and reliable.

Figure 20 shows that while websites are universally popular, there is a large variance in the way information is delivered to the public.

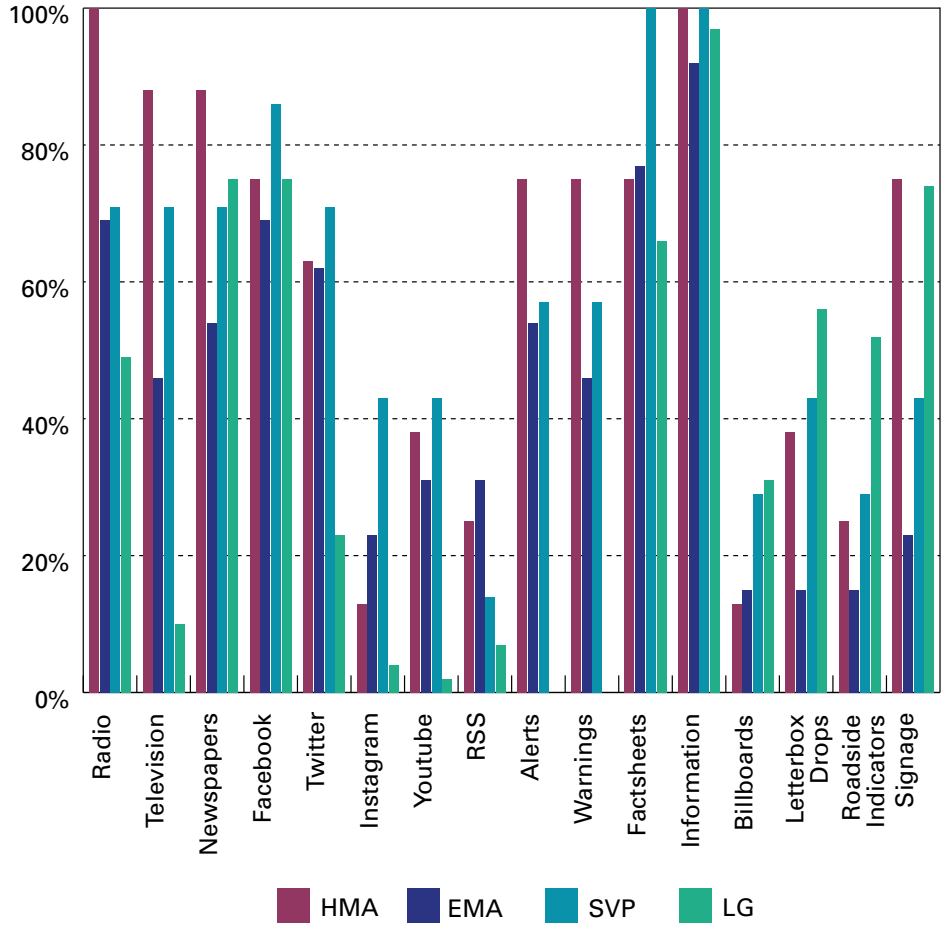



Figure 20. Public information delivery across agencies by media type

While the graph shows that the various categories of social media have good penetration, the use of social media within EM is still in its early stages in WA.

HMAs are using social media increasingly but very few local governments go beyond Facebook, preferring the traditional communication methods of billboards, letterbox drops, local signage and roadside indicators.

Several small local governments reported that in addition to more formal methods (captured in Figure 20), they relied on 'word of mouth' and direct contact between officials and locals.

Due to the complexities involved in delivering information to the public, most respondents used a range of media to increase penetration. For example, under normal conditions, DAFWA communications are limited to stakeholders, such as prevention messages to producers or signs at airports to discourage the illegal importation of plant-based materials. However, in an emergency situation such as a biosecurity incursion, DAFWA broadens this messaging in accordance with the scale and nature of the emergency. For instance, during a Qfly outbreak in the Perth suburb of Alfred Cove in November 2015, DAFWA used signage, media articles and letter drops to advise the public.

In 2016 the City of Belmont partnered with the Red Cross to deliver *RediPlan* emergency preparedness seminars to vulnerable community groups (aged-care providers, childcare providers, retirement villages, seniors, people with a disability, and carers). They also delivered EM information and preparedness brochures in eight languages and prepared webpages ready for immediate populating in the event of an emergency.

Overall, the range of public information strategies adopted by local governments reflects the diversity in demographics and risks across the state:

- Shire of Carnarvon: TropiCOOL festival annual event – vehicle display and volunteers giving public information.
- City of Swan: Community information sessions before the fire season and printed information via libraries, offices and other City facilities.
- Shire of Quairading: Town Clock Information Board – a rotating LED screen.
- Margaret River – Augusta: Bushfire Ready facilitators and groups – mail outs, meetings and community events.
- Shire of Cranbrook: Bushfire preparedness workshops in Term 4 at both local primary schools (tailored to their age levels and in conjunction with the school teaching staff) and run by the shire's Emergency Services and Recreation Officer.

In addition, the Shire of Katanning conducted a Culturally and Linguistically Diverse (CaLD) workshop to examine how agencies can work together to help the shire's CaLD communities to understand the potential risks they face and measures they can take to reduce those risks.

Does public information cater to specific groups:

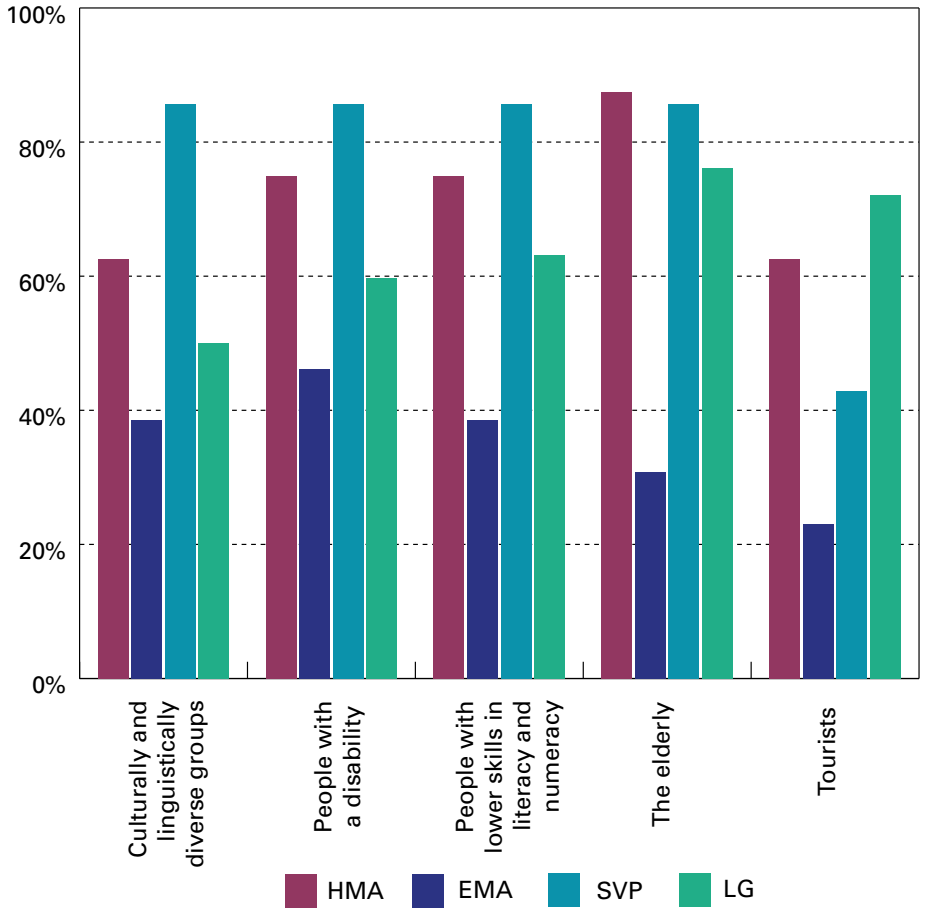



Figure 21. Targeted communications

## Warnings

The issue of community warnings is longstanding. It is and has been a priority area for many years. HMAs are continually exploring a wide variety of means to deliver warnings that are timely, tailored and relevant.

In 2016 all HMAs and EMAs reported that their information is coordinated and validated before release to the public. All HMAs reported they have corporate or media teams to ensure that information is accurate and, where applicable, aligned to national strategies, such as the NSDR. EMAs reported they liaised with HMAs to ensure both that information provided is approved by the HMA (as per Westplan Public Information protocols) and also so that the EMA's expertise is integrated into HMA activities.

Coordination between agencies was reported as a high priority to ensure EM information is reliable and actionable. For example, DFES uses approved templates to facilitate communications between personnel responsible for operations and personnel responsible for public information. Detailed processes, guidelines and plans are in place to ensure that appropriate approvals (e.g. from the incident controller, BOM or senior media team) are completed.

The use of traditional media – radio, television and newspapers – as an emergency communication tool is dominated by HMAs. This reflects the statewide 'ownership' of hazards by the HMAs and the need to convey consistent messaging to the public. Traditional media allows the same message to be seen across the whole state. This use by HMAs remains and further broadens to include major service providers for awareness and prevention campaigns.

Local governments work with the HMA and incident controller to share relevant information that is targeted to the local community. Local governments reported that to ensure standard messages are maintained they either use information provided 'as is' by the HMA or modify it to give specific information about local government. It is evident that local governments are aware of the need for consistent and accurate information.

Despite the large body of work that has gone into enhancing emergency warnings, the events surrounding the 2016 Waroona fires highlighted that still more work was needed.

# Case study – Social media for EM new and growing

The way society receives and consumes information has changed markedly with the advent and proliferation of the smartphone. The use of social media has been growing exponentially, and so too have the opportunities to use this as a critical communication tool during emergencies.

More people are turning to their smartphones during an emergency for fast and reliable information. While traditional forms of emergency warnings—text-based notification systems or ABC news emergency alerts—play a vital role, the potential offered by social networking platforms is immeasurable. Including social media as an additional channel provides another critical tool in crisis communication.

Nationally, Australia uses social media in crisis communications well. However, delivery tends to be ad hoc rather than through a coordinated system. Certain agencies are well advanced in the use of social media and some are just beginning while others do not use it at all. The next several years are sure to see substantial development and increased interoperability (Flew et al. 2015) of social media systems for EM.

In Western Australia, the use of most social media platforms for many EM organisations is still cautious and experimental. While setting up a Facebook page or Twitter feed is easy for most organisations, building credibility and a connection with an audience is far trickier.

WA Police use social media well. They are the most dynamic users of social media in the EM realm with a combined audience of over half a million users. The language they use is simple, personable and appropriately entertaining. The content is current and engaging, ranging from vital messages and requests for information through to local issues and light-hearted posts.

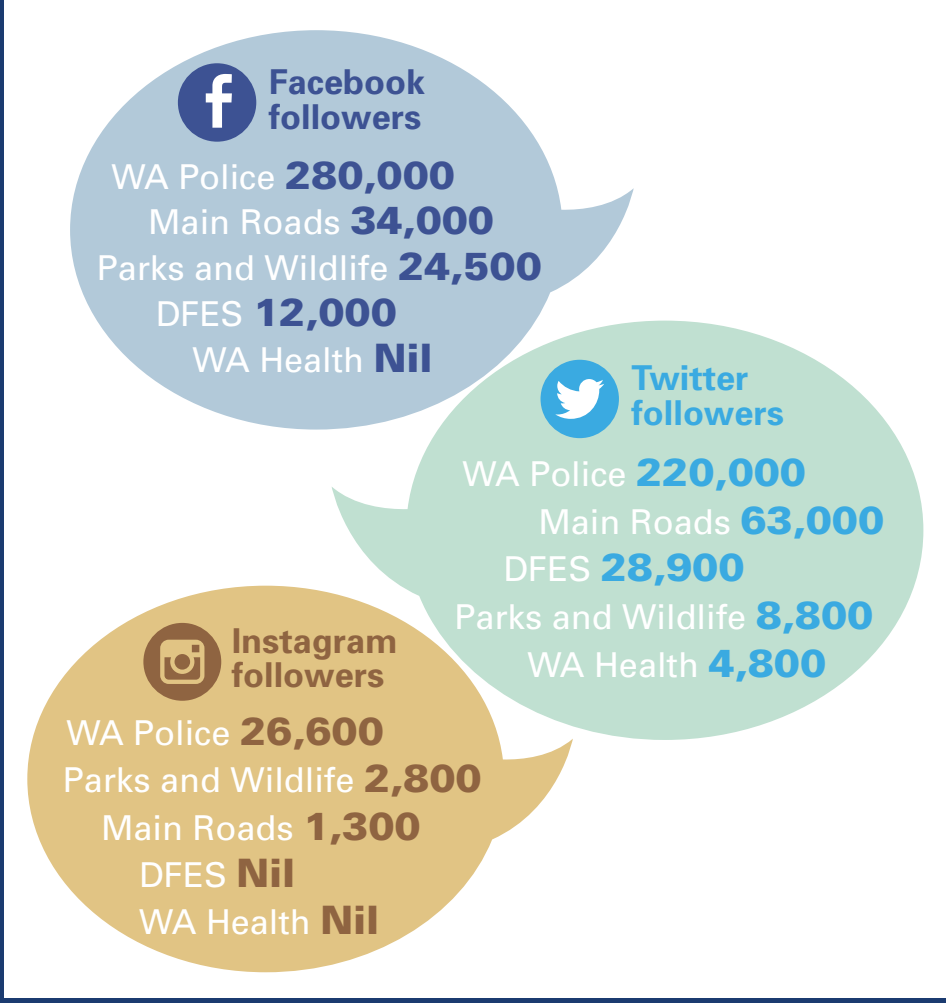



Figure 22. Snapshot of social media use by five EM agencies as at 3 October 2016

Some of the keys to their success are:

- strong policy guidelines with continuous training and mentoring
- two-way communication with the public
- a full time social media officer to manage their corporate accounts
- localisation – district officers manage their 168 regional Twitter accounts.

WA Police accept that a degree of devolved responsibility comes with the decentralisation of their Twitter accounts. Social media is embedded in the community engagement duties of each district officer. The decentralised model is believed to have contributed significantly to building the audience of WA Police in all parts of the community.

The Department of Parks and Wildlife (P&W) is also emerging as active social media users, on Twitter and Facebook. While the department does not have a dedicated social media officer, the role is shared across their media team. Like WA Police, they have corporate and regional social media accounts – and, once again, this spread helps build a broad audience within local communities.

**P&W Twitter**

- The corporate Twitter account received about 3900 new followers, bringing the current total to more than 8400.
- Tweets were seen more than 1 million times.
- Tweeted website links were clicked about 5000 times.

**P&W Facebook**

- More than 22,000 'likes' – an increase of about 12,700 in the past year (since July 2015).
- Posts were seen more than 11 million times by more than 5.8 million users.
- Posts were shared almost 200,000 times.

Over the past year, P&W have worked hard to increase audiences across their social networking platforms, reaching a combined audience of over 31,000 users. Based on this growth, their newest platform (Instagram) has the potential to gain tens of thousands of followers. Engagement level (likes, mentions, comments) average 43.8 per cent, well above the average post engagement of 4.3 per cent across Instagram.

From an EM perspective, P&W uses Twitter for immediate, newsworthy and important information, providing bushfire alerts, maps and media statements. Facebook is more image-focused and engages the community through photos and videos, and the stories behind them.


Figure 23. Close call for Parks and Wildlife officers

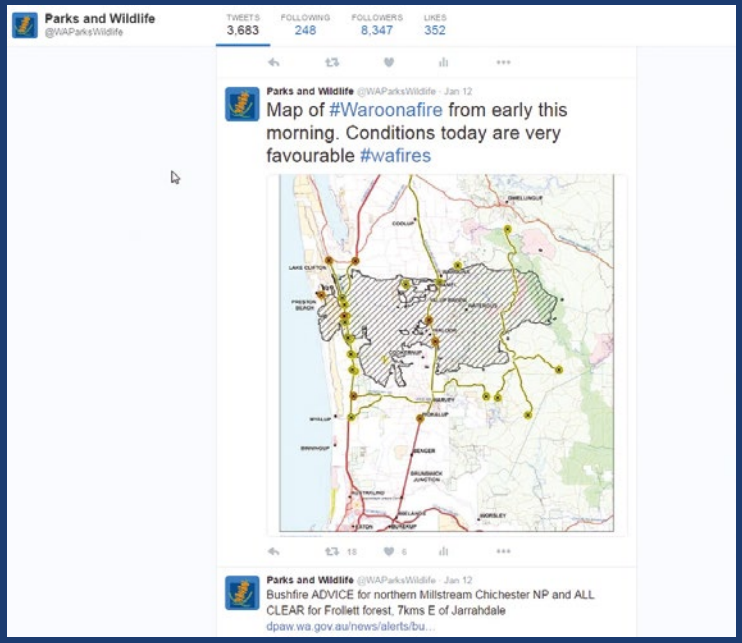



Figure 24. P&W posted this map of Waroona during the January 2016 fires

Meanwhile, EM Victoria embeds specialist teams in their control centres during emergencies to actively monitor social media chatter. This can provide 'live' intelligence from those on the ground to aid situational awareness. It also gives EM agencies the opportunity to debunk rumour and misinformation in real time.

EM organisations in Western Australia would benefit from a more coordinated approach to social media. As a first step, all HMAs should aim to establish a presence in the social media domain. The proposed establishment of a national framework, including a social media taskforce, will hopefully support this evolution.


Figure 25. WA Police tweet vital messages to mitigate road crash hazards

## Risk awareness and understanding

**Objective**

3.3 The community is aware of the hazards that may affect them, the vulnerable elements, and understands the role they should play during an emergency.

**Key findings**

- All respondents perceived there was a generally low to moderate level of community understanding of hazards.
- There seems to be a relatively low uptake of EM information by some sections of the community.
- It is possible that some sections consider emergency alerts and warnings as akin to spam, junk mail or white noise.

As outlined in the public information section, EM agencies try to provide clear and accurate information to the public during emergencies through a variety of means and on a range of platforms. Despite this, there seems to be a relatively low uptake of this information by some sections of the community.

All respondents perceived that there was a generally low to moderate level of community understanding of hazards. This may be reflective of the geographical diversity of the state and the number of hazards. More troubling is the possibility that people could be ignoring warnings and failing to act to protect themselves.

Of the 170 agencies surveyed during 2016, only two – the shires of Williams and the Upper Gascoyne – believed that their communities had a 'very high understanding' of the hazards that may affect them.

And only the Upper Gascoyne believed that their community was 'very aware' of vulnerable elements (buildings, people) and knew what to do in the event of an emergency. Respondents believed that fewer than one in seven people had a 'high' or 'very high' knowledge of what to do in the event of an emergency. (It should be noted that these responses were the opinions of respondents as to how prepared their communities were and not the result of research or community measurement.)

Many local governments reported providing detailed information to new residents and ongoing information through local newsletters. These newsletters regularly contain targeted information, which enabled community members to be aware of the specific risks they faced. This tailoring of information for the local community is considered useful.

The Town of Bassendean rolled out a community awareness and preparedness project that involved volunteer State Emergency Service (SES) officers door-knocking all households within the 'once-in-a-100-year' flood zone. Each household was given a personal preparedness Flood Ready Kit.

The Shire of Serpentine–Jarrahdale provided its residents with resources to increase understanding of potential risks and the best strategies to manage those risks. For example, the shire's annual Firebreak and Fuel Hazard Reduction Notice contained information on a recommended hazard reduction schedule and provided a template to establish phone trees (a method of communication between members of a community where information can be passed effectively to provide warning of an emergency) with eight surrounding properties to build local networks and preparedness.

The Shire of Cranbrook reported that most of the local farming community had been dealing with hazards (fires, floods) for most of their lives and have a good understanding of both the hazards that will affect them and the actions required in an emergency. However, an increase in the number of newcomers to the area raised concern that 'people new to the area don't have the understanding of the hazards, the response process (e.g. they expect someone to tell them what to do and a truck to appear on their doorstep to protect their property) and the actions that should be taken in an emergency event'.

To bridge the gap, the shire regularly draws upon readiness and preparedness information produced by DFES and republishes these on the shire website, on their Facebook page and in both local newsletters. The information products include:

- How prepared are you for a bushfire?
- Prepare to actively defend
- Preparing your survival kit
- Bushfire survival plan
- Checklist – leaving for a safer place
- Prepare–Act–Survive booklet
- Preparing for storms.

In addition to these products, the shire has established an SMS system to alert and inform the public of hazards or emergencies and regularly hosts or attends local workshops on preparedness. Despite this proactive attention to EM however, a survey carried out by the shire this year showed significantly more work was needed to bring awareness to the desired level.

## Shared ownership

**Objective**

3.4 Individuals take responsibility to minimise the impacts of emergencies through the preparation and adoption of appropriate mitigation measures. This includes individuals who understand the nature of the hazard, have emergency action plans and who monitor and respond to emergency messaging and alerts.

**Key findings**

- There are elements within all communities where understanding of their responsibility is poor.
- Understanding the hazard is one thing; acting upon it is another.
- WA Health have assessed that individual behaviours do not significantly differ during heatwave events.
- Some elements of society have become complacent to the risks posed by some hazards.
- More work needs to be done to ensure that community members know what to do during an emergency.
- The aim and hope is that community members will recognise the importance of being prepared and will take action to protect themselves as best they can.

Different elements of the community have different levels of knowledge, awareness and skills to respond in an emergency. HMAs and EMAs indicated that while most people have achieved some level of understanding and ownership of their personal responsibilities, there are some elements in all communities – and significant numbers in some communities – where understanding is poor.

For instance, WA Health reported that fact sheets about the danger of heatwaves are made available, in several languages, specifically addressing the needs of vulnerable groups (the very young and the elderly). Despite this availability – and traditional media alerts – there continued to be anecdotal evidence that individual behaviours do not differ significantly during heat events. Further, in some public health emergencies (e.g. Ebola or Zika), there are common elements of panic and misunderstanding of the hazard.

Generally, HMAs advised that understanding in the community varies according to the area and the risks they face. That is, people in areas of regular risk have a greater understanding than those who live in areas of infrequent risk. Reports from local governments reflect this locally focused knowledge. Local governments who report high levels of understanding generally advise that this is because the community is small and active or has recently, or regularly, been impacted by a hazard.

The issue of changing demographics was a concern for several local governments. Some reported an influx of people to rural communities from Perth, interstate and other countries. They believed many newcomers did not have the generational understanding of local hazards, actions and what are considered 'normal' response processes in a rural crisis. There was a perception that, in addition to lack of knowledge, some people held an expectation of service rather that an attitude of self-sufficiency.

### Understanding the hazard is one thing; acting upon it is another.

Comments received suggest that certain hazards are well understood by the communities that may be impacted by them. People in the north-west, for example, generally have a high level of understanding of what they need to do in the event of a cyclone. Some responsible people take steps to prepare.

Other people have become complacent with the risks, and reports of 'cyclone parties' have become commonplace in post-incident media reports.

During the South West floods in January 2016, despite warnings from local governments some residents were found driving around looking at the flooding. This disregard of official warnings potentially placed them in harm's way along with any emergency services personnel that may have been required to rescue them.

There is much uncertainty among responding agencies about the depth of community engagement with respect to EM. At least one-quarter of respondents were unable to even estimate what proportion of the community may:

- have emergency action plans
- understand emergency messaging
- monitor emergency messaging
- respond to emergency messaging.

Table 5. Perception of community engagement

| | What proportion of the community do you estimate: | | | |
|---|---|---|---|---|
| % | Have emergency action plans (%) | Understand emergency messaging (%) | Monitor emergency messaging (%) | Respond to emergency messaging (%) |
| 0–19 | 40.6 | 11.6 | 12.3 | 11.6 |
| 20–39 | 13.5 | 18.1 | 18.1 | 12.9 |
| 40–59 | 8.4 | 25.2 | 22.6 | 23.2 |
| 60–79 | 3.2 | 18.7 | 17.4 | 20.6 |
| 80–100 | – | 1.3 | 1.3 | 2.6 |
| Not sure | 34.2 | 25.2 | 28.4 | 29.0 |

Of those that did venture an estimate, over 60 per cent of respondents believed that fewer than one in five community members maintained an emergency action plan. However, estimates of the number of community members understanding, monitoring and actioning emergency messaging were much higher.

Agencies in the EM system disseminate masses of information intended to empower individuals and the community – in both a 'push' and 'pull' manner. Agencies 'push' some information on the public (make it available), while members of the public 'pull' the information they demand for their needs (seek it out themselves). The hope is that the public will recognise the importance of being prepared and take action to protect themselves in an emergency as best they can.

Recent incidents have shown that some people remain passive, both in the face of information and the hazard itself.

It is possible that the volume of emergency information and warnings being promulgated overwhelms the public, causing some people to dismiss it along with spam, junk mail or white noise. This stance will present an ongoing challenge for EM agencies when communicating in an emergency and may contribute to inaction in some parts of the community.

Insurance is a feature of a community carrying a shared ownership of preparedness when it comes to disaster management. Given the wide-ranging benefits of household and business insurance and the negative consequences of non-insurance, ways to promote the benefits of insurance coverage across our community should be explored.

## Sector information sharing

**Objective**

3.5 Engagement occurs between government, industry and communities to share EM information including risks, vulnerabilities and treatment options.

**Key findings**

- Sharing of information is well established at government level.
- The SEMC, DEMC and LEMC structure facilitates sharing.
- Local government encouragement of business continuity plans based upon risks is extremely low.
- It is clear that there is more work to be done when engaging local businesses and industries.

EM stakeholders have reported having a high level of activity when it comes to assessing local risks. But sharing this information between sectors does not seem to happen enough. By way of example the risk posed to local government buildings from a flood will pose a similar risk to the private and commercial buildings nearby.

The practice of sharing information seems to be well established at government level, on a scale suitable for state-level planning and policymaking. The SEMC, DEMC and LEMC structure facilitates sharing knowledge of risk, vulnerabilities and treatment options, including the requirement to undertake EM planning at each level.

Engagement occurs across a range of topics and forums such as the Flood Warning Consultative Committee and the Australian Tsunami Advisory Group, and in business-as-usual dealings with the BOM, Geoscience Australia, and the SEMC Secretariat. The scale of information sharing at the local level varies.

Local governments rated highly across all components of sharing information with the community. However, most other respondents had variable responses. The difference likely reflects the close relationship between local governments and their communities and a lesser community focus by other government or industry respondents.

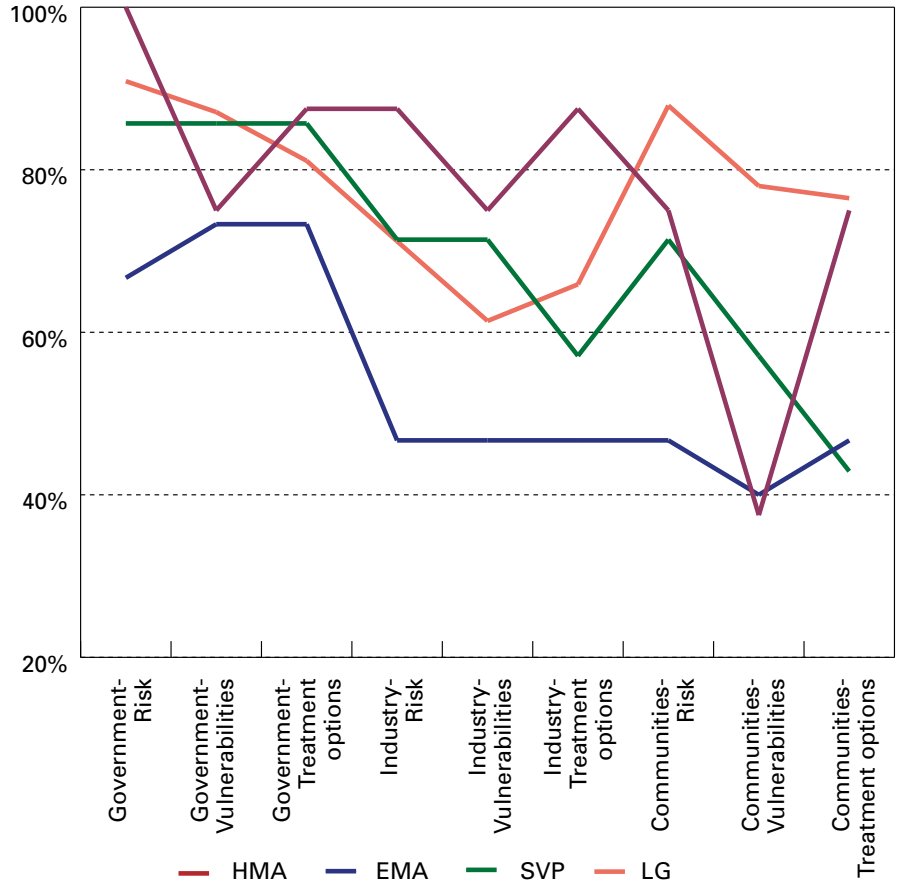



Figure 26. Sharing of information between sectors

Some EMAs and service providers are primarily support agencies and as such it is not their role to share information with industry or the community. When required, these EMAs do report sharing information that is targeted to those stakeholders or groups that are directly relevant.

Others reported that it is not their role to share information at all and that they have no involvement with doing so at the community level. (Note that one of the service providers answered this question with a general comment that as a privately run business, EM information is not shared as it is 'commercial in confidence'.)

The highest ratio of information sharing was reported when discussing bushfire risk treatments. These are more likely to be discussed with community members in rural areas as they have a greater understanding of risk mitigation and the importance of reducing fuel loads.

One reason for reduced sharing at community level may be due to differing views over how to mitigate risk. Contrasting opinions can lead to instances where proposed treatments do not align with industry standards.

Sharing hazard and risk information with industry was lower across all respondents. For example, local government engagement with industry to encourage business continuity plans was extremely low at only 16 per cent.

One local government noted that the question was answered with some difficulty – the authority shared with some industries (such as healthcare) but not with others. Others responded that they have industry representation via the LEMC but do not specifically share with or marshal information from the wider industry.

It is clear that there is more work to be done when engaging local businesses and industries. Greater engagement is likely to increase preparedness and lessen impacts following an event.

## 4.4 Planning and mitigation

### Land use planning

**Objective**

4.1 Land-use planning is in place to manage and minimise the impact of known risks.

**Key findings**

- Land-use planning and enhanced building standards are possibly the most cost-effective methods available to increase long-term resilience.
- A significant advancement has been the development of maps that show bushfire-prone areas.
- This has extended to additional building requirements within those zones.
- This represents effective use of land-use planning for risk reduction.

Land-use planning can be an effective tool to manage a community's exposure to risk, particularly if it is informed by quantitative hazard information. The ideal is to forestall development in areas where known risks exist (e.g. don't build on a flood plain).

Hazards may be unpredictable and cannot be entirely avoided. However, effective planning can be a vital tool to minimise exposure, vulnerability and impact.

The recent creation of maps that show bushfire-prone areas and additional building standards and requirements for building within them represent a significant advancement of land-use planning for risk reduction in Western Australia.

As the primary assessor of applications to develop land, local governments have a significant role to play in managing risk. Where possible, land-use planning decisions should consider all hazard information, including local emergency risk assessments completed as part of the local EM arrangements.

Most local governments (96%) acknowledged their role in land-use planning decisions. Of these, 95 per cent stated that EM information was used to minimise the impact of foreseeable risks and that hazard information does inform planning decisions (97%). However, only 63 per cent reported having current local emergency risk assessments, which can be an important source of hazard information.

All applicable HMAs and 88 per cent of EMAs stated they used risk and hazard information to inform their land-use planning decisions.

While service providers do not have a role in state land-use planning, they can and do use risk assessments to make land-use decisions to protect their infrastructure. All service providers reported applying risk information to their business planning decisions.

The responses received are encouraging, indicating that most organisations with responsibility for land-use planning apply their knowledge of risk to reduce the state's exposure and actively use hazard information when making decisions about the use of land.

When used effectively, land-use planning and enhanced building standards are possibly the most cost-effective method available to increase the long-term resilience of the community.

## Ecosystem management

### Objective

4.2 The ecosystem is effectively managed to preserve natural barriers that aid community protection and biosecurity maintenance.

### Key findings

- The environment already provides certain natural barriers that reduce the potential impact of hazards.
- Environmental management is primarily focused on protecting ecological integrity; however, community protection can be an advantageous by-product.
- The identification and effective management of natural buffers may provide low-cost solutions to reduce risk, lessen impacts and increase resilience.
- A large-scale biosecurity incursion would quickly exhaust existing resources.
- Despite the value of natural barriers, most local government respondents reported they had not been identified and were not being managed.

The environment already provides certain natural barriers that reduce the potential impact of hazards. For example, sedges or low wetlands may protect against floods, dune systems may prevent coastal erosion, and vegetation may stabilise slopes.

The effective management of natural barriers is of the utmost importance in EM. Communities can protect themselves simply by leaving some of these natural buffers alone. Conversely, they can create new risks by reducing or destroying them through urban or agricultural expansion. Despite the value of natural barriers, most local government respondents reported they had not been identified and were not being managed.

One key exception is the area of coastal management, where natural barriers that aid community protection are actively considered. A number of local governments have prepared coastal management and hazard plans that assess vulnerability and hazards, and undertake risk assessment, planning, review and implementation.

It should be noted that state funding has been made available to conduct coastal vulnerability assessments and works.

In practice, the primary purpose of most environmental management tends to be to protect ecological integrity rather than to aid community protection. However, protection of property and lives can be an advantageous by-product. The identification and effective management of natural buffers may provide low-cost solutions to reduce overall risk, lessen impacts and increase resilience.

Western Australia is a signatory to a number of national agreements on biosecurity. DAFWA, as the relevant HMA, is responsible for implementing all these agreements. Some resources to discharge this responsibility are available; however, a large-scale biosecurity incursion would quickly exhaust existing resources. Local governments typically have a low level of engagement in biosecurity, with only 28 per cent having plans and only one in five having the capacity to implement these plans.

## Infrastructure protection

**Objectives**

4.3 Plans are in place to identify and protect critical infrastructure, community assets and individual housing.

4.4 Effective use of building codes is in place to mitigate potential hazards and insurance is considered as a treatment option.

**Key findings**

- The state's transition towards infrastructure resilience is likely to result in lower impacts on critical infrastructure from a range of hazards.
- All applicable HMAs and service providers reported they have plans in place to identify and protect critical and crucial infrastructure.

The *Emergency Preparedness Report 2015* highlighted the importance of protecting critical infrastructure to improve the state's resilience to a range of hazards. Over the past decade, the focus has been on the protection of critical infrastructure from terrorist acts. This has now broadened to an all-hazards approach, in recognition that any loss would be important, regardless of the cause.

It is clear that many hazards could impact upon critical infrastructure and that protection is required. In 2016 critical infrastructure was incorporated into the State EM Capability Framework.

The national definition of critical infrastructure is 'those physical facilities, supply chains, information technologies and communication networks, which if destroyed, degraded or rendered unavailable for an extended period, would significantly impact on the social or economic wellbeing of the nation, or affect Australia's ability to conduct national defence and ensure national security.

Within the Capability Framework, facilities and essential services have been included but are treated separately.

In the state context, critical infrastructure includes everything from major electrical and water networks to individual bridges owned by local governments. A piece of infrastructure may not be critical to the state overall but may be vital to the wellbeing and movement within an individual community.

Due to the wide range of hazards that are faced and the vast area that could be impacted, it is important that all infrastructure be identified and protected as far as possible.

All applicable HMAs and service providers reported they have plans in place to identify and protect crucial infrastructure. Fewer applicable EMAs (80%) reported having these plans in place.

Most local governments reported having plans in place as part of their local EM arrangements. However, 15 per cent reported that they either did not have plans in place or did not believe they were required to have such plans.

Over 90 per cent of local governments reported that they protected building stock through building codes, firebreaks and land-use planning. Fewer (80%) reported that they protected buildings through insurance.

## Essential services protection

**Objective**

4.5 Planning for the continuity or rapid restoration of essential services is in place, including water, food distribution, power, sewerage, telecommunications, fuel and local government services.

**Key finding**

- All applicable EMAs, service providers and local governments reported having plans for the protection and rapid reestablishment of services.

Applicable EMAs, service providers and local governments were asked about their plans for the protection and restoration of essential services (see table 6). All agencies reported they have plans in place for the rapid reestablishment of services after an emergency.

Food availability can become a significant issue during an emergency and can be exacerbated by panic buying. To ensure adequate food supply, many local governments have entered into agreements with local suppliers and distributors to ensure continuity of supply and access to stocks outside of normal trading hours. Forty per cent of local governments reported having plans in place to ensure the continuity or rapid restoration of food distribution.

Some local governments and welfare agencies (such as Department for Child Protection and Family Support (CPFS)) also considered food distribution in emergency planning. However, this seemed to relate to food security for locally affected communities.

Table 6. Organisations responsible for the restoration of essential services and the status of their plans

| Organisation | Service | Plans in Place |
|---|---|---|
| Water Corporation | Water, Sewerage | Yes |
| Horizon Power<br>Western Power | Power | Yes |
| Telstra | Telecommunications | Yes |
| Dampier Bunbury Pipeline<br>ATCO Gas | Fuel | Yes |
| CPFS | Shelter and accommodation | Yes |
| Local governments | Local government services | Yes (93%) |

National food chains such as Coles, Woolworths, Metcash and Aldi were not surveyed as part of the *Emergency Preparedness Report 2016*. No meaningful comment can be made as to how quickly these companies could respond to a state-level emergency in Western Australia.

## Minimise single points of failure

**Objective**

4.6 Exposure to hazards is limited through the minimisation of single points of failure and that mitigation options or redundancy planning are in place.

**Key findings**

- All commercial enterprises report that they actively identify and try to build redundancies to avoid single points of failure.
- HMAs and EMAs report a heavy reliance upon business continuity planning to address equipment and facility outages, and extensive training programs to build redundancies.
- For local governments, this largely means areas or towns with single access and egress roads.

The identification and minimisation of single points of failure is critical to the protection of society and infrastructure during an emergency and is an effective way to increase resilience to a range of hazards.

A consistent theme of recent reviews of major incident reviews has been the need for all EM agencies and local governments to identify critical and crucial infrastructure—at the state and local level—and to ensure that appropriate and effective plans are in place to protect these assets in an emergency.

In 2016 all EM agencies and local governments were asked to report on their plans to identify and protect assets within their jurisdiction, including:

- critical infrastructure
- community assets
- individual housing
- food distribution
- restoration of water, power, sewerage, telecommunications, fuel, local government services, shelter and accommodation.

Of the HMAs, where such planning was applicable, most reported having plans in place to identify and protect these assets.

Local governments similarly reported that plans were in place to identify and protect critical infrastructure, community assets and individual housing. However, a need for more planning for the restoration of essential services at the local level was clearly identified.

Essential services include water, telecommunications, power and gas supplies. Their maintenance and reliability become critical in times of emergency. All companies with direct control over these services reported that they had identified single points of failure in their operations and had taken steps to mitigate the impact or had introduced redundancy measures.

Most reported they have either multiple layers of redundancy in their systems or the ability to ensure supply through multiple supply points. ATCO Gas provided a specific example citing that the network was capable of 'back gassing', which minimises loss of supply in areas where the line has been affected. Most organisations also stated that they have minimum performance standards and undertake risk assessments as part of their normal business to maintain awareness of single points of failure in their networks.

HMAs and EMAs reported a heavy reliance upon business continuity planning to address equipment and facility outages, and extensive training programs to build redundancies in areas where shortages of either capacity or skills have been identified.

Just over two-thirds of local governments reported identifying single points of failure. Fewer (39%) stated that plans had been formed to address identified issues. The local governments that had both identified and made plans to address single points of failure largely focused on the road network, primarily identifying areas or towns with single access and egress roads.

The City of Mandurah reported addressing single points of failure by implementing back-up plans or alternative work processes. For example, the customer request management (CRM) system was identified as a key vulnerability. The CRM captures and allocates work requests to relevant sections within the City. Due to the system's reliance on ICT and power, a breakdown – systems failure or power outage – would cause major issues.

In consultation with key staff, the City created hardcopy CRM books to allow normal business to continue during the period of disruption. Details captured via the manual process would be incorporated into the main system later. The books can also be used by the Mandurah SES unit to capture City-related work requests, and copies have been placed in welfare centre activation kits.

Industry respondents whose activities have commercial implications reported developing multi-layered redundancy options for service delivery. Government agencies, probably due to fiscal constraints, reported having fewer redundancy layers. However, detailed business continuity planning and training regimes were designed to minimise the potential impacts of disruptions to services.

The depth of consideration and mitigation of single points of failure declines further among local governments. It must be noted that the commercial providers have single service delivery responsibilities, whereas most HMAs, EMAs and particularly local governments have multiple demands upon limited budgets.

## Remoteness planning

**Objective**

4.7 EM planning takes account of emergencies occurring in remote areas of the state.

**Key findings**

- 85% of Western Australia meets the ABS classification of 'very remote'.
- Remote communities can be some of the most resilient.
- Responders and critical services will take longer to reach any incident occurring in remote regions.

The Australian Bureau of Statistics classifies most of Western Australia (85%) as 'very remote' (Australian Bureau of Statistics 2011). Hence, responders and critical services will take longer to reach any incident occurring in remote regions. Some Aboriginal communities are sited in the farthest reaches of the state and many of these communities face complex challenges such as:

- small communities that are geographically isolated
- restricted or limited accessibility
- lack of access to services or infrastructure
- poor living conditions and poor literacy and numeracy
- entrenched disadvantage
- unique cultural or communication issues
- high unemployment and a low economic base
- few prospects to develop local jobs
- exposure to hazards
- impediments to self-determination (e.g. limited capacity for residents to own their home) (Department of Regional Development 2016 and Emergency Management Australia 2007).

HMAs, local governments and community members reported taking steps to address EM challenges and to increase resilience in remote Aboriginal communities. It should be noted that, while these communities are remote, they are not necessarily vulnerable as they can also be some of the most resilient.

The majority (80%) of local governments with very remote areas within their jurisdiction reported they had considered remote areas in their emergency planning. However, they noted difficulty in complying with certain aspects of legislation due to a lack of resources and the remoteness of some communities.

In 2016 the SEMC Secretariat led a national review of the Keeping Our Mob Safe Strategy, a national strategy for EM in remote Aboriginal communities. The review is due to be completed in December 2016.

An increase in the resilience of remote Aboriginal communities requires collaboration with Aboriginal people and organisations, private industry, not-for-profit organisations and government at the federal, state and local level.

Governments, communities and families all have their own unique roles and responsibilities to play to increase the resilience of remote Aboriginal communities (Department of Regional Development 2016).

## Business continuity planning

### Objective

4.8 Business continuity plans are in place across government, industry and business and consider hazard-specific risks.

### Key findings

- All HMAs have business continuity plans; however, only half of these consider fatigue management.
- 73% of local governments reported having business continuity plans.
- Only 16% of local governments encourage local businesses to have the same.

A key part of preparedness is ensuring that things keep on running through an event and after it. Business continuity planning is the mechanism that allows organisations to be resilient by creating systems of prevention and recovery.

All HMAs have business continuity plans in place and these plans consider hazard-specific risks. Of these eight HMAs, three, however, have not used or tested their plans. Half of the agencies do not have fatigue management strategies incorporated into their plans.

Of the local governments who responded to the survey, 73 per cent claimed to have business continuity plans, three quarters of which consider hazard-specific risks. Less than half of these have been tested or incorporate fatigue management.

Table 7 shows that the highest reported proportion of local governments with business continuity plans can be found in the Pilbara and Metropolitan areas. The Midwest–Gascoyne and the Kimberley, who generally have smaller local governments, offer the most room for improvement.

Table 7. Percentage of local government respondents with business continuity plans

| District | % |
|---|---|
| Goldfields–Esperance | 71 |
| Great Southern | 64 |
| Kimberley | 25 |
| Metropolitan (4 EM districts combined) | 91 |
| Midwest–Gascoyne | 53 |
| Pilbara | 100 |
| South West | 70 |
| Wheatbelt | 74 |

While three-quarters of local governments report having business continuity plans, only 16 per cent of them encourage local businesses and industries to have similar plans in the event of an emergency. The broadening of business continuity planning to and throughout the community will be crucial in strengthening resilience.

The more prepared and equipped local businesses are, the less likely they are to fail and the quicker they will be able to reopen after an incident. This maintenance of service (or minimisation of outage) will likely reduce community feelings of displacement and will allow impacted communities to return to normal more quickly.

Surge capacity management relates to the ability of a health service to manage a larger-than-normal number of casualties over a defined period of time. This time period varies according to the type of incident, existing capacity of the health system, location and transportation arrangements in place for the movement of casualties.

WA Health has a suite of plans – regularly reviewed and exercised – that address the state's acute surge requirements. In addition, there is an extensive medical stockpile at the state level containing medical and non-medical equipment, pharmaceuticals, consumables, personal protective equipment, and self-sustainability equipment. A national medical stockpile is also maintained, with various items pre-positioned in Western Australia. Health business continuity plans outline how resources can be redeployed from non-critical areas. St John Ambulance, in conjunction with WA Health, manages disaster kits pre-positioned across the state.

## Community activities

### Objective

4.9 Consideration is given to the protection and rapid reestablishment of community activities. This may include cultural and community events, sporting activities and schooling.

### Key findings

- The quicker that a community can get back to its normal state, the quicker it can begin healing.
- The resumption of community activities is considered an important psychological element of the healing and recovery process.
- Only 28 per cent of local governments reported having specific plans in place for the rapid reestablishment of community activities following an emergency.

Across Western Australia, 93 per cent of agencies involved in EM reported having measures in place to help ensure that communities are prepared for emergencies. About 88 per cent of agencies provide emergency or hazard information to the public and 92 per cent of local governments reported having specific measures in place to help their communities stay safe from the threat of hazards. However, only 28 per cent of local governments reported having specific plans for the rapid reestablishment of community activities following an emergency – such as the reopening of schools, cultural events, community events and sporting activities. After an incident, the quicker that a community can get back to its normal state, the quicker the community can begin healing.

The reestablishment of activities post-emergency is considered to be an important psychological element of the healing and recovery process. The simple act of returning to a normal routine and the sharing of stories and experiences among the community can build a sense of unity and resilience.

A community-based approach should include initiatives that build partnerships, encourage participation and ownership and, most importantly, restore community functions as quickly as possible.

In 2015–16 the Shire of Wandering delivered bushfire preparedness and other awareness information at the annual fair and other local events. The Shire of Narrogin conducted community information sessions that included Yarloop residents who provided valuable information and advice based on their personal experiences of the 2016 fire.

While local governments undertake a wide range of community-based initiatives around the state, a common theme reported was a lack of funding. Local governments reported the need for increased funding, training and support to enable improved planning and mitigation activities in their local communities.

## 4.5 Resources

### People

**Objective**

5.1 Agencies have appropriate levels of trained, capable and supported people to effectively undertake all aspects of EM.

**Key findings**

- EM personnel are generally highly trained and capable.
- They are well supported by management practices.
- Consideration is given to their mental and emotional wellbeing.

EM personnel in Western Australia are generally highly trained and capable in dealing with emergencies. They are well supported through internal policies, management and occupational health and safety. General consideration is also given to their mental and emotional wellbeing through the provision of counselling and support services.

WA Police provided professional development to officers in preparation for the 2015–16 bushfire season. This was based on corporate policy originating from an internal review of the previous bushfire season.

DAFWA has developed and delivered significant training to DAFWA personnel over the past three years. About 100 personnel have, or are currently completing, a Certificate III in Public Safety (Biosecurity Response Operations) and about 100 senior personnel have, or are currently completing, a Diploma in Public Safety (Biosecurity Response Management). These new qualifications are in line with a nationally agreed training framework for biosecurity response qualifications. Supported by Royalties for Regions funding, DAFWA has developed its own training and assessment material. Some trained personnel have also taken part in interstate biosecurity responses or exercises undertaken by

DAFWA. In addition, some have been identified as 'competent/mission ready' and will be used as part of DAFWA's First Response Team.

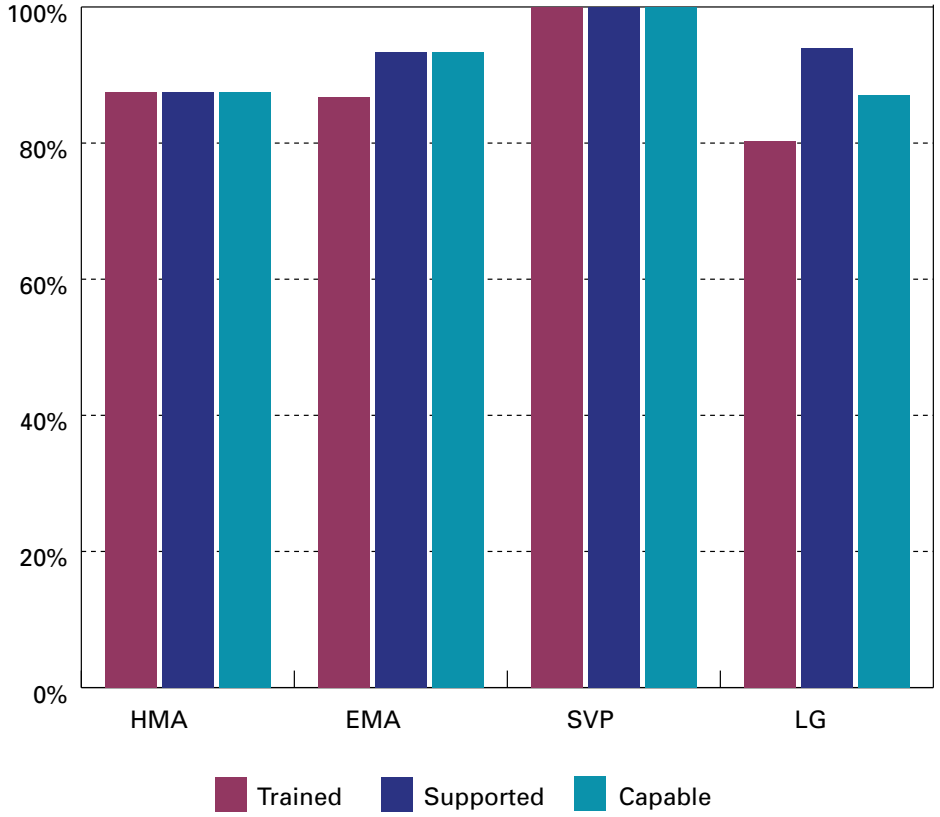



Figure 27. Status of stakeholder personnel

Note: HMA = hazard management agency; EMA = emergency management agency; SVP = service provider; LG = local government.

EM personnel across WA Health undertake a variety of training opportunities, which are supported with regular exercises. Training includes lessons in crisis information management systems, and mass casualty management in the pre-hospital environment. Personnel who have a role in the State Health Incident Coordination Centre receive regular training and exercising in command, control and coordination.

WALGA provides EM training to the local government sector. During 2015–16, 950 people attended WALGA's various EM training courses.

Service providers and critical infrastructure owners that do not have dedicated EM personnel have identified 'incident management' leaders and emergency services liaison officers on staff. These designated personnel are trained and experienced. Some organisations are also currently conducting senior management and executive-level incident leadership training.

In addition to training to ensure that personnel are capable, and given that many EM assets and staff are located in risk-prone areas, personnel are reminded via pre-season readiness briefings of the risks and processes in place for managing an escalating event.

## Volunteering

### Objectives

5.2 A clear strategy exists for the recruitment, retention and ongoing training of volunteers that addresses motivation and barriers.

5.3 A strategy exists to manage good Samaritans and spontaneous volunteers.

### Key finding

- Volunteers are an important part of EM in Western Australia, providing over 95 per cent of emergency services response personnel.

Volunteering involves freely giving time to help others or to support a cause. All volunteering has this in common, but volunteers contribute their support in a wide variety of ways.

Volunteering can be regular or episodic, formal or informal, pre-planned or a spontaneous response to emergencies. It can be done through an organisation, the workplace or individually, in person or online. It can involve professional or other work skills, generic skills or manual labour (Department of Prime Minister and Cabinet 2011).

Volunteers are an important part of EM in Western Australia. Emergency services volunteers are critical to protecting our communities; providing over 95 per cent of the emergency services response personnel (Department of Fire and Emergency Services 2015). DFES, in conjunction with local governments, has a large volunteer workforce.

Do you have a clear strategy for volunteers which addresses:

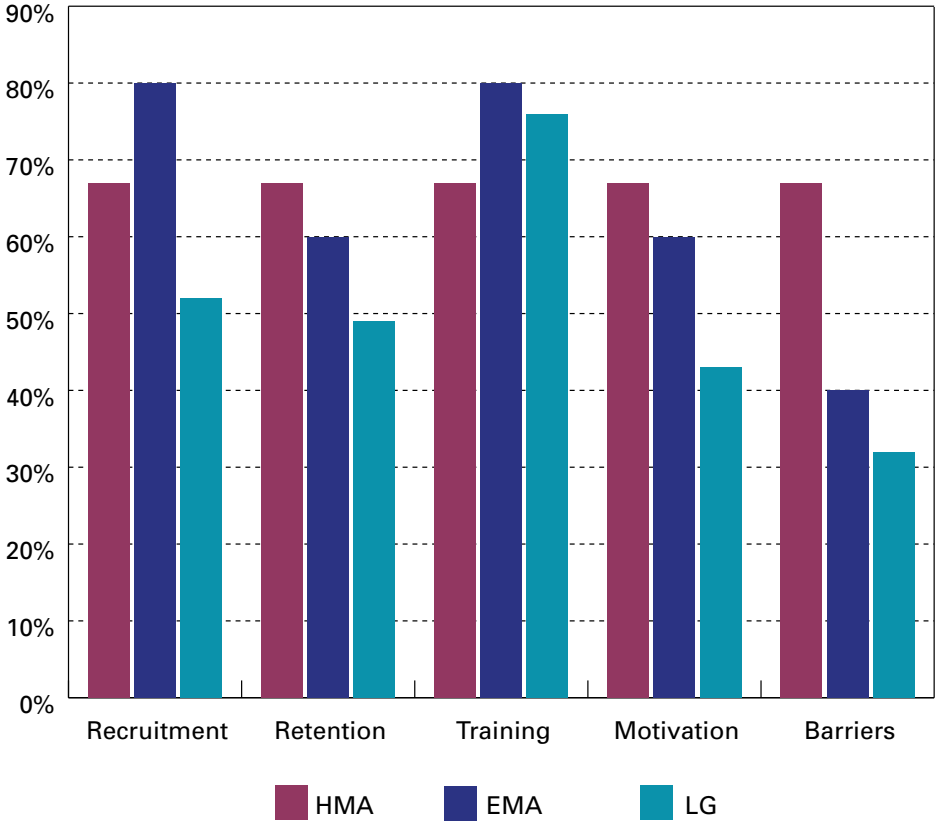



Figure 28. Volunteer strategy

Note: HMA = hazard management agency; EMA = emergency management agency; LG = local government.

While DFES has a good volunteer training program in its 'Pathways' structure, some concern has been raised from regional local governments that the program does not allow for low IT literacy levels and intermittent internet access in regional areas. The concern is that the system may lead to fewer volunteers accessing training, thereby decreasing capacity and driving volunteers away from the organisation.

One local government commented that: 'Brigades just want to put out the fires. Work out a way to minimise red tape and paperwork on these volunteers. This type of volunteerism is not a hobby for farmers—it is part of risk mitigation for their business enterprise.' This is an important point about some volunteers, especially in regional areas. These volunteers do not aspire to be firefighters and do not seek high levels of specialised training. What they do seek is the skills to safely put out fires and protect their businesses and communities.

Ambulance and other emergency services are critical requirements for a well-serviced town—and frequently the only providers available are volunteers.

Through volunteers, communities build the resilience, capability and capacity needed to manage emergencies. DFES has released the *Emergency Services Volunteer Workforce Sustainability Strategy (2015 to 2024)* to support volunteering in Western Australia. The strategy has a two-pronged approach:

- increase the recruitment of volunteers and broaden membership diversity
- increase the retention rates of emergency services volunteers and improve their experience across a diverse range of roles.

Local governments have a responsibility to administer operating grants provided to SES units and then complete an acquittal process without having any authority to direct the unit from an operational perspective. Vehicles and plant are managed as local government assets, but are not local government owned. SES personnel are trained and operated under command and control of DFES. Some – although not all – local governments have indicated that the effectiveness and efficiency of their local units would benefit from a direct link to DFES rather than via the local government conduit.

In large-scale emergencies, many people spontaneously volunteer because of their desire to assist those affected (*Managing spontaneous volunteers in emergencies: project report 2015*). Spontaneous volunteers need to be managed because uncoordinated responses can make an emergency even more chaotic (Department of Prime Minister and Cabinet 2011). Uncoordinated responses have the potential to overwhelm agencies and reduce their ability to respond to and assist those affected by the emergency.

Organisations must manage the expectations of spontaneous volunteers: not all volunteers can be used right away or have the skills needed. Responding quickly to registrations with opportunities to volunteer later can also help to maintain people's interest; otherwise people may be disappointed and refrain from volunteering in the future.

The Australian Red Cross developed the Spontaneous Volunteer Management Resource Kit. The kit enables consistent good practice across jurisdictions, municipalities and organisations that engage spontaneous volunteers in emergencies (Department of Families, Housing, Community Services and Indigenous Affairs 2010).

## Finance and administration

### Objectives

5.4 Robust financial and administrative processes exist to capture and track EM expenditure.

5.5 Funding for proactive measures and mitigation is available and sufficient.

5.6 Adequate funding arrangements are in place to manage the response and recovery of a large-scale emergency.

### Key finding

- The majority of respondents identified that funding for proactive mitigation options was available; however, two-thirds of these believed the funding was insufficient.

All except seven respondents have advised they have appropriate systems in place to capture expenditure for individual emergencies. DFES, DoP, BOM and WALGA have suggested that insufficient tracking options are available for particular emergencies, and therefore individual cost components cannot be fully identified as yet.

The majority (80%) identified that funding for proactive mitigation options was available; however, two-thirds of these believed the funding was insufficient. Agencies did comment that in the event of an operational deployment or activation, additional funds could be sourced, and Western Australia Natural Disaster Relief and Recovery Arrangements (WANDRRA) funds could be used to alleviate some expenses. However, this same option was not available for mitigation options.

### Funding sources in WA

State agencies have the opportunity to source funds to assist in preventing, preparing, responding and recovering from emergencies. These funding sources are dynamic, with priorities constantly changing over time. For example, funding sources available in 2015–16 may not necessarily be available in 2016–17.

### Mitigation funding

#### Emergency Services Levy (ESL)

The ESL is the primary source of funding for the state's fire and emergency services, SES units, the Volunteer Marine Rescue Service and the Volunteer Emergency Service units. Generating around $320 million, revenue for the ESL is sourced via a levy applied to every Western Australia property owner with the annual council rates notice. This program is managed by DFES.

Funding to SES units and local government bush fire brigades is through an ESL-funded grants program.

#### Natural Disaster Resilience Program (NDRP)

Funding for the NDRP is apportioned to the state by the Attorney-General's Department. The NDRP aims to enhance resilience in accordance with the *National Strategy for Disaster Resilience.*

A two-year agreement starting from July 2015 will see Western Australia receive $6.3 million for disaster resilience activities. These funds are being distributed throughout the state via a competitive grants program as well as being used to deliver identified priority projects.

### National EM Projects (NEMP)

The NEMP program is overseen by the Australia – New Zealand EM Committee (ANZEMC) and managed by the Attorney-General's Department. It funds EM projects of national significance that support the implementation of the NSDR. These grants are designed to improve the ability to prevent, prepare, respond to and recover from disasters across social, economic, environmental and governance elements.

Applications for grants are sought nationally on an annual basis with information provided on the Australian EM website. In 2015–16, $3.6 million was allocated across 22 projects nationally.

### National Bushfire Mitigation Program (NBMP)

Funding for the NBMP is distributed to each state and territory by the Attorney-General's Department. The program is hosted by DFES and is distributed via a competitive grants round. The program delivers bushfire mitigation activities to implement long-term mitigation strategies and fuel reduction programs, and has a total of $905,000 to distribute from 2015 to 2018. In 2015–16, over $550,000 was allocated.

### All West Australians Reducing Emergencies (AWARE)

The AWARE program is a grant scheme designed, managed and financed by the SEMC Secretariat. This program aims to enhance the state's EM arrangements by building local EM capability and knowledge. The annual competitive grants program focuses on established state priorities and in 2015–16 the AWARE program awarded $111,627.

## Relief and recovery funding

### WA Natural Disaster Relief and Recovery Arrangements (WANDRRA)

The Commonwealth Natural Disaster Relief and Recovery Arrangements Fund provides financial assistance to communities whose social, financial and economic wellbeing has been significantly affected by an eligible natural disaster event. This is managed at state level through WANDRRA, which is administered by the Department of the Premier and Cabinet. Should the measures available under WANDRRA be activated during or after a major emergency, relevant EMAs and local governments are advised, directly and through joint state and Australian government media statements, of the claims process for reimbursement of eligible costs.

### Lord Mayor's Distress Relief Fund

This fund provides a tax-deductible location for members of the public to make donations to help victims of natural disasters. The costs of administering the program are absorbed wholly by the City of Perth, allowing all donations and funds raised to go to those requiring assistance.

In 2015–16 the Lord Mayor's Distress Relief Fund was activated twice – once for the Esperance fires in 2015, and once for the Waroona fire in 2016.

### Australian Government Disaster Recovery Payment (AGDRP)

Disaster relief for the response and recovery phases of an eligible disaster is available from the Department of Human Services via the AGDRP. This payment is once only and is not means tested. Applications can be submitted on the Human Services website, with each disaster having cut-off dates. If eligible, each adult may receive $1000 and children under 16 may receive $400.

### Disaster Recovery Allowance (DRA)

The DRA is a short-term income support payment to assist individuals who can demonstrate their income has been affected as a direct result of a disaster. When available, the DRA assists employees, small businesspersons and farmers who experience a loss of income as a direct result of a disaster event. It is payable for a maximum of 13 weeks from the date at which an applicant has, or will have, a loss of income as a direct result of a disaster.

## Equipment/critical resources

**Objectives**

5.7 Organisations have or can readily access appropriate infrastructure and equipment during an emergency.

5.8 Equipment can be mobilised during an emergency and plans are in place to address pre-deployment, peak surges and redundancies for outages.

**Key findings**

- All operational HMAs, EMAs and service providers report they have access to the appropriate infrastructure and equipment required during an emergency.
- Smaller agencies and local governments tend to rely on phone and email systems.
- If phones go down, communication would be problematic.

All HMAs, service providers and relevant EMAs reported they have access to the appropriate infrastructure and equipment required during an emergency. The Water Corporation noted – and this is characteristic of all respondents – that contingency plans are seasonal as well as risk and priority based. Multiple or compounding emergency incidents would deplete the state's capability.

Seasonal preparedness is common among local governments: taking a risk-based approach means that they can make the most of limited resources. For example, the Town of Port Hedland has generators and support equipment on standby hire during the cyclone season, and agreements with multiple organisations within the town that can provide assets to the potentially affected area.

Most local governments also reported that resources and equipment contacts are regularly maintained and updated. And further, that preplanning is, in conjunction with the Controlling Agency, a priority before and when an incident happens. That is, the incident support group (ISG) will identify and prepare to mobilise equipment that may be necessary both pre- and post-impact.

St John Ambulance has recently delivered new four-wheel-drive emergency service vehicles to Albany and East Bunbury, with mass casualty response capacity and resources (see case study). Due to actively improving stakeholder engagement with HMAs and other combat/support agencies, St John Ambulance has increased their engagement in incident coordination activities. This has enabled them to proactively resource major incidents. An added benefit is improvement to the organisation's situational awareness and operational response.

In terms of major resources, DFES and P&W have critical equipment including ICT, fire vehicles, heavy earthmoving equipment, mobile incident control centre facilities, and surveillance aircraft. DFES Operations has business continuity plans, high fire season fleet allocations and crisis plans. There are also plans for the mobilisation of state resources, deployment registers (intra/interstate/international), contractors listed/checked, and utilities supporting priority requirements. In addition, P&W has contracts in place for seasonal availability of additional earthmoving equipment and fixed-wing water bombers.

EM equipment for the Dampier Bunbury Pipeline is specifically kept at the Jandakot depot and at strategic places along the pipeline.

Frequently, access to plant and resources needed for emergencies in Western Australia is on a 'just in time' basis through hire contracts for equipment. This may prove to be a concern, depending on the nature and extent of any emergency event when other agencies, local governments and businesses are looking for the same resources.

Are plans for equipment in place to address:

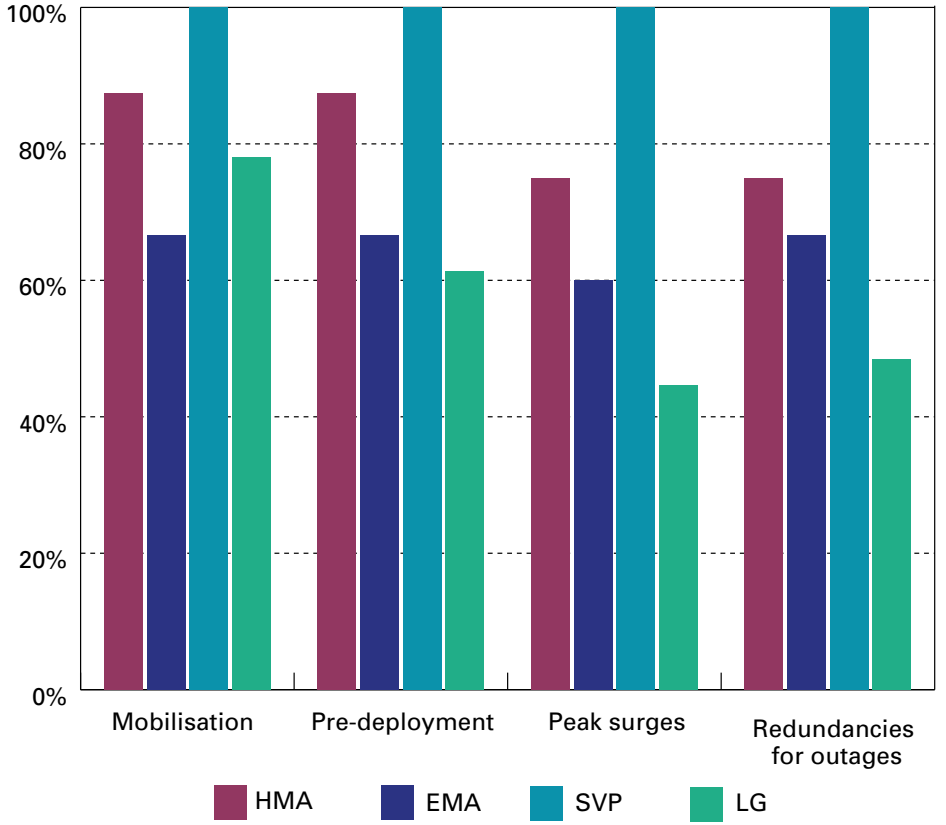



Figure 29. Equipment planning in place

Note: HMA = hazard management agency; EMA = emergency management agency; LG = local government.

There is a high degree of interrelatedness in mobilisation, pre-deployment and redundancy for outages. For example, loss of mobile phone services would severely hamper communication for all aspects of EM, including deployment of resources.

While HMAs all have access to some form of electronic communications system, in some cases this is new and yet to be fully embedded. For example, DAFWA has recently purchased and is implementing WebEOC® and the DoT (Marine Safety) has recently adopted Noggin. The PTA is in the process of implementing its own dedicated WebEOC product (currently they have an arrangement for sharing access with Main Roads Western Australia (MRWA)).

Smaller agencies and local governments, however, tend to rely on phone and email systems. If phones go down, communication would be problematic. Note that Telstra reported they have a number of redundancies and portable devices spread all over Australia that will go some way to mitigating this disruption. Some local governments also have access to limited satellite phones and many use the WA Emergency Radio Network (WAERN).

Local governments have the lowest level of plans for surges and redundancies, and this is highly correlated to their size and proximity to Perth or a large regional local government. The Shire of Northam, for example, indicated that because the shire was close to Perth it would be relatively easy to draw on resources from Perth to support local equipment.

Local governments also reported that their capability 'depends on the emergency' and that they are frequently highly reliant on volunteers. For example, the Shire of Wyalkatchem has agreements with farmers and businesses to use farm machinery in an emergency. Many smaller regional local governments indicated that in the event of a large-scale emergency, available resources would be grossly inadequate due to the size of the town and population. For example, the Shire of Nannup indicated that it had limited appropriate infrastructure and equipment and relied heavily on support from neighbouring shires, DFES and P&W.

Small metropolitan local governments have the luxury of proximity to both HMAs and each other to provide support. For example, the North and East Regional Recovery Group Agreement has been established for mutual aid assistance with all local governments in the north and east of the Perth metropolitan area. Many local governments in the metropolitan area have either joint LEMA, agreements for mutual assistance or memorandums of understandings to assist in the event of emergencies. While regional local governments also have these types of agreements in place, distance will play a part in how quickly they can be activated and accessed.

Proximity also plays a part in pre-deployment for metropolitan local governments: the relatively small areas involved make deployment of resources possible in a timely manner and lessens the importance of pre-deployment.

## 4.6 Emergency response

### Command, control and coordination

**Objective**

6.1 Pre-established and well-understood protocols and structures exist that define the interrelationships between stakeholders during an event and facilitate effective command, control and coordination.

**Key findings**

- C3 and Westplans have created pre-established and well understood protocols across all EM agencies.
- Structures exist that define interrelationships.

Command, control and coordination (C3) is a concept that establishes a predefined set of protocols that are structured, well understood and clearly define the interrelationships between agencies during an emergency. C3 articulates the roles and responsibilities of those who may be involved and facilitates the orderly giving of directions, priorities for key tasks and arrangements for reporting.

All HMAs, 93 per cent of EMAs and 85 per cent of local governments report having effective C3 in place.

All HMAs, most other EMAs and an increasing number of service providers and local governments use an incident management system. Although Western Australia does not align to a single incident management system, it is acknowledged that two particular systems are used – namely, AIIMS (Australasian Inter-service Incident Management System) and ICCS (Incident Command and Control System) Plus.

C3 is primarily conducted by the HMAs (notably WA Police and DFES) but needs to be broadly understood and followed by supporting agencies. DFES reported advancements in both their C3 facilities and exercising regimes. Enhanced C3 training has been delivered to staff and external agencies, further developing interagency working relationships. Training is being further improved by being combined with ICT solutions such as tablet rollout.

A key advancement in the development of effective C3 has been the adoption of the use of shared crisis information management systems (WebEOC or Noggin). Working together from a shared platform provides opportunities for agencies to have increased interoperability and further aids the ability to coordinate emergency responses. This will be further enhanced in 2017 with the progress of an integrated communications hub.

Research conducted by the Bushfire and Natural Hazards Cooperative Research Centre (BNHCRC) suggests that pre-formed incident management teams perform better on a number of measures – including timeliness of decision making and level of team situational awareness – than those established for the first time on the day of an incident.

## Situational assessment

**Objective**

6.2 Situational assessments are undertaken to accurately inform decision makers about the nature and extent of the hazard, vulnerable elements and what resources are required.

**Key findings**

- Respondents report that situations are closely monitored and constantly reassessed, given the dynamic nature of emergency events, particularly natural hazards.
- Technological and human systems are in place to facilitate the effective transfer of information during an emergency.

Given the dynamic nature of emergency events, particularly natural hazards, maintaining situational awareness ('knowing what is going on around you') is critical. Effective EM demands that pre-existing and well-understood structures exist to manage such unpredictable situations.

With the exception of Brookfield Rail, all HMAs (and EMAs with an operational deployment element) reported carrying out situational awareness activities during an emergency, as did 70 per cent of local governments.

All respondents that do conduct such activities reported that their assessments actively considered the nature and extent of the hazard and, further, that consideration was given to vulnerable elements, including people, infrastructure and the environment.

Respondents reported that situations were closely monitored and constantly reassessed, including the resources available and required to combat the threat posed.

Technological and human systems are in place in Western Australia to facilitate the effective transfer of information during an emergency. So too are protocols for interagency teams to come together to manage and coordinate major incidents.

To ensure response and recovery operations are effective, EMAs must follow a consistent approach to roles and responsibilities during an emergency situation (as detailed in the State EM Plan).

## Evacuation

**Objectives**

6.3 Agencies have the resources and skills to undertake both directed and voluntary evacuation of both people and animals.

6.4 Suitable sites have been identified and are available that maintain the provision of critical goods and services (e.g. food, potable water, shelter).

**Key findings**

- CPFS hold primary responsibility for establishing and running evacuation centres in times of emergency, with significant support from local governments, Red Cross and a range of NGOs.
- A wide range of suitable evacuation sites has been identified.
- Conflicts in messaging have been observed once EM staff and volunteers are withdrawn in the face of danger.

Community emergency evacuation planning should be undertaken in accordance with the principles of the Attorney-General's Department's *Australian Emergency Management Institute's Evacuation Planning (Handbook 4),* the SEMC's *Western Australia Community Evacuation in Emergencies Guideline* and the State EM policy and plan.

The need for effective planning for evacuation during emergencies has been highlighted in recent reports, with a particular need for the identification of single points of failure ('choke points', like single road access, critical systems and expertise of responders).

CPFS hold the primary responsibility for the establishment and running of evacuation centres in times of emergency, with significant support from local governments and the Red Cross.

Much proactive work has gone into establishing a wide range of suitable sites for evacuation. This includes training personnel (CPFS, local government and supporting agencies) to operate the sites.

In 2016 agencies and local governments were asked to report on their level of resourcing and planning for coordinating and carrying out evacuations, including:

- directed evacuation
- voluntary evacuation
- evacuation of animals.

Local governments – who have a role for evacuation planning within their respective districts – varied in their level of planning for the various aspects of evacuation. While most acknowledged their role in evacuation and reported having some evacuation plans, a significant number reported that they lacked plans and resources for directed evacuations and the evacuation of animals.

Welfare centres are part of the emergency accommodation function. In 2015–16, the Shire of Nannup completed the set-up arrangements for the Nannup Recreation and Community Centre as a primary welfare centre for the region during an emergency event.

An area of concern is an apparent contradiction in messaging with respect to bushfires. This contradiction, evident both in Western Australia and at a national level, primarily relates to the concept of 'Stay and Defend'. The BNHCRC conducted research that identified that most fatalities occurred in the open when victims fled the flames at the last moment, highlighting the fact that last-minute evacuation was the highest risk strategy (Bushfire CRC).

Last year's Preparedness Report identified that clarity and guidance is required for when residents choose to stay to protect property after EM staff and volunteers are withdrawn as conditions become too dangerous. Much information has been made available to inform and guide the general population about Stay and Defend.

HMAs have the legislative provision and ability to direct evacuations. The Ferguson review identified in its findings a need to find a practical balance between risk to life and the public value of enabling the timely restoration of livelihoods and the movement of critical resources, (including essential services, critical businesses and livestock welfare services), through traffic management points.

## Public protection

### Objectives

6.5 Necessary measures exist to control access and verify the identity of personnel or members of the public seeking entry to critical locations.

6.6 Organisations have the ability to protect against unwanted activity within an impacted area.

### Key findings

- There is clearly a need to have an effective system of controlling access to emergency impacted areas, to protect lives, facilitate effective response and recovery and to limit unwanted activity.
- DFES has been working consultatively with partner agencies in the development of a restricted access permit system. This is expected to be in place ahead of the 2016-17 fire season.

Critical incidents raise many issues with respect to controlling access of persons seeking entry to critical locations. For the most part, these issues have come to light during reviews and inquiries where critical personnel and resources were prevented from entering an area due to an inflexible approach being used at vehicle control points.

Similarly, issues have arisen where residents have been refused access when attempting to re-enter an area, either during or immediately following an event. Farmers seeking to feed and water livestock have been refused re-entry due to an actual or perceived enduring risk. Invariably, there are also intermittent media reports or allegations of 'looting' within affected areas. WA Police report that media reports of looting have been unsubstantiated. Such reporting causes community unrest and may lead to people making poor choices about evacuation.

There is clearly a need to have an effective system of controlling access to emergency impacted areas, to protect lives, facilitate effective response and recovery and to limit unwanted activity.

The operation of vehicle control points was the single most common complaint raised in the Ferguson Inquiry into the January 2016 Waroona fire. Accordingly, a number of recommendations focused on traffic management and access control. The recommendations included tangible actions such as issuing photo identification cards to appropriate personnel through to broader policy considerations to reflect national 'best practice'.

The report suggested a policy review was needed to provide a practical balance between risk to life and the public value of people and community members moving through traffic management points.

Access control remained an issue beyond the initial response phase and continued through into the recovery stage. There are additional levels of complexity added when dealing with hazardous substances such as asbestos (see case study).

DFES has been working consultatively with partner agencies in the development of a restricted access permit system. This is expected to be in place ahead of the 2016-17 fire season.

# Case study – Asbestos and CCA

Many emergencies in Western Australia have exposed the community to a range of toxic substances. This exposure can be created by spillage or rupture of stored materials or chemicals, or through exposing or disturbing dangerous substances, such as asbestos.

Events such as storms, tropical cyclones, floods and bushfires have resulted in community risks and public health-related concerns.

The fires in Kelmscott–Roleystone in 2011, Parkerville–Stoneville–Mt Helena in 2014 and the O'Sullivan and Lower Hotham fires in January 2015 have all seen major issues relating to both asbestos and copper chromium arsenate (CCA), which has been commonly used in the treatment of timber, including pine.

More recently, the Esperance fires of November 2015 and the Waroona fire in January 2016 have seen communities and governments deal with the complexities of removing hazardous materials from damaged and destroyed properties.

Asbestos and CCA contamination emerged as problem across the devastated shires of Waroona and Harvey. The town of Yarloop was significantly impacted, with many properties testing positive for some level of contamination. Some estimates suggest that between 50 and 60 per cent of properties damaged in Yarloop have contaminants present.

With asbestos products still being used in many building materials in Western Australia before 1988 (Healthy WA 2016), and CCA still being used to treat pine products today, site contamination will continue to pose problems for communities and governments following an emergency.

If asbestos is disturbed it can release dangerous fine particles of dust containing asbestos fibres, which, if inhaled, can cause asbestosis, lung cancer and mesothelioma. Importantly, there is no safe level of exposure to asbestos fibres and the risk of contracting asbestos increases with the number of fibres inhaled and the duration of exposure.

In May 2016, the Department of the Premier and Cabinet identified, as part of the recovery efforts in Yarloop, that historical environmental contamination (i.e. contamination **not directly** attributable to the January 2016 bushfire) has been detected including:

- asbestos, both on the surface and to a depth of about 500 mm
- elevated concentrations of lead in soil in limited areas.

This historical contamination was likely caused by industrial operations between 1895 and 1978 (which included a foundry and a timber mill) and when asbestos was a construction material for former housing and other structures. Most of these structures were demolished between 1957 and the early 1970s; however, it is likely that demolition and waste disposal methods were not to the standards expected today.

All communities and governments will potentially confront these complex issues – and sometimes face a long and difficult clean-up when dealing with contaminated sites after an emergency.

WANDRRA funds may provide some assistance for private homeowners in the clean-up of their properties in an effort to make them safe and habitable. However, to qualify for assistance, the contamination must have occurred **as a direct result** of the emergency.


Image courtesy of Melissa Howard

## Agency interoperability

**Objectives**

6.7 Effective and interoperable communication systems (including incident management systems) exist to allow seamless communications during an emergency.

6.8 Interagency cultural differences are identified and managed so as not to impede or inhibit effective response.

**Key findings**

- Much activity has occurred among all respondents over the past five years with respect to interoperability, but more work remains to be done.
- More agencies reported gaining access to incident management systems in 2016.
- There appears to be an almost universal reliance upon telecommunications and mobile phone systems. These are effective but not always reliable.

Much activity has occurred among all respondents over the past five years with respect to interoperability of communication systems. But there is still work to be done and opportunities for improvement.

A major achievement of 2016 was the development of the Emergency Services Communication Strategy. This aligns directly with the State Government *Information and Communications Technology (ICT) Strategy 2016–2020* and has laid down a roadmap and suggested implementation plan to enable reliable, resilient, interoperable and cost effective operational frontline communications.

Extensive effort has been placed on interagency training and the establishment of pre-formed incident management teams. That said, the Ferguson Review commented that 'there is still significant work to be done to have truly multi-agency pre-formed incident management teams'. Ferguson (2016) reported that P&W has five pre-formed incident management teams, each with around 50 personnel filling different incident management team roles.

Primary HMAs reported having redundancies for communications, with UHF/VHF and WAERN radio networks supplementing traditional communications tools. Beyond the HMAs, there appears to be an almost universal reliance upon telecommunications and mobile phone systems. These are effective but not always reliable – and leave no alternative provisions in the case of outages.

Dampier Bunbury Pipeline, however, reported having multiple layers of redundancy with respect to their emergency communications. Some of the options in place include using satellite phones, mobile phones, UHF/VHF radios, and analogue and digital phones, in addition to email, the website and face-to-face meetings.

The Australasian Inter-Service Incident Management System (AIIMS) has provided the framework, principles and structures that are central to how Australian fire agencies respond to or support emergency incidents since the mid-1980s. AIIMS was developed to ensure that it could be applied to all hazards and among all agencies. AIIMS is founded on three key principles:

- management by objectives
- functional management structures
- maintenance of a manageable span of control.

Agencies use electronic incident management systems to record and track actions during emergencies. In this year's survey, more agencies reported gaining access to these systems. This broadening of access will enhance coordination and interoperability between agencies.

Arrangements are in place for relevant agencies to have assigned areas and access within operations centres during emergencies. This enables the placement of an agency liaison representative within the centre for improved coordination.

Strengthened relationships have been achieved between a number of agencies. For example, St John Ambulance and DFES have integrated special operations paramedics in training, exercises and operational deployments.

Some local governments (like the City of Bunbury) have reported aligning their business continuity processes and policy to mirror AIIMS delegations in an effort to maximise the likelihood of good interagency coordination.

The Shire of Dandaragan reported working closely with other agencies in emergency situations; however, the shire has also identified a need to provide more personnel training to help fill incident management team roles.

The Shire of Exmouth reported that mobile phone coverage throughout the district was inadequate, with numerous black spots, and that radio communications were often in and out, depending on the location. Similarly, the Shire of Lake Grace reported that while the WAERN radio network provided interoperability, in some areas the signals were lost due to a lack of repeaters.

## Mass casualty management

### Objectives

6.9 Pre-hospital: mass casualty management services are available, timely and sufficient during an emergency event. This includes pre-hospital treatments of first aid (physiological and psychological), ambulance, aeromedical retrieval and medical teams.

6.10 Hospital: mass casualty management is considered within workforce and surge planning, including the provision and maintenance of specialist services, community health and early discharge programs.

### Key findings

- Pre-hospital mass casualty first aid, ambulance and medical team services are available, timely and sufficient.
- Aeromedical retrieval services are limited in some areas of the state.
- Hospital mass casualty services are available, timely and sufficient, and plans are in place to deploy additional resources if required.

So often, sudden-impact emergencies around the world have resulted in mass casualties, overwhelming existing health and medical resources. WA Health, through its surge planning (see case study), is acutely aware of the challenges associated with balancing a busy health system and the requirements of managing a mass casualty emergency.

While WA Health has the primary responsibility for handling mass casualties, other agencies assist. These include WA Police, DFES and St John Ambulance. The Department of Defence (DoD) also reported playing a role in mass casualty management; however, this relates more to military than civilian emergencies.

Arrangements are in place for WA Health to request additional assistance from DoD through the Defence Aid to Civil Communities (DACC), if required.

Mass casualty management occurs either pre-hospital or at the hospital and includes first aid, ambulance, medical team and aeromedical retrieval services.

### First aid services

In relation to pre-hospital physiological first-aid services, WA Health, WA Police, DFES and St John Ambulance all reported having available timely and sufficient services. WA Police said that all police were trained in basic first aid; however, there may be some delay in delivering casualty care in dangerous situations before a scene was declared safe or secure. DFES reported that their personnel were able to administer first aid as required, and all DFES career responders were first aid and oxygen capable. In addition, DFES special operations officers provided 'snatch' rescue, first aid, basic triage and decontamination services.

Emergency service organisations acknowledge that the provision of first aid by community members, who are often on the scene before emergency service personnel – either because they are bystanders or victims themselves – can save lives. As such, access to affordable, credible first-aid training for the broader community warrants investigation.

The importance of psychological first aid remains, not only for the victims of an event, but also for bystanders and first responders. CPFS, supported by WA Health, coordinates the delivery of psychological first aid to victims and bystanders.

Emergency service agencies are taking positive steps to ensure that first responders have adequate and appropriate psychological assistance and access to welfare services.

These services have been evolving since the September 2012 Community Development and Justice Standing Committee report, *The Toll of Trauma on WA Emergency Staff and Volunteers* (Legislative Assembly, Parliament of Western Australia 2012).

### Ambulance, medical team and aeromedical retrieval services

St John Ambulance (WA) remains the main provider of ambulance services in Western Australia. This is done through a contract with the State Government. As shown in the case study on 'Lifesaving Kits', St John Ambulance has developed mass casualty kits and emergency service vehicles to build their capacity to respond to mass casualty emergencies.

St John Ambulance and DFES reported that aeromedical retrieval services are provided by the RAC Rescue 651 helicopter, based in the Perth metropolitan area, and the RAC Rescue 652 helicopter based in Bunbury, in the state's South West.

The Royal Flying Doctor Service (RFDS) provides aeromedical and primary health care in Western Australia. The RFDS has six facilities in Jandakot, Kalgoorlie, Meekatharra, Port Hedland, Derby and Broome. Service delivery by the RDFS is primarily through the use of fixed-wing aircraft.

WA Health reported that medical team services were available, timely and sufficient. However, aeromedical retrieval capacity, and to a lesser extent, ambulance services were limited in some parts of the state. It was the role of the National Aeromedical Transport Coordination Group to coordinate national air assets in a mass casualty event.

### Hospital services

WA Health is the only government organisation involved with hospital mass casualty management but it calls upon other agencies to assist in times of crisis (see case study).

In an emergency, a range of services will be used to transport casualties between hospitals or to decant existing non-critical patients to other healthcare sites. This 'decanting' will free up beds for incoming casualties.

In the 2015–16 survey, WA Health reported that hospital mass casualty management is available, timely and sufficient. Plans are in place to rapidly deploy additional resources to rural and remote locations as required, if local resources are stretched or insufficient.

While not in response to a specific emergency, WA Health has been involved in a range of activities that have yielded lessons that will prove useful in times of emergency. Activities like the transfer of patients from Swan Districts Hospital to St John of God Midland identified a series of modifications that could be made to business continuity plans, tools and templates. These lessons have increased resilience and have been linked into testing and activating EM plans.

# Case study – Surge planning

Bombings in Madrid and London over a decade ago, which killed 244 people and injured 2700 more, swamped emergency services. Learning from these and other global tragedies, WA Health began a project to enhance the 'surge' capacity of the state's health system.

At the time (2007), occupancy of public hospital beds was running at about 98 per cent and availability of critical care beds was a limiting factor. The project was designed to increase the capacity and capability of the health system to deal with a sudden influx of patients created by a mass casualty incident.

In an urban mass trauma event, emergency departments (EDs), imaging facilities, operating theatres, intensive care units (ICUs), and burns and trauma units are generally considered the focal points in hospital care.

Most casualties are likely to arrive at a hospital in the first 60–90 minutes. Health systems need to be able to surge to meet this increased demand, including support services such as diagnostic tests and specialised surgery, and the requirements that go with them. Ways of suddenly increasing hospital capacity include:

- cancelling elective surgery and decanting select patients to other hospitals or community care
- creating additional temporary facilities within hospitals, such as ICU beds, by using caches of medical equipment and supplies, and repurposing spaces, such as theatre recovery rooms
- using diagnostic and treatment capacity in alternative health facilities, such as private hospitals and day surgical units, to treat people with lesser injuries and patients decanted from public hospitals

- using other health providers, such as general practitioners and nurse practitioners, to treat people with lesser injuries and patients decanted from public hospitals
- modifying models of care, such as the length of shifts, and extending the scope of practice for other health practitioners, including nurses, allied health staff and medical students.

The surge management project devised strategies in four categories to cope with mass casualty incidents.

- **Staff** – strategies that increase the availability of suitably qualified personnel. This involved revised staff call-in procedures, improved staff accessibility, use of other health providers (such as general practitioners and allied health staff), and modified models of care.

- **Space** – strategies that allow for an increase in a facility's headcount and scaled-up activities. This involved a review of decanting plans for ICUs and general wards, plans for clearing EDs of existing patients, identifying suitable hospital areas for expansion of intensive care, burns care and other specialist services, and identifying other areas – including alternative secondary and private hospitals – for management of lower priority cases.
- **Supplies** – strategies that increase the availability, or rationalise the provision, of consumables, pharmaceuticals, and specialist equipment. To support the creation of increased capability in the system, WA Health established and maintains a warehouse cache of equipment and pharmaceuticals to support hospital surge requirements and equip deploying medical teams.
- **System** – the implementation of a system, such as a disaster plan, that documents strategies, roles, delegations, communication and information flows, standard operating procedures, command and control, and continuity of operations. These plans have been in place since 2007 and are regularly tested. Once the State Health Coordinator activates a mass trauma response, hospitals and healthcare facilities will be authorised to implement plans to obtain staff, prioritise diagnostic and therapeutic services, and implement strategies to manage demand.

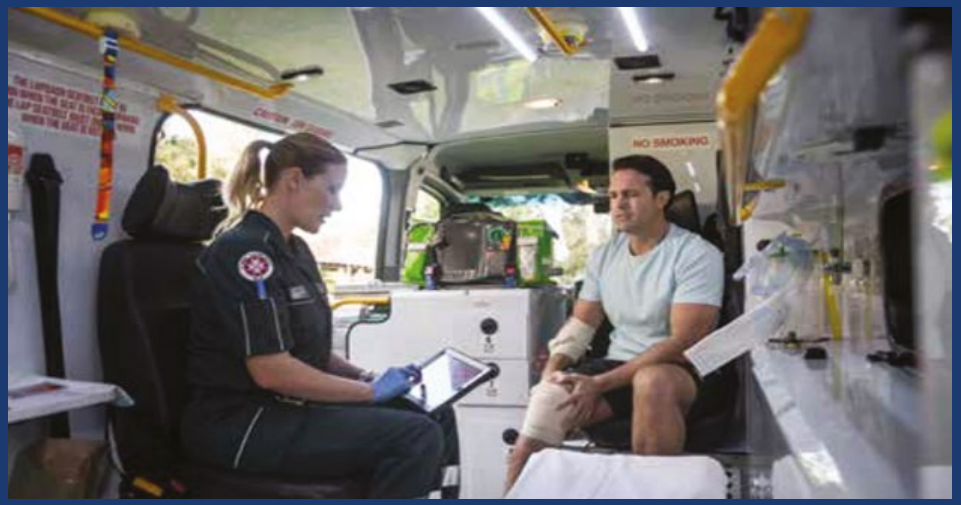
These strategies, supported by training and medical caches developed over the past 10 years, have been designed to address an incident involving multiple casualties. The system has been successfully used to manage a number of events, including the Ashmore Reef explosion in 2009, in which five people died and about 30 more were injured. Ongoing review, testing, exercising and associated training ensures that these capabilities are maintained.

The surge concept has developed and evolved and is now an important part of health disaster planning. It involves an integrated effort between clinical services, logistics, human resource management and facility staff to ensure that requirements can be met.


# Case study – Lifesaving kits

While conducting regional risk assessments, St John Ambulance identified that, despite having many resources in regional areas, these had limitations when it came to managing incidents with large numbers of casualties.

St John Ambulance assessed that their ability to provide pre-hospital care was excellent; however, there was a need to increase their capabilities to manage large numbers of casualties, particularly in rural and remote areas across the state.



So they conceived, developed, compiled and strategically located 65 mass casualty kits across the state. The kits can be easily transported and contain enough materials to provide immediate medical care for about 20 patients.

In addition to the kits, St John Ambulance bought additional emergency service vehicles (ESVs) – 1.5 tonne 4WD vehicles with purpose-built pods that contain medical resources, further increasing triage and treatment capacity to around 40 patients.


The ESVs are equipped to treat trauma injuries, respiratory conditions and burns. They carry intravenous fluids and contain an automated external defibrillator. Staff and volunteers need little extra training to operate the ESVs, as many of the supplies and processes are the same as working from an ambulance only on a larger scale.

The new fleet gives St John Ambulance personnel easier access to supplies likely to be needed at mass casualty scenes. The vehicles are located in the Pilbara, South West and Great Southern, with plans to expand into the Kimberley region in 2016–17 and other regions later.

The ESVs were deployed in the Esperance and Waroona fires and pre-deployed for the cyclone season in the North West.

## 4.7 Impact management and recovery

### Mass fatality management

**Objective**

7.1 Services are available to deal with a mass fatality incident. This includes body recovery, disaster victim identification, mortuary, burial and cremation services and the management of information.

**Key findings**

- Coordination of a mass fatality incident is the responsibility of the relevant HMA.
- WA Police reported that body recovery services and disaster victim identification were available, timely and sufficient.
- WA Health report that sufficient mortuary service capacity exists and plans were in place to 'surge' to meet increased demand.

Planning for mass fatalities is an important EM capability. The scale and complexity of a mass fatality incident has the potential to overwhelm responders and therefore more resilient arrangements need to be put in place.

In the context of this report, mass fatality services are considered in terms of five areas:

- body recovery
- disaster victim identification
- mortuary services
- burial and cremation services
- management of information and relatives.

Coordination of a mass fatality incident is the responsibility of the relevant HMA. Depending upon the type and location of the hazard, a range of agencies (primarily EMAs) may be responsible for recovering the bodies of disaster victims. WA Police take primary responsibility for disaster victim identification with WA Health providing forensic pathology services.

DFES works in partnership with WA Police through their USAR (urban search and rescue) teams, and St John Ambulance (WA) also reported high levels of involvement with the DFES USAR teams, including joint training. In the 2016 survey, WA Police reported that body recovery services and disaster victim identification were available, timely and sufficient.

WA Health is responsible for mortuary services and reported that sufficient capacity exists for normal workload and plans were in place for these services to 'surge' to meet increased demand from an emergency. For example, temporary mortuary facilities may be required for catastrophic events leading to large numbers of fatalities. DFES reported that personnel might assist as mortuary technicians, when requested.

Funeral directors will work closely with the families of victims to coordinate funeral or memorial services. Subsequent burial and cremation services are the responsibility of various entities that may include metropolitan or regional cemetery boards or where such boards do not exist this may fall upon local governments.

As reported in the *Emergency Preparedness Report 2015*, the Metropolitan Cemeteries Board has developed a rapid burial technique for use following a mass fatality event.

Management of information in the event of a mass fatality is the responsibility of all agencies involved. WA Health, WA Police and DFES all reported that management of information services are available, timely and sufficient.

## Welfare

**Objective**

7.2 Welfare and social services are available, timely and sufficient during or immediately after an emergency event. This includes critical support services and communication plans to inform affected people of impacts.

**Key findings**

- CPFS is primarily responsible for coordinating the provision of welfare support services.
- A number of local governments said they would provide interim welfare and social services in an emergency.
- Local governments would rely for support on external agencies.

Under EM arrangements, CPFS is responsible for coordinating the provision of welfare support services to people affected by an emergency. In the first instance, this starts with establishing and operating evacuation centres. During this immediate period, CPFS, in conjunction with local government and community organisations, provides for the needs of impacted communities. For the most part, this tends to be short-term immediate relief such as:

- emergency accommodation
- emergency catering
- emergency clothing and personal requisites
- financial assistance
- personal support services
- registration and reunification functions, if people become separated.

Agencies that reported providing welfare services during an emergency included DFES, WA Police, WA Health, CPFS, Red Cross, the Department of Education, the Housing Authority, St John Ambulance and the Department of Defence. In addition, 54 per cent of local governments acknowledged a role in the provision of welfare services.

Comments from local governments, for the most part, related to the identification and establishment of evacuation centres until CPFS personnel were able to arrive. Some said they would provide welfare and social services for an interim period only and that they would be reliant upon support from external agencies.

The Shire of Mundaring reported that welfare and social services were structured and provided according to a needs assessment process that was amended and supplemented, as required. The system was modified in accordance with feedback sought and obtained from the community concerned.

The City of Wanneroo offered Home and Community Care Services to its residents. Programs have been developed to allow officers to quickly identify affected people. Database systems have been prepared to identify those clients who have requested contact in relation to weather and emergency alerts.

Following the Waroona fire, the City of Mandurah created a ‘Community Outreach & Impact Assessment’ form for the Local Recovery Plan. This template was developed from the Red Cross version and one used by the Shire of Harvey in their recovery efforts. The form can be used to gather data quickly about community needs following a large incident.

WA Health reported providing welfare, family support and a range of mental health services in an emergency. The Housing Authority reported that while staffing resources were sufficient and responsive, the extent to which the physical infrastructure of housing could be provided in response to an emergency depended on the size and scale of the impact.

The Community Engagement Directorate of DFES provides a level of support during incidents through the activation of the community liaison unit (CLU). The CLU provides impacted communities with incident information, which is a critical element of their welfare.

In addition to community support, DFES reported that a range of wellness services was provided to DFES paid staff, volunteers (including Bush Fire Brigades and Volunteer Marine Rescue volunteers) and their immediate families. The DFES Wellness Branch provided and coordinated a range of support services aimed at enhancing the physical, spiritual and psychological health and wellbeing of the fire and emergency services community. They provided training in resiliency, stress management, mental health first aid, coping with potentially traumatic events (critical incidents), and general health and wellbeing.

## Impact assessment

**Objective**

7.3 Agencies have the ability to undertake and complete comprehensive impact assessments across the natural, built, social and economic environments. These findings inform recovery coordination and future EM planning.

**Key findings**

- An ongoing body of work is the evolution of the comprehensive impact assessment.
- Avenues for increased collaboration with the community and community organisations should be considered.

There will come a point in an emergency when the focus will shift from response to recovery. At this point, the leadership of the emergency will also move from the Controlling Agency/HMA to an appropriate official within the affected local government (usually the local recovery coordinator).

To facilitate this process, work has continued to further develop the comprehensive impact assessment (CIA) template. Completed by the Controlling Agency, the purpose of the CIA is to provide the affected local government or governments with an understanding of the current impacts arising from the emergency. This in turn should inform and guide priorities for recovery efforts.

Western Australia continues to be involved in the National Impact Assessment Model (NIAM) project, led by the ANZEMC Recovery Subcommittee. The model was endorsed by ANZEMC in April 2016 and is specifically designed to assess the severity of an emergency within 72 hours of it occurring.

This information is used to facilitate State/Commonwealth resource negotiations. The NIAM indicators are being integrated into the CIA processes.

In addition to the CIA, agencies undertake their own assessments to determine the impact of an emergency on their business. Most HMAs, about half of EMAs and all service providers reported an ability to undertake impact assessments. They also reported that their findings were used to inform their emergency planning activities, including determining priorities for prevention and coordinating recovery.

Among local governments, fewer than half reported they had the ability to undertake an impact assessment, although the majority reported that their findings would be used to update and improve their EM arrangements. It should be noted also that several local governments acknowledged they had never experienced an emergency so this ability had not been tested in practice.

In its submission to this year's *Emergency Preparedness Report,* the Red Cross identified there was a need for more collaboration with the community and community organisations.

There was a sense that social needs and impacts were not sufficiently incorporated into planning, and that there needed to be a greater emphasis on wider community social impacts during and after an emergency.

## Recovery coordination and rehabilitation

**Objectives**

7.4 Agencies have the resources and skills to aid impacted communities in restoring the normal state of affairs. This includes rehabilitation of the natural, built, social and economic environments.

7.5 Recovery arrangements are in place following a major emergency. This should include engagement between HMAs, local government, NGOs, industry and communities and should consider long-term impacts.

**Key findings**

- Half of all responding local governments had been impacted by a large emergency event within the past three years.
- Local governments vary in their capability and capacity to manage large-scale recovery.
- Issues exist around having the necessary expertise to lead a recovery.
- Access to adequate funding continues to concern local governments.

Depending on the size and nature of the emergency, the State Government may become involved in recovery activities. Structures exist for this to occur through the State Recovery Coordinator and the State Recovery Coordination Group (SRCG) or through the appointment of a State Recovery Controller. These options provide for a whole-of-government approach to recovery. However, there remains a lack of clarity regarding the state's role in recovery, how it is enabled and how it is activated.

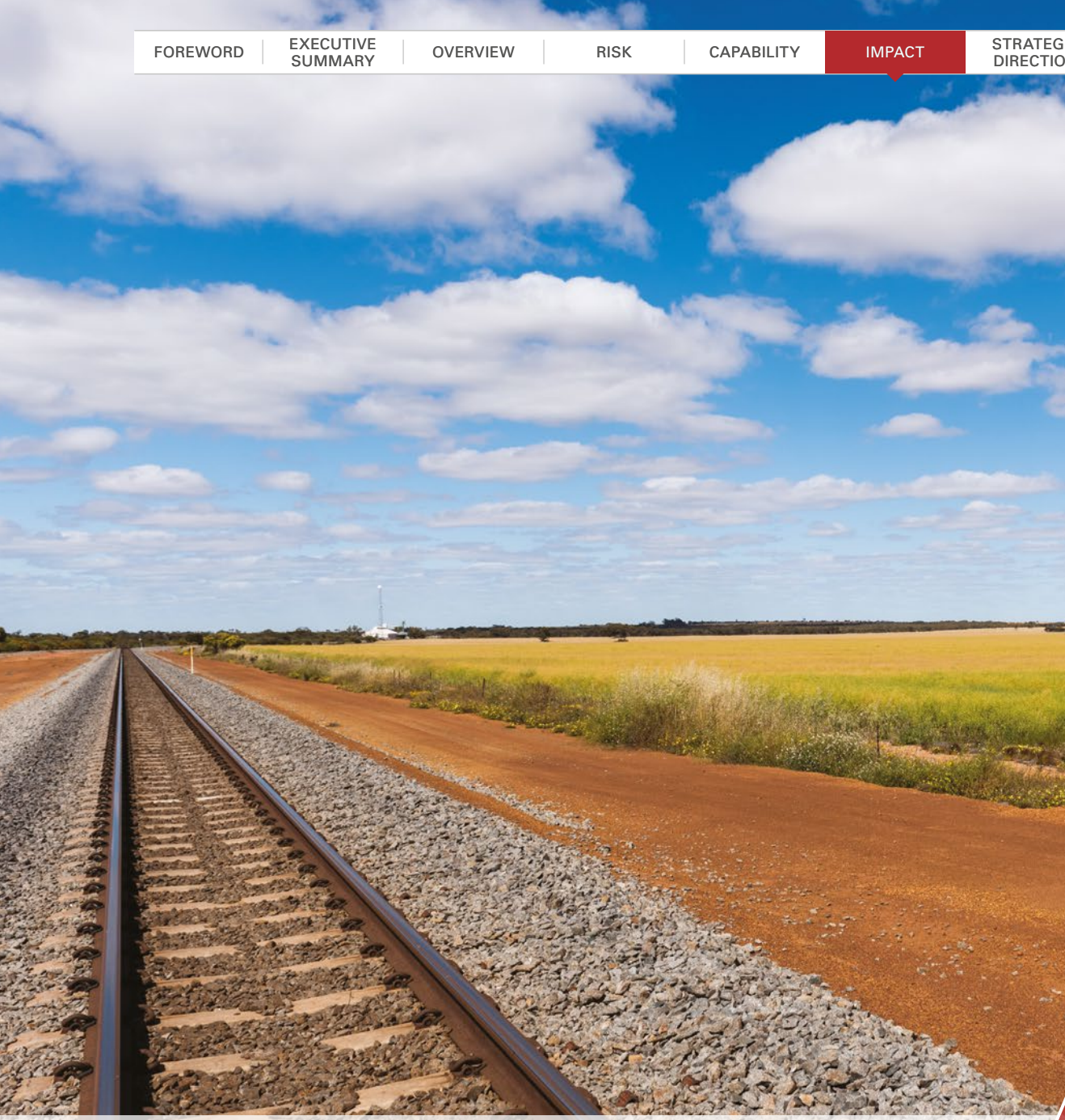
Preparations to assist a community in recovering from an emergency take place through the SEMC Recovery Subcommittee and through local government recovery planning activities.

Following the Esperance and Waroona fires, the State Recovery Coordinator attended the regions to provide support to the local governments with recovery activities. Help was also provided with the CIA process and through the provision of additional financial assistance where necessary.

Due to the scale of the Waroona fire, the state appointed a State Recovery Controller and established a SRCG on 19 January 2016.

In the 2016 survey, local governments were asked how long it had been since they had an emergency that required a coordinated multi-agency response. Almost 36 per cent reported having experienced at least one such event in the past 12 months, but almost one-third reported no incidents for a decade or longer. Despite this difference, half of all responding local government's had been impacted by a large emergency event within the past three years.

Local governments vary in their capability and capacity to manage large-scale recovery. Issues around access to adequate funding and having the necessary expertise to lead a recovery continue to concern local governments. WALGA's new Recovery Coordinator Training seeks to address the expertise issue but more work is needed in the way of sharing key lessons and experiences.



# 05 Impact

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INFRASTRUCTURE – TO MAINTAIN KEY INFRASTRUCTURE SUCH AS TRANSPORT AND UTILITIES

# 05 Impact

## 5.1 Events

**Without action, the stage is set for an escalation of bushfire risk and the consequences thereof.**

(Ferguson 2016)

### 5.1.1 Esperance fires

In November 2015, dry lightning ignited multiple bushfires in the Esperance region. Catastrophic fire weather conditions, coupled with temperatures in the low 40s and extremely hot and powerful winds, frustrated attempts to quell fires in the Cascades, Merivale, Norseman and Cape Arid Complex.

The fires burning between Esperance and Norseman impacted several town sites including Grass Patch, Scaddan, Salmon Gums, Merivale, Gibson and Stockyard Creek. The fires were a traumatic event for local communities with extensive residential property damage, extended disruption to schools and services, and four deaths.

The fires involved widespread coordination of multiple agencies including DFES, P&W, CPFS and local governments, and the input of both paid and volunteer combat and support personnel.

DFES taskforce teams were called in from across the district, from other districts, and from the metropolitan area. WA Police assisted in traffic management throughout the incident and numerous vehicle checkpoints were set up across the fire zones. The Shire of Esperance maintained communications with the public throughout the incident through public meetings.

A total of 195,507 hectares of national parks and nature reserves were burnt by the Cascades and Merivale fires, significantly impacting the habitats of native wildlife (almost 90% of the habitat of the critically endangered western ground parrot was burnt in the Cape Arid National Park). About 80 km of coastal vegetation was severely impacted by the fires in November and subsequent fires in January 2016.

Further, 80,000 hectares of agricultural property was burnt, including 30,000 hectares of standing crops. A total of 4685 sheep perished and 1023 km of fencing was destroyed. In addition, infrastructure such as signs, fences, gates, bollards, road surfaces and tracks within parks were burnt.

Within the fire ground, 19 structures were lost, of which three were residential properties. Loss of power as a result of the fire further impacted homes, water supplies and mobile phone sites. Several customers in the area lost power services for 5–10 days and 69 properties experienced a loss of water supply as a result of power loss at pumping stations. Four schools were closed.

Damage to communications infrastructure resulted in loss of phone services for an unknown number of rural customers, affecting their ability to make calls and to use dial-up internet services. The limited coverage and loss of power for mobile services meant that mobile communications were unreliable and congested. The main impact of this loss was to community members who had evacuated and were trying to contact friends or families who had stayed to defend their properties.

Several roads and tracks, including arterial and secondary routes in the region, were closed for extended periods due to the fire. Tourist attractions and services (including caravan parks and hotels) were not damaged; however, economic losses were incurred through a number of local events being cancelled during and immediately after the incident. A drop in accommodation bookings and visitor centre numbers was reported but long-term impacts to tourism were not expected.

As a result of the fire impacts, WANDRRA assistance was activated. In addition, the Lord Mayor's Distress Relief Fund was activated, raising about $1.5 million.

Despite the significant impact of the fires, the response was perceived to be broadly well managed and the Esperance community showed significant resilience during the incident.

The communities of both Esperance and Norseman were proactive in caring for residents who were displaced or in need. The Shire of Esperance quickly activated a recovery coordinating committee, which did a variety of work. While many key issues have been addressed, the recovery effort is ongoing.

### 5.1.2 South West floods

Between 18 and 21 January 2016, parts of the South West and Great Southern districts experienced widespread flooding after extended moderate to heavy rainfall. Between 100 mm and 150 mm fell in the southern parts of the South West, with unofficial reports of over 200 mm. A number of towns throughout the region recorded their highest January daily rainfall since the 1970s.

The widespread nature of the flooding caused damage across 16 local government areas. Farms were flooded and pasture was lost; however, dams were also filled ahead of the 2016 season.

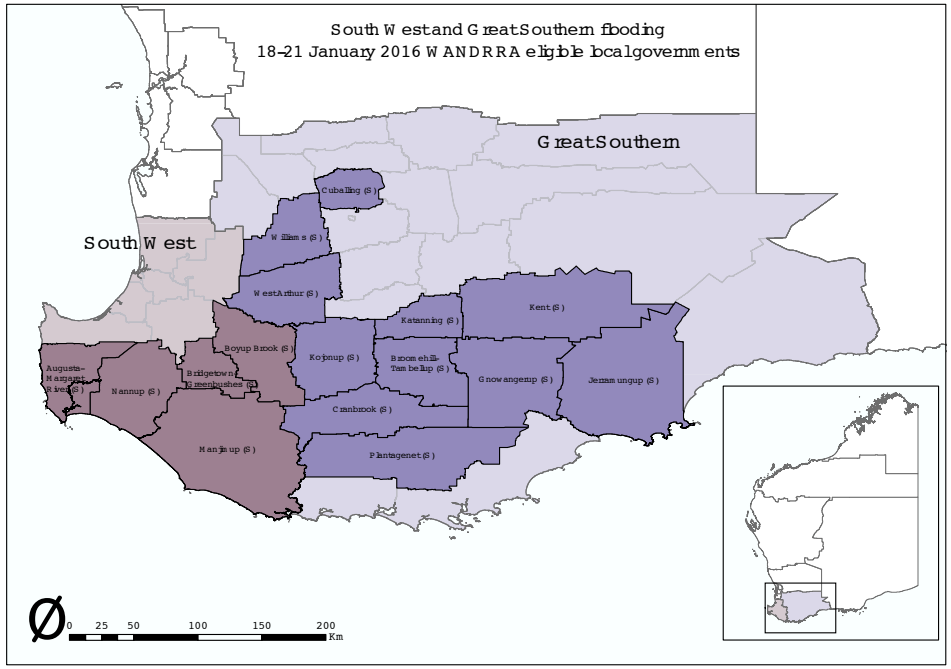



Figure 30. Local governments eligible for WANDRRA assistance after the floods

Despite warnings from local governments, residents were driving around to have a look at the flooding, possibly endangering themselves and potential rescuers. A road train carrying grain was washed off the road by fast-moving floodwater about 10 km south of Gnowangerup. Fortunately, in this case the driver was uninjured.

Figure 31. Floods closed a major highway in the Great Southern

The road network suffered the main damage. At least three main highways were closed in the Great Southern district, with numerous local roads flooded and closed.

Water up to 2 m deep flowed into floodways, over highways and up to doorsteps in some towns. Most roads were closed for 3–4 hours until it was safe to pass, although some were closed for longer – up to four days until the water had gone down.

Fast-moving floodwaters tore bitumen seal off some roads, requiring significant repairs. Dirt roads and soft shoulders of many roads were scoured, undermining the road itself, exposing culverts and drains, and damaging signs. Local governments and MRWA were able to begin 'make safe' repairs as water levels dropped, with Main Roads due to make permanent repairs in the 2016–17 financial year.

WANDRRA assistance was activated for the 16 affected local government areas. To date, the estimated WANDRRA eligible repair and replacement costs are $7 million, mostly for road damage.

While the storms were some of the most intense for some time, most impacts were short term and few long-term impacts are anticipated.

### 5.1.3 Heatwave

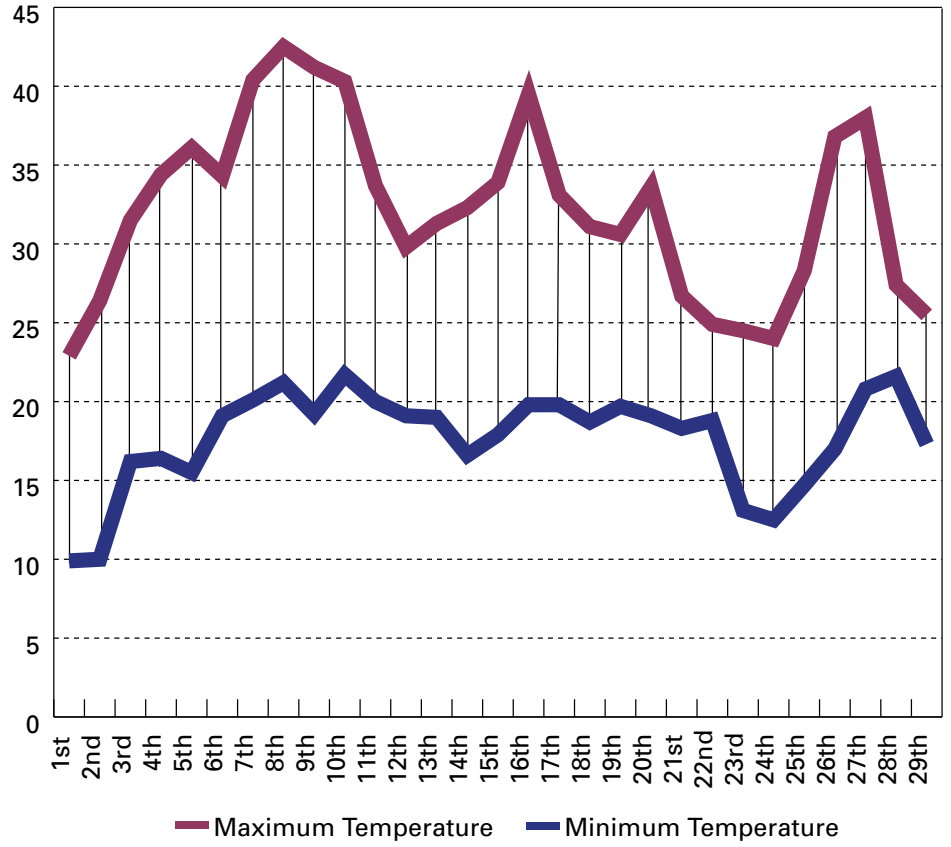
Between 6 and 10 February, Western Australia experienced a severe to extreme heatwave with four consecutive days above 40°C causing the BOM and WA Health to issue warnings up to a week before and throughout the event.

Hot weather was experienced throughout February with mean maximum temperatures above the long-term average. The heatwave prompted a preventive decision to slow the speeds on some Transperth train services to 80 km/h in an attempt to avoid lines heating up that may potentially buckle tracks.

The State Health Incident Coordination Centre (SHICC) was set up and acted as the central coordination hub throughout the incident. During the heatwave, WA Health and supporting agencies held regular press conferences and issued alerts to the public to reinforce the need to take preventive measures.

They worked in collaboration with service providers such as the Water Corporation and jointly developed a reporting protocol for water service outages. They also ensured a sufficient supply of bottled water in case of a prolonged water outage.

Daily Temperature in Perth metropolitan area, February 2016



Although February's hot weather led to severe to extreme heatwave conditions, the impacts experienced remain as yet unquantified. This is due to the complexities in determining whether the mortalities experienced during this period were due to chronic diseases or whether they were aggravated by the extreme heatwave conditions.

Preliminary data suggests a small, consistent and incremental rise in the number of people presenting to EDs in the metropolitan area with acute heat-related illnesses.

In its submission to this report, WA Health commented that the heatwave activation in January 2016 resulted in their best ever engagement with external agencies.

### 5.1.4 Waroona fire

In January 2016, lightning strikes in the Shire of Waroona caused one of the state's most devastating bushfires and largely destroyed the small town of Yarloop. It burnt for 17 days, destroyed 69,000 hectares and had a boundary of 398 km.

The fire was detected on 6 January just before 6:30 am by P&W. High temperatures and strong wind gusts of up to 80 km/h quickly created an unpredictable and out of control bushfire.

The fire moved rapidly through the Shire of Waroona and into the Shire of Harvey. On the evening of 7 January, the town of Yarloop suffered catastrophic impacts with the fire rapidly engulfing structures, many of which were built of timber.

**All of the people the Special Inquiry met with – citizens, landowners, farmers, business owners, personnel from agencies, essential services and from emergency services – were genuine in their commitment to do the best they could during this crisis.**

(Ferguson 2016, p. 12)

Most of the town's 545 residents self-evacuated before the fire struck. Many of the residents who remained were forced to leave at the last minute as the fire front made its way towards the town. Others stayed to defend their properties and those of their neighbours.


Figure 32. Devastation in Yarloop. Image courtesy of Melissa Howard

The independent post-fire review noted that:

*'… extreme fire behaviour caused massive spotting and ember attack which resulted in the ignition of many buildings in Yarloop within a very short period of time. Many houses ignited simultaneously, overwhelming the firefighters and small number of residents who remained.'*

(Ferguson 2016, p. 84).

Tragically, two residents died and 181 commercial and private properties were destroyed, including many historic buildings.

Property losses in the town included:

- Private residences
- Yarloop Workshops and Steam Museum
- Yarloop Hotel
- Yarloop Catholic Church
- Cabin Restaurant
- Yarloop units
- Yarloop Memorial Hall
- Yarloop Old Post Office.

In the days following the fire, many Yarloop residents who had evacuated learnt their homes had been damaged or destroyed. Recovery from any major bushfire is difficult but was made even more challenging for the people of Yarloop with initial uncertainty about the town's long-term viability.

Many of the evacuated residents have remained in temporary accommodation but some have moved out of the district and even left the state.

Alcoa owned 80 homes in the town, 35 of which were destroyed. The company announced that it would not rebuild these houses, as they fell within an informal noise buffer zone for its Wagerup Refinery. Such actions exacerbated the degree of uncertainty and stress about the town's future. The community eventually viewed the clean-up of the town as a sign of hope and a step towards Yarloop's renewal.

Disasters disrupt normal community functions and can cause significant psychological stress and social issues within communities. Some people may suffer a lowered quality of life, others may become isolated and disconnected and about 10–20 per cent will go on to develop post-traumatic stress disorder, depression, anxiety or substance abuse (Gordon 2009).



### 5.1.5 Animals in emergencies

Animals play a significant role in the lives of many Western Australians, whether as pets, wildlife or livestock. The wellbeing of animals during emergencies has become a topic of considerable concern. The 2009 Royal Commission into the Victorian Black Saturday bushfires found that people returned to the fire zone to try to rescue their animals. The Queensland Flood Commission of Inquiry found that pet owners were reluctant to evacuate without their animals (Australian Animal Welfare Society 2012).

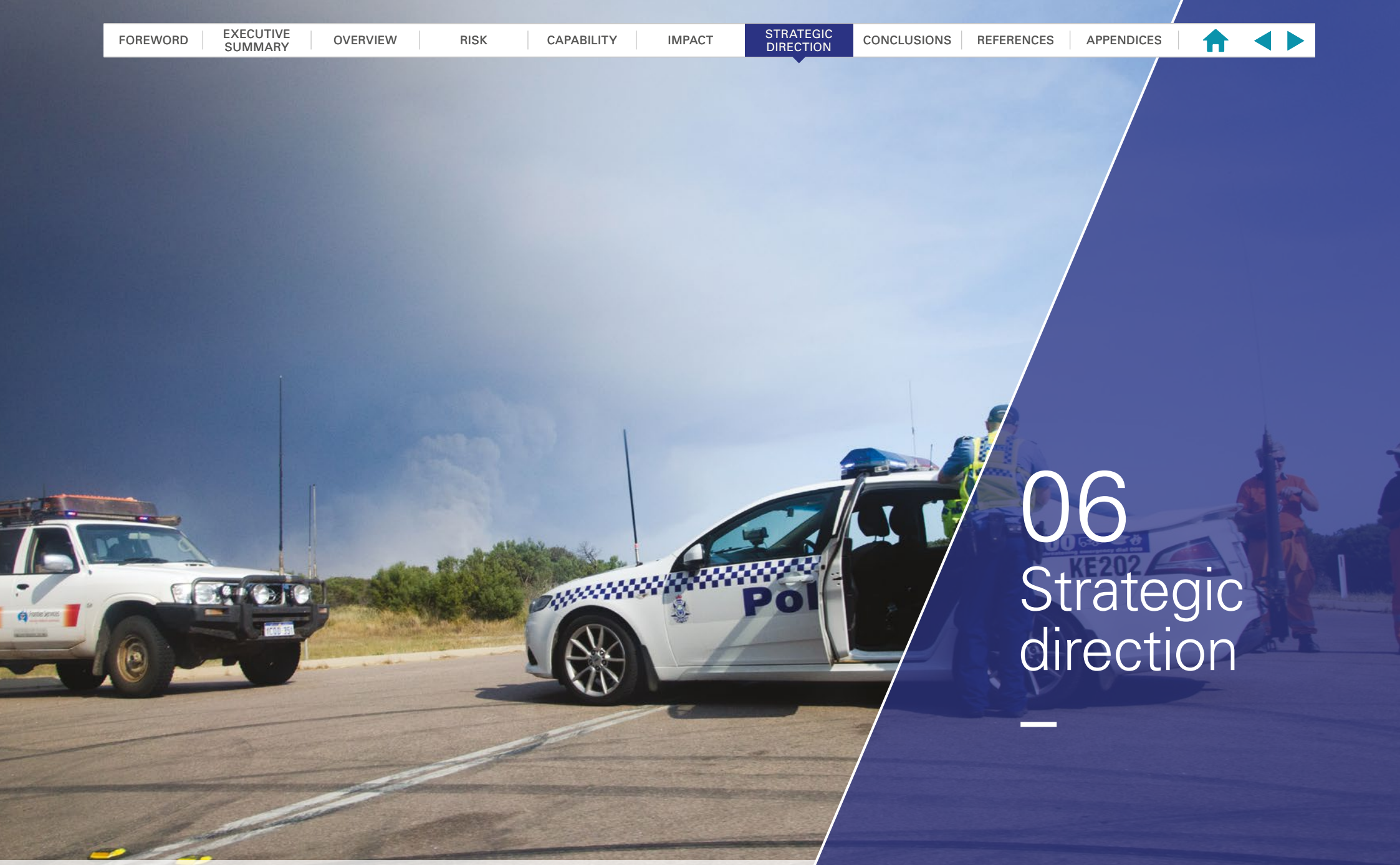
The psychosocial wellbeing of individuals and communities is undermined by the loss of animals, particularly in farming communities. As such, an expectation has developed that EM arrangements will incorporate considerations for the management and welfare of animals.

While state plans and policies for animals in emergencies are being developed, local governments are concurrently taking action to address the issue. Almost half (48%) of local governments reported having plans in place to deal with the evacuation of animals in emergencies, and CPFS consider animals when establishing and operating evacuation centres.

AWARE grants have also been awarded to the SES Mounted Section to provide accredited training in large-animal emergency rescue operations, and to the City of Mandurah to develop short-term evacuation arrangements for the Peel and South West equestrian communities during emergencies.

Beyond the evacuation and management of pets and companion animals, livestock can pose major challenges if left unattended. The ability for farmers in rural communities to enter emergency impacted areas to tend to animals is a longstanding issue. This was incorporated within one of the recommendations of the Ferguson Review and will be considered as part of a policy review around traffic management points.

In February 2016 the Animals in Emergencies Working Group (AIEWG) was convened. Chaired by DAFWA, the group comprises key government and non-government agencies and will seek to include animal welfare in the State EM Framework.



# 06 Strategic direction

SOCIAL SETTING – TO MAINTAIN PUBLIC ORDER, SAFETY, SANITATION, EDUCATION, HEALTH AND CULTURE.

# 06 Strategic direction

## 6.1 Tracking the progress of recommendations

Since February 2011, six significant reviews examining seven separate major fires in Western Australia have been conducted. While the terms of reference for each of these reviews have varied, it is fair to say that these inquiries and post-incident analyses have focused upon the effectiveness of the responses provided to these incidents by all of the agencies involved. The major reviews are:

- *A shared responsibility – report of the Perth Hills bushfire February 2011 review* (Keelty, 2011)
- *Appreciating the risk – report of the Special Inquiry into the November 2011 Margaret River bushfire* (Keelty, 2012)
- *Post-incident analysis of the 2011 Margaret River and Nannup bushfires* (Noetic Solutions, 2012)
- *Parkerville Stoneville Mt Helena bushfire review* (SEMC, 2014)
- *O'Sullivan and Lower Hotham bushfires review* (SEMC, 2016)
- *Reframing rural fire management – report of the Special Inquiry into the January 2016 Waroona fire* (Ferguson, 2016).

In addition to these reviews and inquiries, as part of normal business, agencies have conducted their own (internal or independently contracted) post-incident analyses of these events and other smaller incidents that have taken place during this period.

In the lead-up to the 2015–16 fire season, of the six reviews listed above, four had been completed, reviewing five fires, one review was in draft and one review was soon to be announced following the destruction of Yarloop. The finalised reviews contained:

- 93 individual recommendations for improvement
- 9 commitments by government
- 91 lessons identified through post-incident assessments
- 86 actions identified to remedy any actual or perceived shortcomings of the actions of the individuals, agencies or systems involved.

The report in draft contained an additional 23 recommendations and the events of January 2016 would see the Ferguson Special Inquiry add a further 17 recommendations and identify another 23 opportunities for improvement. At the time of publication of the *Emergency Preparedness Report 2016,* there have been six separate recent reviews with a total of 342 individual learnings or recommendations emanating from them.

The Ferguson Review was quick to acknowledge that they had the 'benefit of time and the luxury of hindsight' and that 'those who were key players in this fire emergency were not afforded such luxury'.

The Ferguson Special Inquiry examined the recommendations from earlier reviews and made an assessment of the level of completion of each, reporting the assessed progress with a traffic light system.

| | |
|---|---|
| | Complete |
| | Intent not fulfilled / in progress / unable to measure |
| | Incomplete |

Of the 342 individual learnings or recommendations, the ones that stemmed from the O'Sullivan and Lower Hotham and the Waroona fires report (63 recommendations) were not assessed or judged within the Ferguson Review. This left 279 items deemed as follows:

- 140 were considered by the Special Inquiry to be completed
- 97 were classified as in progress or partially complete
- 38 were assessed as incomplete
- 4 recommendations were either not assessed or were overlooked in the Ferguson Review.

One of the recommendations of the Ferguson Review was for the recommendations and findings of these reviews to be considered and reported upon in the annual *SEMC Emergency Preparedness Report*.

The Ferguson recommendations were still under consideration at the time this report was completed. As such, a full analysis of these recommendations and the level of compliance against the initial intent have not been completed. They will be evaluated and considered for possible inclusion from 2017.

For the Ferguson assessment on the level of completion of individual recommendations, see Table 7. It should be noted that some of the recommendations made in earlier reviews were not accepted or have been superseded and therefore no progress has been made towards their completion. To avoid these remaining as permanent 'red lights', it is intended that outstanding recommendations will be reviewed by a panel of senior officers from the responsible agencies to determine, by consensus, the appropriate status. Outstanding or superseded actions will be consolidated and the resulting consensus opinion will be referred to the SEMC for endorsement.

Those remaining, and any future recommendations, will be assigned specific performance indicators (and milestones where appropriate) to provide greater clarity in assessing progress and implementation.

Table 7. Ferguson assessment of the status of previous review recommendations

| | Keelty, 2011 | Keelty, 2012 | Noetic Solutions, 2012 | | SEMC, 2014 | SEMC, 2016 | Ferguson, 2016 |
|---|---|---|---|---|---|---|---|
| **Report** | Perth Hills | Margaret River | Margaret River | Nannup | Parkerville, Stoneville, Mt Helena | O'Sullivan and Lower Hotham | Waroona |
| Recommendations | **55**<br>**34** **17** **4** | **10**<br>**8** **1** **1** | | | **28**<br>**12** **8** **7** | **23**<br>Not classified | **17**<br>Not classified |
| Additional commitments made by government | | **9**<br>**5** **4** **0** | | | **1**<br>Not classified | | |
| Lessons identified | | | **58**<br>**24** **24** **8**<br>**2** Not classified | **33**<br>**17** **10** **5**<br>**1** Not classified | | | |
| Actions to remedy | | | **54**<br>**24** **22** **8** | **32**<br>**17** **10** **5** | | | |
| Opportunities identified | | | | | | | **23**<br>Not classified |

## 6.2 Fire management

Three distinct and separate groups are involved in fire management in Western Australia. They operate under different systems, structures and workforce arrangements, differing in makeup, style and motivation and – most significantly – in the philosophies and approaches they take towards fire management and suppression.


The differing primary responsibilities in the management of fire has led to the evolution of different fire behaviour approaches for bushfire incident planning. They also reflect the very different skillsets required in managing an urban/structural fire as opposed to bushfires. The Ferguson Review noted that 'experience in rural fire fighting and management is crucial as the strategies applied in that context greatly differ to strategies in the urban environment'.

This has given rise to fundamental variances in the way that bushfire risk is managed, especially in peri-urban and rural areas.

Research has identified that fuels older than seven years are difficult to control under average summer conditions of moderate to high fire danger in open eucalypt forest. Fuel reduction programs better enable fire managers to control major fire events and prevent serious impact on lives, property and environmental values.

The differing cultures, management styles, practices and skillsets are wholly appropriate for groups operating individually in day-to-day business. However during an emergency, when a multi-agency response is required, these groups come together.

They share resources, experience and personnel in an attempt to produce the best outcome for Western Australia. However, when seeking to integrate career urban firefighters with volunteer brigades and land management agencies, interoperability and cultural issues become apparent.

A warming and drying climate in the South West, coupled with growing populations at the peri-urban fringe (where urban areas intersect with heath, bushland or forest), means that the area of intersection is becoming larger and the need to come together more frequent. Therefore, the need to address impediments also looms larger.

Much work has been done – and continues to go on – at the intersections between the agencies. These advances have been recognised in every review that has been completed in recent times.

There have been considerable improvements in bushfire management practices as a result of recent inquiries. Central among these has been the introduction of a tenure-blind (or cross boundary) approach to assessing and treating bushfire risks.

### 6.2.1 Prescribed burning

The management of fire-prone landscapes is complex and requires a balance between different treatment options. Even if this balance is achieved, there is no guarantee that a disastrous fire event will not occur. Ignitions cannot be controlled. They can be caused by lightning strikes or by human intervention through carelessness, mishaps or arson.

Prescribed burning – its benefits and risks – has been extensively addressed in previous reports to government. It is an issue that can polarise communities and divide public opinion. However, the reports have broadly emphasised that prescribed burning (deliberate burning to reduce fuel loads) can significantly reduce the potential severity (scale and impact) of bushfires.

The main government department tasked with prescribed burning is P&W. It should be noted, however, that the area under P&W management accounts for less than half of the land within the South West bushfire risk zone.

Prescribed burning is a complex process used to manage bushfire fuel loads. It can take several years to implement, from planning to execution. Prescribed burning also comes with an element of risk, if they escape containment lines. It is generally accepted that the risk associated with prescribed burning is outweighed by the benefit it provides.

Achievement of a 200,000-hectare target is useful, mainly to the extent that it is a proxy for the reduction in bushfire risk achieved. P&W has developed new guidelines that more explicitly focus upon the risk reduction achieved by prescribed burning.

In 2015 an extra $20 million over four years was committed from the Royalties for Regions program for P&W to increase prescribed burns in the South West.

During 2015-16, P&W reported completing over 154,000 hectares of prescribed burns and up until the time of publication had conducted an additional 22,916 hectares in the lead up to the summer season.

## 6.3 Planning to recover

The bushfires of 2016 brought to the fore some longstanding dilemmas for EM. Traditionally, once the fire is out or the incident is over, the responders withdraw to be ready for the next deployment. This leaves the clean-up to be managed by often under-equipped and under-resourced local governments.

During an emergency, HMAs have access to incident control rooms, large numbers of suitably trained staff and redundancies for their long-term deployment, equipment suitable for task, interagency cooperation agreements and funding streams available to effectively manage the incident. This is not the case for the recovery phase.

As a state, much work has been done as we **prepare to respond** to an emergency. This has taken place in the form of ensuring that the planning, equipment, training, resources and interoperability are in place well in advance of the required response. The events of 2016 have highlighted that it is just as important that we **plan to recover**.

The Waroona fire highlighted that where the state has an existing capability or arrangement (such as water or power); it was relatively easy to redeploy assets to aid the recovery process. Where this became challenging was when such assets or arrangements did not exist.

Many of the services required after the bushfire could not be completed by state-owned agencies, so the safe and appropriate clean-up of impacted sites presented major challenges. This situation was exacerbated by the presence of dangerous and harmful goods, such as asbestos. Not only was there a need to remove the asbestos but it needed to be removed carefully by a reputable contractor and any contamination had to be remediated. The ability to do this safely and appropriately while having an assurance framework in place presented many challenges.

It is suggested that the same level of maturity that goes into planning and preparing for an emergency response should also exist when planning and managing the recovery from such an incident.

### Recovery assets

When conducting an emergency response, numerous incident control rooms are available. Managed by HMAs, EMAs and service providers, they are equipped and set up to deal with an emergency response. However, there is no such facility available to coordinate a large-scale protracted recovery. There is an increasing number of suitably trained incident controllers for responses but no comparable lists of capable personnel to project-manage a recovery.

Incident controllers can call upon the assets of numerous agencies, local governments and community groups to combat threats faced. While some short-term mechanisms (such as CPFS welfare services) exist for the immediate aftermath, longer-term recovery functions are often reliant upon goodwill.

The State Recovery Coordinator can request, but cannot compel, HMAs to make personnel, assets and equipment available. It is considered that the process of recovery should be given the same standing and resourcing as that given to response. Powers and resources that might be considered to support the state recovery function could include:

- the ability to second personnel to support recovery
- a pool of suitably trained recovery project managers
- administrative support and funding
- dedicated facilities to manage a recovery
- standing contracts with appropriate service providers.

## 6.4 From likelihood to consequence

Within a broader Australian context, thinking about EM is changing. The focus is shifting from priorities based upon the likelihood of an emergency to examining its consequence.

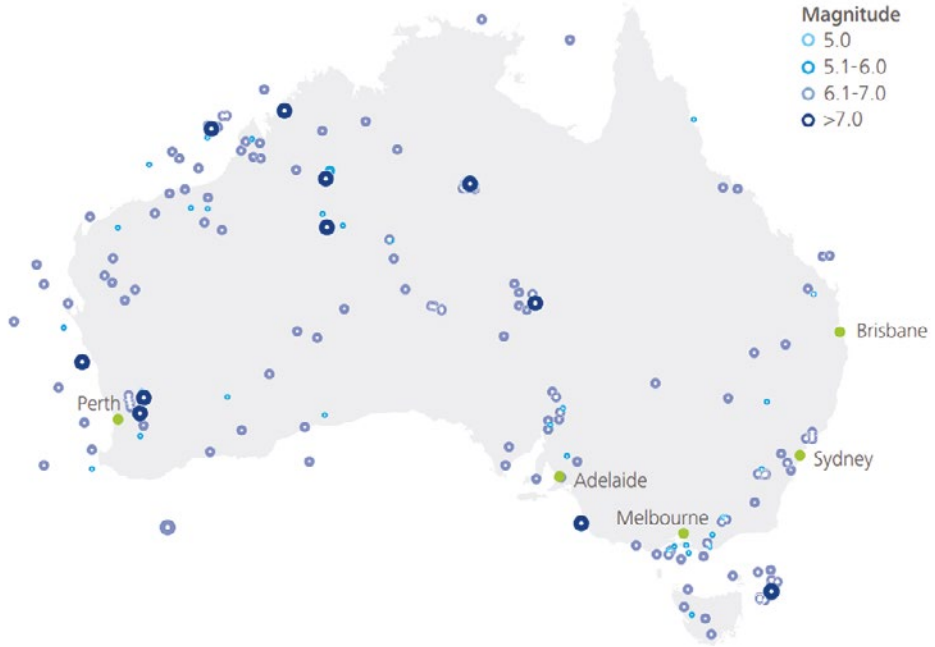



Figure 33. Earthquake epicentres in Australia since 1840. Source: Australian Business Roundtable for Disaster Resilience & Safer Communities 2016

The *Emergency Preparedness Report 2015* highlighted that some events, such as earthquakes, are rare and unpredictable but may nevertheless have a high impact. They tend to lie outside the dominion of common experience (and past experience). The development of strategies and mitigation plans will be crucial, as will the need for agencies to exercise against such scenarios.

Historically, media attention is directed towards those events that arise frequently. The resulting public outcry tends to drive investment decisions. Consequently, funding and resources are directed towards these issues rather than those that may pose a greater risk or generate greater impacts. Some events, such as earthquake, have a lower likelihood; however, they potentially have a higher proportion of extreme consequences. These events will stretch and likely overwhelm existing EM arrangements and capabilities.

## 6.5 Interconnectedness

As technology advances, so too does our reliance upon it. Technology has brought with it much more than just an increased infiltration of web technology into our day-to-day lives. The interconnectedness that technology enables also potentially presents a critical flaw as systems and processes become increasingly reliant upon each other.

This interdependence may mean that the failure of one element could result in the loss of functioning in one or many other systems, potentially giving rise to a catastrophic domino effect. This was seen in Yarloop when an interruption of power affected the ability of water to be pumped into the town.

Usually, this enhanced interoperability and connectedness is a good thing. Things like multi-modal transport cards (Transperth's SmartRider) allow passengers easy movement across a range of services. Some EM agencies are able to remotely manage any number of critical systems and functions without needing to put a person in harm's way.

However, as the NBN rolls out cross the nation, there is movement away from traditional technologies, such as land line telephones, as people increasingly migrate towards VOIP systems and discontinue land line services. This, combined with the broad uptake of the mobile network, has made society more connected than ever.

But its practical application has removed potential redundancy options in the event of a major outage. The NBN depends on a constant power source to work and therefore is immediately reliant upon society's power infrastructure. An outage would impact both services. It is possible that the same event that causes an NBN failure would also cause normal mobile phone tower failure.

## 6.6 What can you do to protect your assets from catastrophes?

Part of building resilience is finding and employing methods to protect yourselves and your assets from suffering in an emergency. Whether through education, effective planning, insurance, asset hardening or business continuity measures, all Western Australian should be seeking to build resilience.

It is important to note that minimum building standards in Australia do not cater for property protection, but only for **safety**, allowing occupants time to leave before a building constructed to a minimum standard becomes untenable.

**Resilient design and planning** – Your property should be designed so that it is resilient to the hazards present in the environment, both current and projected (to the end of the expected lifespan of the building). Property owners and developers should ensure that they use appropriate materials and design to ensure that the property will survive the predicted intensity of natural hazards in their region into the future.

**Disaster planning and preparation** – You should have a relevant emergency plan for your location, designed not only to protect your safety in the event of an emergency, but also to save your property where it is possible and safe to do so.

**Financial protection** – Insurance protection over your most important assets is critical to ensure you can return to a normal lifestyle as quickly as possible after an emergency. Australia has a highly competitive general insurance market and cover is available for most conceivable risks to property. You should also undertake annual risk planning, taking into account the replacement value of assets and the nature of the risks in your location, ensuring you then have enough insurance to cover the risks and the costs (Insurance Council of Australia website 2016).

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# 07 Conclusions and future actions

GOVERNMENT – TO MAINTAIN PUBLIC ADMINISTRATION, DEMOCRACY AND RULE OF LAW

# 07 Conclusions and future actions

## Conclusions

The efforts of those involved in the EM sector over recent years has provided Western Australia with a highly committed, engaged, equipped, capable and cooperative EM sector. Stakeholders actively strive to deliver the best outcomes for the state.

Considerable effort has gone into developing and implementing effective EM structures and mechanisms that support the agencies in fulfilling their roles. Further, the structures encourage sharing of information, skills and experience across the entire sector.

The key stakeholders broadly assess the risks that they may face, plan for them and where possible pre-deploy appropriate assets and personnel to combat them. They proactively seek to mitigate the risks to reduce loss and damage caused by hazards, thereby lessening the likely impact upon the WA community.

Weaknesses do exist but are being addressed. While there is still work to be done and EM is by no means perfect, the known or foreseeable issues are generally already incorporated within the forward work plans of those involved. Strategies are being developed to address known shortfalls and research is being conducted to examine areas where not enough is known.

This maturity is occurring at all levels of EM with considerable input and engagement from the majority of stakeholders. While this engagement and commitment is broad and deep across the sector, it is still not universal. There is still work to be done to have full integration and commitment to EM.

In some cases (particularly among local governments) long intervals between emergencies has led to complacency and therefore engagement has dropped off. 36 of the responding local governments reported that it had been a decade or more since they were required to respond to a multi-agency emergency, while in other regions such a response is almost annual.

There is a perception among EM stakeholders that despite extensive education and information campaigns, public understanding of risk and engagement remains low. Further, WA Health indicated a belief that individual behaviour does not differ in emergency events.

Remoteness will remain an issue in WA.

A major achievement of 2016 was the development of the Emergency Services Communication Strategy. This aligns directly with the State Government *Information and Communications Technology (ICT) Strategy 2016–2020* and has laid down a roadmap and suggested implementation plan to enable reliable, resilient, interoperable and cost effective operational frontline communications.

Traffic management during emergencies is an ongoing issue that will require further attention. The ability to have an effective system of controlling access to emergency impacted areas remains elusive. The aim will be to find a practical balance between the risk to life and the public value of enabling the timely restoration of livelihoods.

A number of stakeholders have raised funding and resourcing as an issue of concern. Some agencies are drawing funds for core business functions from supplementary schemes such as Royalties for Regions. Broadly the requirements placed upon stakeholders to conduct EM activities are largely unfunded.

Resourcing limitations in some areas have been identified as adversely impacting the ability to provide: proactive mitigation, asset betterment, recruitment of appropriately skilled staff, response and recovery services. This issue is particularly acute among some local governments.

The resourcing issue is likely to be an enduring concern as funds are finite and there are many competing priorities.

## Future actions

It is clear that there is room for improvement in the way in which the EM sector engages with:

- the public
- community groups
- business and industry.

While a large volume of quality information is being provided and made available to the public, the effectiveness of delivery or message must be questioned given the perception by EM agencies that the understanding and uptake is low.

Very little information was gathered during the 2016 collection to indicate that community groups were sufficiently engaged in the EM process. These groups represent a standing resource that may be highly beneficial in assisting preparation, support and recovery efforts. This is considered to be a largely untapped resource and enhanced engagement in this area is expected to prove fruitful in enhancing resilience.

At the highest level a strategy is being developed for greater engagement with critical infrastructure owners and providers to better capture the all-hazards approach of EM. This will seek to build upon the significant engagement that has already taken place within a security setting.

At the local level, consideration will need to be given on how best to engage with local businesses to encourage business continuity planning to increase preparedness and build resilience. LEMC and DEMC structures may provide the appropriate vehicle for enhancing and progressing this engagement.

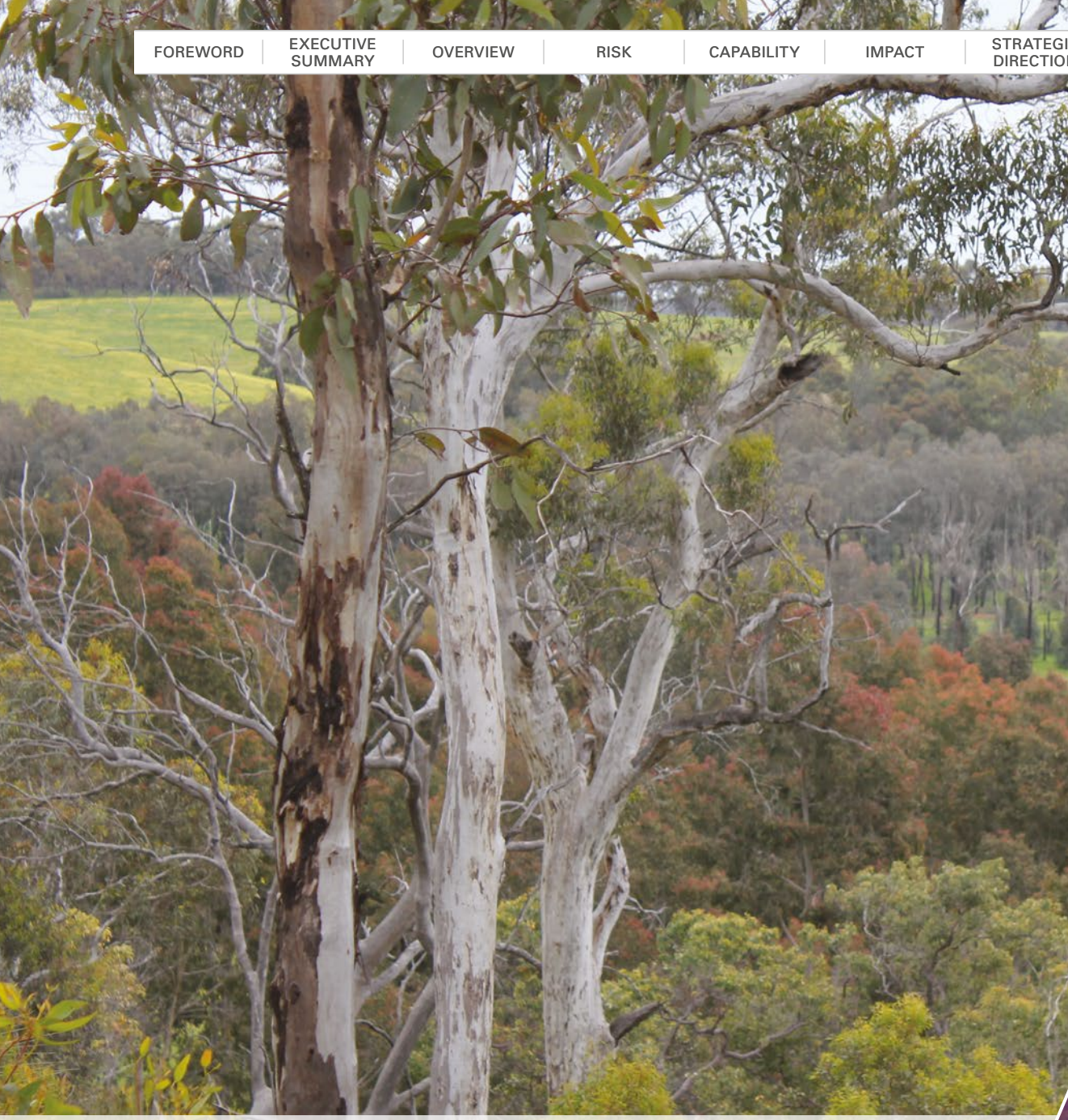
Agencies will continue with their ongoing work plans to address known or identified shortcomings – by way of example the extensive collaboration between DFES and P&W to establish and staff truly multi-agency pre-formed incident management teams.

An ongoing body of work to continue will be the evolution of the comprehensive impact assessment.

The Policy and Governance Review Project will continue with progress on phase 4 that will finalise the policy review by the end of 2017. In addition, phases 6 and 7 will deliver hazard specific plans, appropriately updated procedures and comprehensive guidelines.

Opportunities exist to have greater engagement with local businesses and industry and possibly representative groups such as the Chamber of Commerce and Industry (CCI).

The SEMC will begin development of a lessons management model in order to appropriately identify, capture, progress monitor and ensure compliance with best practice. This will include but not be limited to post incident reviews and inquiries, ongoing research and horizon scanning.



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ENVIRONMENT – TO PROTECT THE ECOSYSTEM AND BIODIVERSITY OF THE STATE

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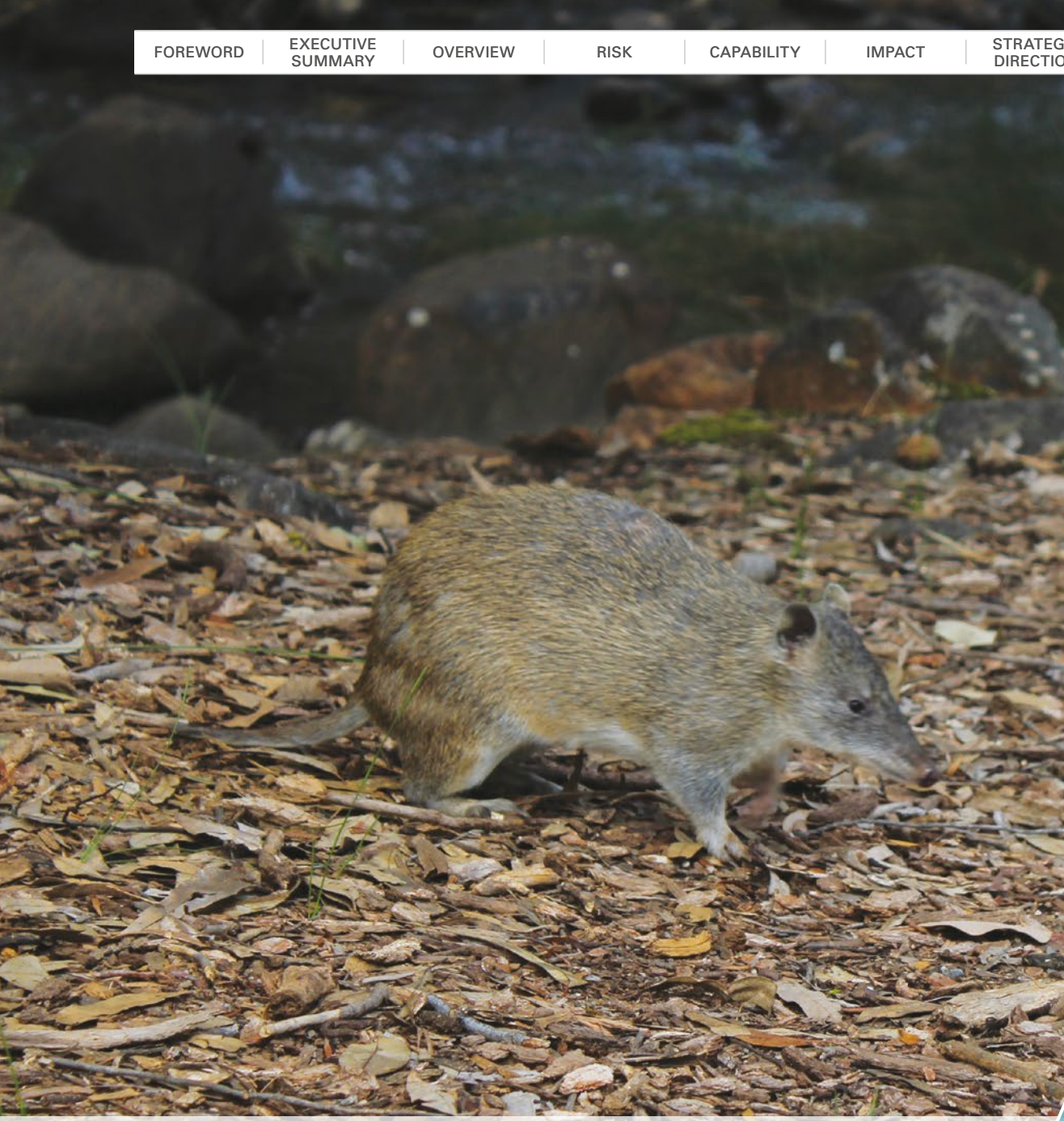

# 09 Appendices

ENVIRONMENT – TO PROTECT THE ECOSYSTEM AND BIODIVERSITY OF THE STATE

# 09 Appendices

## Appendix A. SEMC Emergency Management Principles

The State Emergency Management Committee Emergency Management Framework is underpinned by the SEMC Emergency Management Principles.

### Risk management approach

Emergency Risk Management (ERM) is a systematic process that contributes to the wellbeing of communities and the environment. The process considers the likely effects of hazardous events and the controls by which they can be minimised'

The process begins with an understanding of the hazards, evaluates the likelihood and consequence of possible events and produces a range of treatment options to minimise or eliminate the resulting risk.

Risk treatments include prevention and mitigation measures that reduce the frequency of events or consequence of the impacts, and preparation, response and recovery measures if an emergency event occurs. Ongoing risk identification and analysis is essential for the anticipation and management of the consequences of emergencies. This is underpinned by the six state core objectives, endorsed by the SEMC, which apply to Western Australia, to assist in measuring the risk posed to Western Australian communities as part of ERM planning. These highlight important objectives for the state which may be impacted by an emergency event, as they contain identifiable vulnerable elements (i.e. key vulnerabilities).

### Shared responsibility for resilience

Increasing resilience to emergencies is the collective responsibility of all sectors of society, including all levels of government, business, the non-government sector and individuals. Given the increasing severity and occurrence of natural hazards, all these sectors need to be empowered and work together with a united focus and a shared sense of responsibility to keep hazards from becoming emergencies.

Resilience minimises the vulnerability, dependence and susceptibility of a community by creating or strengthening social and physical capacity in the human and built-environment to cope with, adapt and respond to, and recover from emergencies.

To improve resilience we need to learn from emergencies in order to lead change and coordinate effort; understand the risks and communicate them to all levels of the community; work with the people and organisations that can affect the necessary changes; and empower individuals and communities to exercise choice and take responsibility. Our planning approaches need to include risk reduction strategies and our capacity to deal with disasters needs to be enhanced by greater flexibility and adaptability of our emergency services agencies and communities.

### All-hazards approach

The all-hazards approach assumes the functions and activities applicable to one hazard are often applicable to a range of hazards.
The all-hazards approach increases efficiency by recognising and integrating common emergency management elements across all hazard types. It does not, however, prevent the development of specific plans and arrangements for hazards that require a specialised approach.

## Graduated approach

The 'graduated' approach is based on the following principles:

- Decisions should be made at the lowest appropriate level (subsidiarity); however, existing command, control and coordination arrangement apply.
- Where emergency management activities extend beyond the capability of the local community, support may be obtained from the district, state, interstate, national or international levels, as appropriate.

## All agencies coordinated and integrated approach

The 'all agencies coordinated and integrated' approach recognises that no one agency can address all of the impacts of a particular hazard. It is necessary for a lead agency to coordinate the activities of the large number of organisations and agencies involved. These can be drawn from across all levels of government, non-government, volunteer organisations and the private sector.

EM requires collaboration, coordination and integration to facilitate complementary and coherent action by all partners to ensure the most effective use of resources and activities. Coherent actions rely on well-defined and appropriate roles, responsibilities, authorities and knowledge of the capacities of EM partners. This includes adherence to an incident management framework encompassing command, control and coordination.

## Continuous improvement

Continuous improvement, including incremental and transformational change, is undertaken systematically as an integral part of emergency management measures and practices to improve outcomes.

Improvement in arrangements is achieved through the regular monitoring and review of plans, arrangements, policy and procedures at all levels, as well as the capture and implementation of lessons identified by research, exercises and incident reviews.

## Community engagement

Effective and timely communication with the community is a critical and continuous process before, during and after an emergency.

Prior to an emergency, communication focuses on enhancing awareness of hazards, risks and vulnerabilities; strengthening prevention, mitigation and preparedness measures; and providing information on all aspects of emergency management. Public alerts communicate warning messages that an emergency is imminent.

Communications during and directly after an emergency explain and guide immediate response actions to minimise impacts and to maintain safety and security. The provision of accessible, clear, consistent and reliable recovery information and advice improves the speed of community recovery after an emergency. Given the popularity and importance placed on social media by the community, it should be incorporated into community communication strategies.

## Integrated information management

Information is critical to emergency management. The collation, assessment, verification and dissemination of relevant and appropriate information must be underpinned by integrated information management systems that adhere to governance and accountability standards. These systems need to support single and multi-agency decision making. Systems must also be flexible, multifaceted and dynamic to provide information that will allow members of the public to make informed decisions to ensure their safety.

## Appendix B. Hazards

| | |
|---|---|
| **Air crash** | Worldwide, aviation incidents are a regular occurrence. Fortunately, disasters are less frequent but have far more devastating impacts. Major aviation incidents have shown that an air crash may cause hundreds of fatalities and injuries and be hazardous to rescuers. Crash sites may also contain a wide variety of hazardous materials. In Australia, 14 commercial airline accidents since 1950 have resulted in injury or death. |
| **Animal or plant, pests or diseases** | Agriculture is a major industry within Western Australia, representing about 10 per cent of the state's economy. Agricultural products are the second largest export commodity. An animal and plant biosecurity hazard can threaten the industry, causing major economic loss, while also affecting the state's environment, social amenity and human health. |
| **Collapse** | The collapse of natural landforms or built infrastructure such as buildings, bridges or subsurface commercial operations is a risk. A landslide in 1996 near Gracetown in the South West of WA resulted in nine deaths and a further three injuries, after 30 tonnes of rock and soil was dislodged. |
| **Cyclone** | On average, Western Australia experiences five large-scale cyclone events that threaten the coastline each year. Two of these cyclones cross the coastline, one at high intensity. These have the potential to cause deaths and injuries along with major damage to homes, infrastructure and industry. |
| **Earthquake** | Western Australia has experienced at least one significant earthquake each decade since Federation in 1901. Earthquakes of magnitude 4.0 or greater are relatively common and occur about every five years in the South West Seismic Zone, which is adjacent to the main population centres of the state. The 1968 Meckering earthquake measured 6.9. |
| **Electricity supply disruption** | Electricity supply disruptions are inevitable. There is a wide variety of hazards that can disrupt electricity supplies, including cyclones, storms, floods and bushfires. A severe disruption can potentially have serious, costly and distressing consequences. |
| **Fire** | Each year in Western Australia, thousands of fires occur that destroy or damage houses, sheds, garages, commercial and industrial buildings, vehicles and vast areas of bushland. Some of these become critical events, subject to size, location or prevailing weather conditions. |

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| **Flood** | Western Australia has a history of floods, often causing widespread impact. Floods are a natural phenomenon. After heavy rainfall, rivers, creeks and catchments may be unable to cope with water volumes and overflow causing flash flooding or slower rising riverine flooding, which is the most common cause of floods in Australia. |
| **Gas supply disruption** | Industry and communities rely heavily upon natural gas. A gas supply disruption threatened Western Australia in 2008, when an explosion occurred at the Varanus offshore plant that supplies over 30 per cent of the state's gas needs, including large mining companies. |
| **HAZMAT – biological** | Biological hazards are organic substances that pose a threat to the health of humans, animals and plants. Worldwide, it is estimated that about 320,000 workers die each year from communicable diseases caused by work-related exposure to biological hazards. |
| **HAZMAT – chemical** | There is a risk of a hazardous materials emergency wherever hazardous materials are manufactured, used, stored, or transported. Hazardous materials include explosives, compressed gases, corrosive substances, poisons, radioactive materials, and flammable liquids and gases. |
| **HAZMAT – radiological** | Intermittently, global events see renewed interest in the potential use of chemical, biological and radiological material, including their deliberate use on the civil population. Public health and safety experts continue to ensure the state is safeguarded from CBR risks. |
| **Heatwave** | Heatwaves kill more people than any other natural hazard in Australia. On average, all areas of Western Australia will experience heatwave conditions annually. Heatwaves can cause increased sickness and death, increase bushfire risk, and disrupt electricity supplies and train services. |
| **Human epidemic** | There have been nine human epidemics in Australia since 2000. Historically, Australia has experienced several epidemics – including the bubonic plague, H1N1, poliomyelitis and the 'Spanish flu'. Experts consider the next influenza pandemic to be inevitable and overdue. |

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|  **Land search** | Remote, harsh terrain and extreme temperatures create a challenging environment for people who undertake search and rescue missions. The need for specialist skills, equipment, medical care, and interagency cooperation could elevate such searches to a critical level. |
|  **Liquid fuel supply disruption** | The world is heavily dependent upon energy products and a disruption to liquid fuel supply would significantly impact both industry and the community. Natural hazards such as floods and storms continue to demonstrate that disruptions to liquid fuel supply affect the whole community. |
|  **Marine oil pollution** | Marine oil pollution can have severe impacts on the environment and economy, with the response phase lasting months and the recovery phase sometimes lasting for decades. Marine oil pollution events in Western Australia include the 2009 Montara oil spill that lasted for 76 days with about 60 tonnes of oil entering the environment each day. |
|  **Marine transport emergency** | Marine transport emergencies can threaten lives and have significant consequences for the economy and environment. Marine transport emergencies in Australian waters include the 2007 Pasha Bulker incident which grounded the ship for almost a month. |
|   **Marine search** | Sinking, lost and distressed vessels and aircraft, along with marine search and rescue, occur frequently off our coastline. Australia has a search-and-rescue service that covers 52.8 million square kilometres of the Indian, Pacific and Southern oceans. Plans are in place to coordinate efforts where Commonwealth and state responsibilities intersect. |
|  **Radiation escape from a nuclear powered warship** | If when traversing Western Australian waters, the fuel in a nuclear-powered warship melted, hazards could result from direct radiation from the vessel, radiation from a drifting cloud, inhalation of airborne particles and ingestion of contaminated food and water. Arrangements are in place to limit the consequences. |
|  **Rail crash freight** | Western Australia has over 5000 km of freight rail network. Despite ongoing maintenance, it is not possible to eliminate the risk of derailment, collision, malicious acts or other rail incidents on the network. This type of event could significantly disrupt the flow of vital services. |
|  **Rail crash passenger** | On a typical weekday, over 1000 passenger train services operate within Western Australia, with additional trains servicing regional centres. A derailment or collision on such a service could result in a mass casualty incident requiring substantial resources and coordination. |

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|  **Road crash** | On average, 192 people are killed in car crashes every year in Western Australia. A single road crash can result in numerous fatalities and injuries such as the road crash in Kempsey, NSW, in 1989 that caused the deaths of 35 people and injured 41. |
|  **Space re-entry debris** | Space debris has descended out of orbit at an average rate of about one object per day for the past 50 years (2011). In 1979 debris from Skylab landed south-east of Perth and was found between Esperance and Rawlinna. |
|  **Storm** | Storms can be both deadly and destructive. Storms have killed over 770 people in Australia since 1824. Hailstorms in Perth in 2010 were the most costly event in Western Australian history causing over $1 billion worth of damage. |
|  **Terrorist act** | A number of terror organisations and cells have been identified as operating or having a presence in Australia. Their activities have varied from fundraising and providing material support for terror activities overseas, to plotting and undertaking domestic terrorism. The emergence of Islamic State has raised concerns globally. |
|  **Tsunami** | Several tsunamis have reached Western Australia over the past few decades. In 2006 a tsunami inundated the Steep Point area, near Shark Bay, and caused widespread erosion of roads and sand dunes. It damaged vegetation and destroyed several campsites. Significant losses could be expected if a similar tsunami were to hit a populated area. |

# Appendix C. District risk profiles

## Great Southern EM District hazard scenarios

| Hazard | Scenario |
|---|---|
| Animal and plant biosecurity | The owner of a small residential block near Narrikup keeps a few pigs for their own consumption. The owner travels back from Nepal with processed meat (illegally imported) that contains foot and mouth disease in his luggage. The contaminated meat is fed to the pigs and incubates in them before being spread to the neighbouring cattle farm (200 Murray Grey cattle) without the knowledge of either owner. The cattle are taken to the Mount Barker Saleyard and then transported out of the area. Three days after the sale, foot and mouth disease is confirmed and DAFWA activate their response plans. Five days after the sale a national stock standstill is put in place to prevent further spread. All infected animals are destroyed. |
| Bushfire | Extreme fire weather occurs during the January holiday period. Over the Australia Day weekend, winds start north-easterly and turn westerly during the day. Dry lightning ignites near Scotsdale and Mt Lindsay roads (north-west of Denmark) and an hour later another fire is ignited in Little Grove. The fire north-west of Denmark escalates out of control due to changing wind conditions and moves towards Denmark. Fires impact on the Denmark and Little Grove town sites. Residential properties are cut off from the South Coast Highway and Ocean Beach Road. |
| Earthquake | A magnitude 5.7 earthquake occurs in the centre of Albany at a depth of 5 km at midday on a Thursday in June. The earthquake results in extensive damage within the district, especially for older buildings that do not withstand the earthquake shaking. Albany hospital, airport and port silo structures sustain damage. Potable water supply pipes and the York Street pump station are also damaged. |
| Flood | A strong, slow-moving storm and associated rainband across the Great Southern District results in over 300 mm of rainfall over five days with daily totals up to 150 mm. Above-average rainfall in the preceding year exacerbates flood severity. Significant stream rises and major flooding is expected in Frankland River, Kent River, Denmark River and Albany coastal catchments. |
| Marine transport emergency | In January a passenger cruise ship with 4800 people on board strikes the Gio Batta Reef while inbound to the Port of Albany. The ship is sitting 8 km east off the harbour entrance sinking in 16 m of water. The ship has been evacuated and most passengers and crew have disembarked. About 150 people are unaccounted for and a number of people on lifeboats have serious injuries. Heavy oil is leaking from the ship and is heading towards Middleton Beach and into both Oyster and Princess Royal harbours. This occurs during summer time when there is limited accommodation available in Albany and the port is operating with limited staff. |
| Storm | A strong, slow-moving cold front moves over the South West of the state. Heavy rainfall occurs ahead of the front with daily totals up to 150 mm. The heavy rainfall leads to localised flash flooding across the district. A tornado associated with the storm passes through Yakamia and Spencer parks in Albany. Destructive wind gusts up to 150 km/h cause damage to powerlines, homes and schools. |

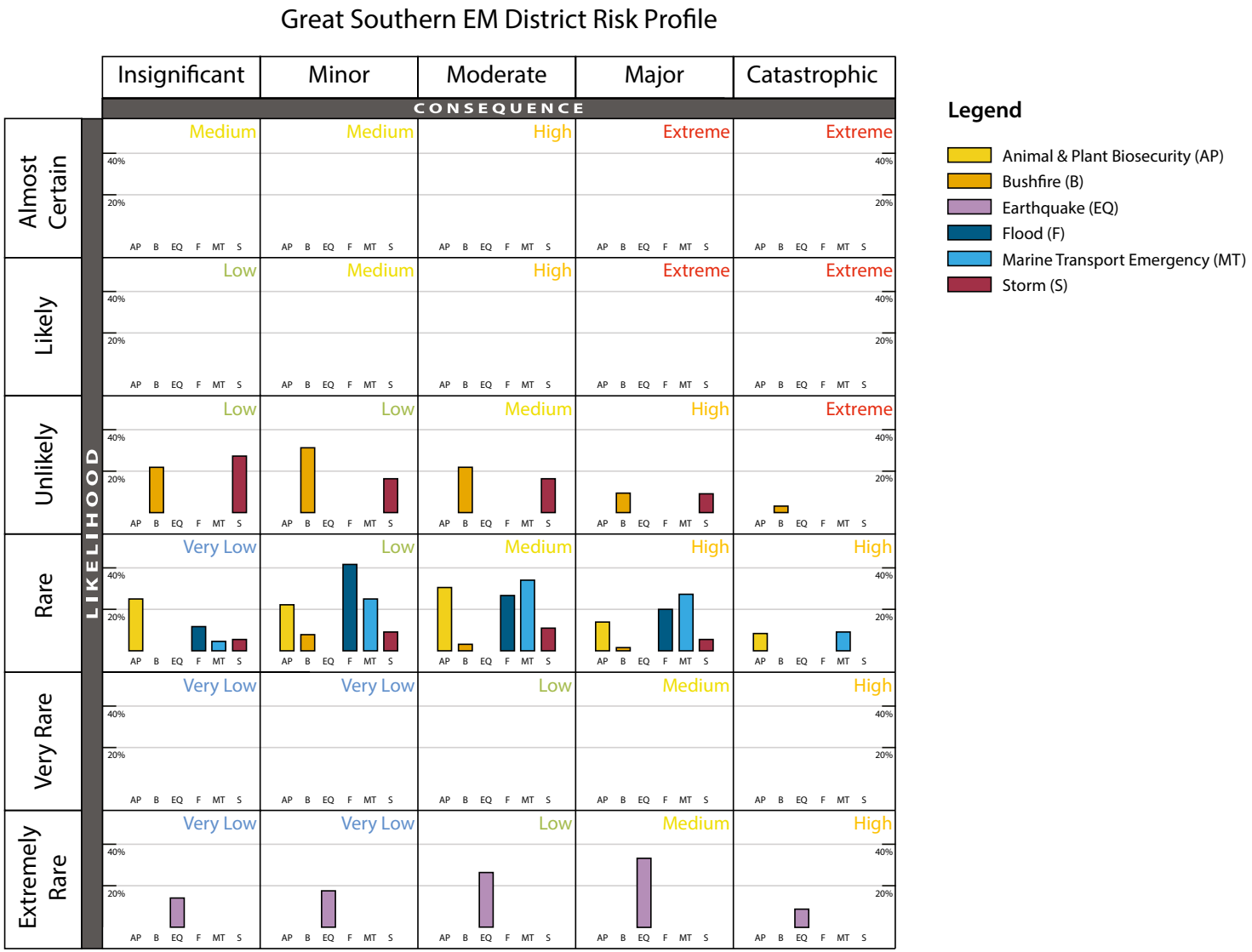



Figure C1. Great Southern EM District risk profile: percentage of risk statements shown according to their consequence, likelihood and risk level

## Kimberley EM District hazard scenarios

| Hazard | Scenario |
|---|---|
| Bushfire | Late in the dry season (September–October), all vegetation in the district is 100 per cent cured. Extreme fire danger occurs over three days. Deliberately lit fires are ignited along the Great Northern Highway east of Broome and on the Cape Leveque Road north of Broome. The fires escalate out of control with the change in wind direction. Roads in the two areas are cut off and residential buildings are impacted. |
| Cyclone | A category 5 cyclone crosses the coast just south of Broome during the April school holidays. Broome is exposed to very destructive winds over 200 km/h. The cyclone continues to track inland. Heavy rainfall (200–400 mm) occurs over 48 hours. The heaviest rainfall occurs around Broome and the Dampier Peninsula. The cyclone also causes a 7.5 m storm surge on top of a spring high tide. |
| Flood | During the northern wet season, a monsoonal low passes across the district resulting in heavy rainfall. About 400 mm of rain falls over three days, with 250 mm in one day. Significant stream rises and major flooding occurs across the district. Flooding is exacerbated by above-average rainfall in the preceding months. |
| Human epidemic | The scenario concerns the spread of H5N1R5-alpha influenza virus. Two cases of severe respiratory illness were admitted to Fitzroy Crossing Hospital and a family connection advises of a third case. Patients are transferred to Broome Hospital. One patient recovers, one deteriorates and the third died. A fourth patient, a foreign national who was attending a festival, died from severe pneumonia and post-mortem pathology confirmed the H5N1R5-alpha influenza virus. At least 105 people are known to have been in contact with infected people, 68 of whom have been contacted and quarantined. There are limited staff and a shortage of isolation rooms in clinics and hospitals in the district. |
| Road crash | During peak tourist season (July–August), a head-on collision occurs between a road train carrying fuel and a tourist bus on the Willare Bridge. Fuel from the truck's tank spills and enters the river. Some of the fuel ignites, damaging the bridge. The tourist bus crashed off the bridge and into the river below, causing injuries and deaths. There is no alternate road available for traffic and, due to the remote location, difficulties are experienced getting recovery equipment to the site. |

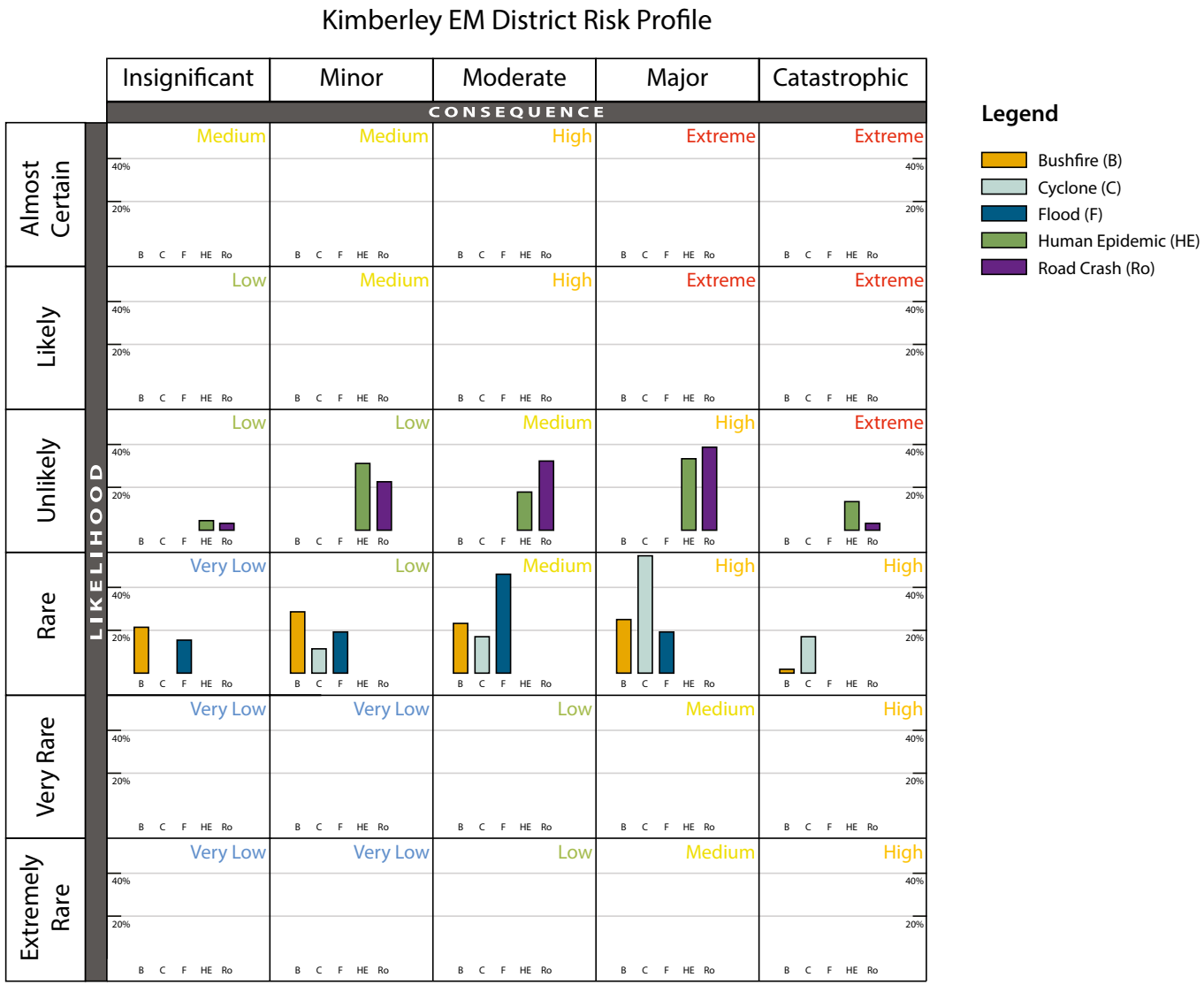



Figure C2. Kimberley EM District risk profile: percentage of risk statements shown according to their consequence, likelihood and risk level

## Wheatbelt EM District hazard scenarios

| Hazard | Scenario |
|---|---|
| Bushfire | Extreme fire weather warnings are in place across the district in December following a hot start to the summer with little rain. A large storm with strong winds moves south-east. Dry lightning ignites four large fires north of the towns of Gingin, Bindoon, Toodyay and Northam. A change in wind direction to the South West pushes the fires into Gingin and Toodyay. All four towns are evacuated. The Great Northern and Great Eastern highways are closed and rail lines are disrupted. Agriculture in the region is severely impacted. The fires remain uncontrolled for 3–4 days. |
| Earthquake | A magnitude 7 earthquake occurs on the Meckering Scarp, 28 km east of Northam, at a depth of 5 km. The earthquake occurs on a Sunday afternoon during a street festival in York. Vulnerable masonry buildings near the epicentre collapse and there is damage to other building types, including homes. Transportation routes, including rail lines and the Great Eastern Highway, are damaged and interrupted. The Goldfields Water Supply Pipeline is also impacted. |
| Flood | In January, a former tropical cyclone and now a tropical low results in heavy rain and significant flooding over the district. Rainfall totals over two days are over 100 mm with isolated totals of up to 140 mm. Above-average rainfall in the preceding year and recent rainfall has created wet catchments prior to the rainfall event that exacerbated the flooding. Significant stream rises and major flooding occurs in Northam, York, Beverley and Toodyay and moderate flooding in other catchments across the Wheatbelt. |
| Rail crash | On a Sunday evening in winter, the Indian Pacific passenger train travelling east derails on an overbridge (over the Great Eastern Highway), east of Carrabin. As the train derails, it hits the bridge columns, causing the middle section of the bridge to collapse. The train wreckage comes to rest on Great Eastern Highway. The highway is blocked for at least a week. Injuries and deaths are likely to occur as a result of the derailment. |
| Storm | A category 3 extra-tropical cyclone makes landfall north of Perth some time in March. The cyclone is moving south-east and is expected to impact York. Heavy rain (150–200 mm) occurs south of the cyclone track, with hot and windy conditions north of the track. Winds are destructive to very destructive with peak gusts of 180 km/h at Northam. Damage is expected throughout the district. |

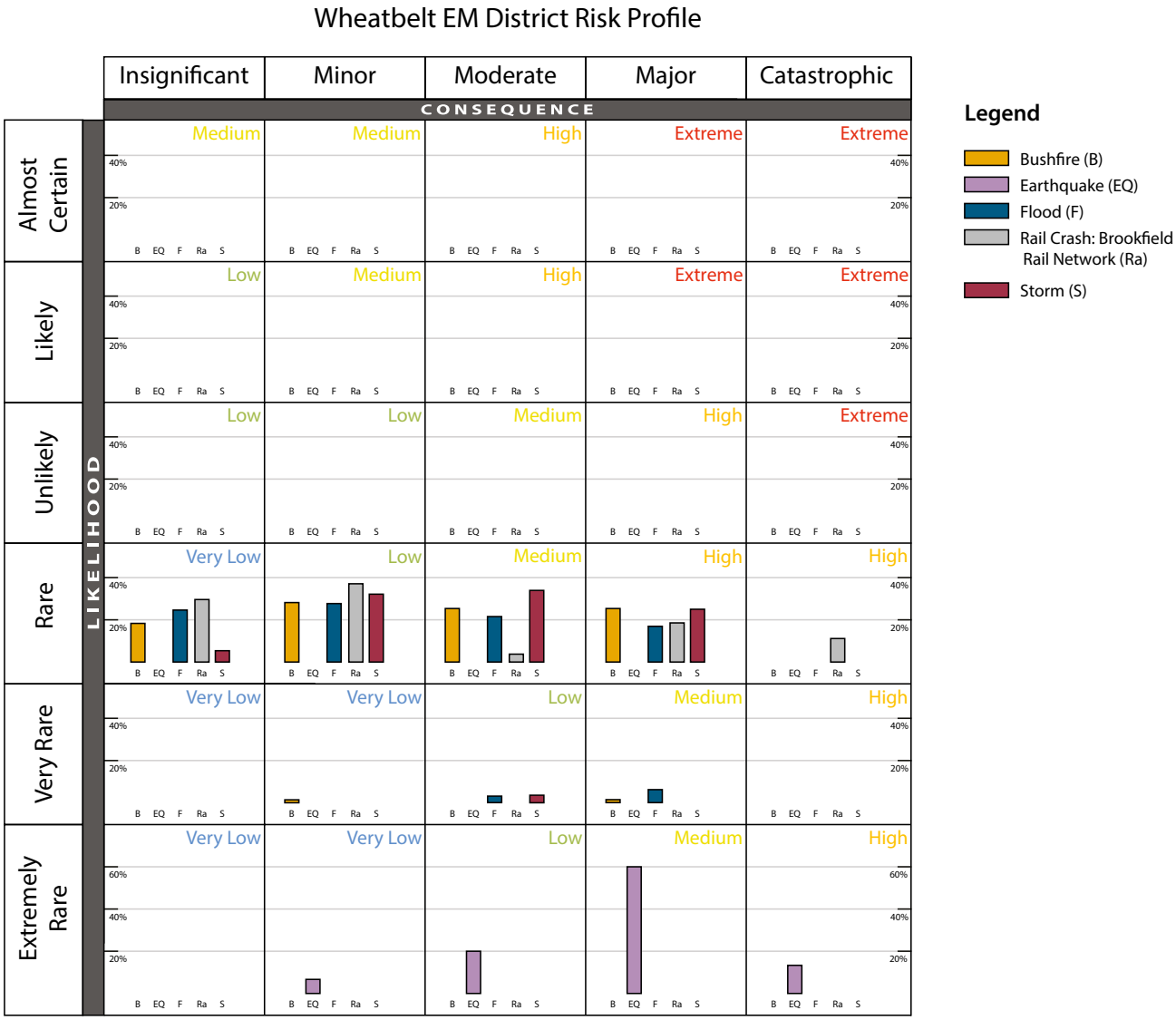
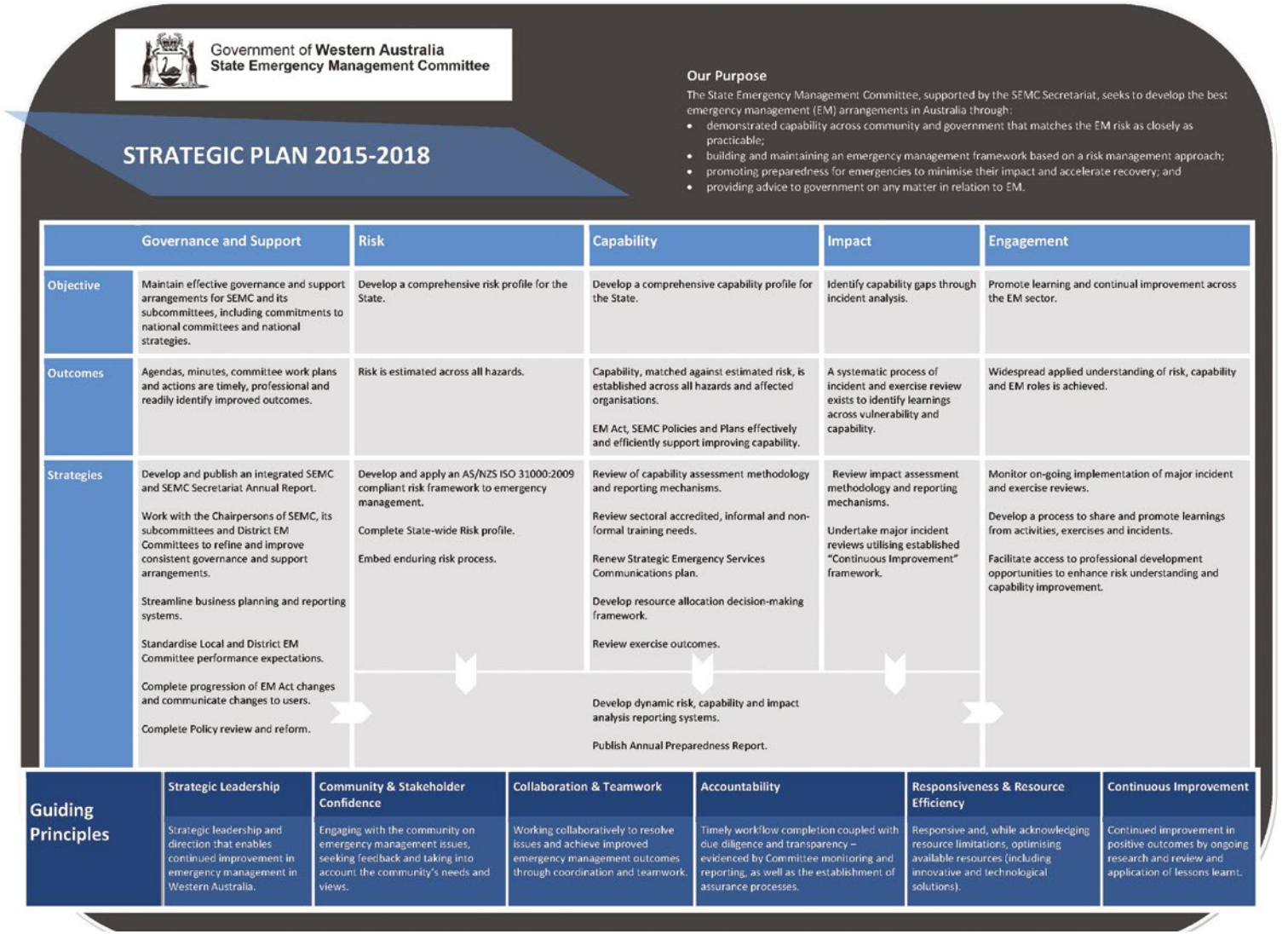



Figure C3. Wheatbelt EM District risk profile: percentage of risk statements shown according to their consequence, likelihood and risk level

# Appendix D. SEMC strategic plan 2015–2018



## Appendix E. Western Australian Emergency Management Capability Framework

| | | |
|---|---|---|
| **Governance** | | |
| Legislation | 1.1 | Comprehensive EM legislation exists that is current, appropriate and congruent with supporting legislation. |
| Policies | 1.2 | State level policies are appropriate, useful, usable and used, and the intent of these policies flows consistently through individual supporting agencies. |
| EM plans | 1.3 | EM plans (Westplans) are comprehensive, documented and predetermined processes and procedures are in place. |
| | 1.4 | EM plans are regularly reviewed, exercised and tested. |
| **Analysis and continuous improvement** | | |
| Risk assessment | 2.1 | Agencies have the ability to and regularly conduct relevant risk assessments and the findings are implemented and shared with relevant stakeholders. |
| Horizon scanning | 2.2 | Organisations examine existing and ongoing hazard research. |
| | 2.3 | Pre-emergency situational awareness occurs through examination of international and interstate events that may impact locally. |
| | 2.4 | Implement best practice identified through hazard research and pre-emergency situational awareness. |
| Lessons management | 2.5 | Performance is reviewed following an incident, emergency or exercise and appropriate treatments are implemented based upon the findings. |
| **Community involvement** | | |
| Public information | 3.1 | Messages to communities at all stages of EM are planned, coordinated, prompt, reliable and actionable. |
| | 3.2 | The messages are clear, consistent, accessible and culturally and linguistically appropriate. |
| Risk awareness and understanding | 3.3 | The community is aware of the hazards that may affect them, the vulnerable elements, and understand the role they should play during an emergency. |
| Shared ownership | 3.4 | Individuals take responsibility to minimise the impacts of emergencies through the preparation and adoption of appropriate mitigation measures. This includes individuals who understand the nature of the hazard, have emergency action plans and who monitor and respond to emergency messaging and alerts. |
| Sector information sharing | 3.5 | Engagement occurs between government, industry and communities to share EM information including risks, vulnerabilities and treatment options. |

| | | |
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| **Planning and mitigation** | | |
| Land-use planning | 4.1 | Land-use planning is in place to manage and minimise the impact of known risks. |
| Ecosystem management | 4.2 | The ecosystem is effectively managed to preserve natural barriers that aid community protection and biosecurity maintenance. |
| Infrastructure protection | 4.3 | Plans are in place to identify and protect critical infrastructure, community assets and individual housing. |
| | 4.4 | Effective use of building codes is in place to mitigate potential hazards, and insurance is considered as a treatment option. |
| Essential services protection | 4.5 | Planning for the continuity or rapid restoration of essential services is in place including for water, food distribution, power, sewerage, telecommunications, fuel and local government services. |
| Minimise single points of failure | 4.6 | Exposure to hazards is limited through the minimisation of single points of failure and that mitigation options or redundancy planning are in place. |
| Remoteness planning | 4.7 | EM planning takes account of emergencies occurring in remote areas of the state. |
| Business continuity planning | 4.8 | Business continuity plans are in place across government, industry and business, and consider hazard specific risks. |
| Community activities | 4.9 | Consideration is given to the protection and rapid reestablishment of community activities. This may include cultural and community events, sporting activities and schooling. |
| **Resources** | | |
| People | 5.1. | Agencies have appropriate levels of trained, capable and supported people to effectively undertake all aspects of EM. |
| Volunteering | 5.2. | A clear strategy exists for the recruitment, retention and ongoing training of volunteers that addresses motivation and barriers. |
| | 5.3 | A strategy exists to manage Good Samaritans and spontaneous volunteers. |
| Finance and administration | 5.4. | Robust financial and administrative processes exist to capture and track EM expenditure. |
| | 5.5 | Funding for proactive measures and mitigation is available and sufficient. |
| | 5.6 | Adequate funding arrangements are in place to manage the response and recovery phases of a large-scale emergency. |
| Equipment/critical resources | 5.7. | Organisations have or can readily access appropriate infrastructure and equipment during an emergency. |
| | 5.8 | Equipment can be mobilised during an emergency and plans are in place to address pre-deployment, peak surges and redundancies for outages. |

| Emergency response | |
|---|---|
| Command, control and coordination | 6.1. Pre-established and well understood protocols and structures exist that define the interrelationships between stakeholders during an event and facilitate effective command, control and coordination. |
| Situational assessment | 6.2. Situational assessments are undertaken to accurately inform decision makers about the nature and extent of the hazard, vulnerable elements and what resources are required. |
| Evacuation | 6.3. Agencies have the resources and skills to undertake both directed and voluntary evacuation of both people and animals.<br>6.4. Suitable sites have been identified and are available that maintain the provision of critical goods and services (e.g. food, potable water, shelter). |
| Public protection | 6.5. Necessary measures exist to control access and verify the identity of personnel or members of the public seeking entry to critical locations.<br>6.6. Organisations have the ability to protect against unwanted activity within an impacted area. |
| Agency interoperability | 6.7. Effective and interoperable communication systems (including incident management systems) exist to allow seamless communications during an emergency.<br>6.8 Interagency cultural differences are identified and managed so as not to impede or inhibit effective response. |
| Mass casualty management | 6.9. Pre-hospital – mass casualty management services are available, timely and sufficient during an emergency event. This includes pre-hospital treatments of first aid (physiological and psychological), ambulance, aero-medical retrieval and medical teams.<br>6.10 Hospital – mass casualty management is considered within workforce and 'surge' planning, including the provision and maintenance of specialist services, community health and early discharge programs. |

| Impact management and recovery coordination | | |
|---|---|---|
| Mass fatality management | 7.1 | Services are available to deal with a mass fatality incident. This includes body recovery, disaster victim identification, mortuary, burial and cremation services, and the management of information. |
| Welfare | 7.2 | Welfare and social services are available, timely and sufficient during and immediately after an emergency event. This includes critical support services and communication plans to inform affected people of impacts. |
| Impact assessment | 7.3. | Agencies have the ability to undertake and complete comprehensive impact assessments across the natural, built, social and economic environments. These findings inform recovery coordination and future EM planning. |
| Recovery coordination and rehabilitation | 7.4. | Agencies have the resources and skills to aid impacted communities in restoring the normal state. This includes rehabilitation of the natural, built, social and economic environments. |
| | 7.5 | Recovery arrangements are in place following a major emergency. This should include engagement between HMAs, local government, NGOs, industry and communities, and should consider long-term impacts. |

# Appendix F. Emergency situation declarations

Section 50 of the *Emergency Management Act 2005* allows for the declaration of an 'emergency situation' by the HMA or State Emergency Coordinator. An 'emergency situation' may be declared where the HMA or State Emergency Coordinator is satisfied that an emergency has occurred, is occurring, or is imminent, and that Part 6 powers of the EM Act are required to prevent or minimise:

- loss of life, prejudice to the safety, or harm to the health, of persons or animals
- destruction of, or damage to, property
- destruction of, or damage to, any part of the environment.

The declaration of an 'emergency situation' allows for hazard management officers, appointed by the HMA, to exercise emergency powers under Part 6 of the EM Act. These powers include, but are not limited to:

- obtaining identifying particulars
- movement and evacuation of people
- using vehicles or property
- exchanging information for emergency management purposes.

In 2015–16, only one emergency situation was declared; in respect of the Murray Road Incident (Waroona fire) in the South West. However, this declaration was extended on six separate occasions to allow for the continued use of EM powers during recovery.

On 7 January 2016, the Fire and Emergency Services Commissioner declared an emergency situation for the shires of Waroona and Harvey. The declaration was extended successively on the following dates:

- On 10 January, the State Emergency Coordinator extended the declaration for a further seven days
- On 15 January, for a further seven days
- On 21 January, until 30 June, to allow for EM powers to be used to assist the recovery efforts. These powers were specifically limited to s. 69 of the EM Act to allow for the use of property, and s. 72 to allow for the exchange of information for EM purposes
- On 28 June, until 31 July – again, limited to ss. 69 and 72 of the Act
- On 12 July, until 30 August – again, limited to ss. 69 and 72 of the Act.
- On 22 August, until 31 October – again, limited to ss. 69 and 72 of the Act.

## Appendix G. Incident levels

**An incident level is broadly defined by meeting one or more of the following typical conditions:**

| Level 1 | Level 2 | Level 3 |
|---|---|---|
| • There are no significant issues.<br>• There is a single or limited multi-agency response (day-to-day business).<br>• The incident area is limited in extent (i.e. to one jurisdiction or district).<br>• The response duration is within a single shift.<br>• Resources can be sourced from one local government district.<br>• There is minimal impact on the community and critical infrastructure.<br>• The incident can be managed by a Controlling Agency incident management team only.<br>• There is a low level of complexity.<br>• There is potential for incident escalation. | • A limited multi-agency response is required.<br>• Coordination of multi-agency resources is required.<br>• There is a duration covering multiple shifts.<br>• There is medium term impact on critical infrastructure.<br>• Resources are sourced from district or State level.<br>• There is a medium level of complexity.<br>• One or two incident areas are involved.<br>• There is a medium impact on the community (health, safety, economic, technological or other).<br>• There is potential for the incident to be declared an 'emergency situation.<br>• The incident involves multiple hazards. | • Requires significant coordination of a multi-agency response.<br>• There is a protracted response duration.<br>• There is significant impact on critical infrastructure.<br>• Resources need to be sourced from State, National and even International level.<br>• There is a high level of complexity.<br>• There is significant impact on the routine functioning of the community (health, safety, economic, technological or other).<br>• There are multiple incident areas.<br>• Evacuation and/or relocation of community is required.<br>• There is actual or potential loss of life or multiple, serious injuries.<br>• A declaration of an 'emergency situation' or 'state of emergency' is likely. |

**Satisfying one or more of the typical conditions of a Level 2 or Level 3 incident does not automatically necessitate an escalation to that level. The 'typical conditions' listed are provided for consideration only, and the escalation of an incident is at the discretion of the Incident Controller.**

## Appendix H. Status of state hazard plans (Westplans)

| | Hazard management agency | Hazard specific plan (status) | Hazard | Date of Westplan exercise and name | Date of state-level incident and name |
|---|---|---|---|---|---|
| 1 | Commissioner of Police | Westplan Air Crash (current) | **Air crash** | Exercise Air Coordination, June 2016 | Nil |
| 2 | Agriculture Director General | Westplan Animal and Plant Biosecurity (current) | **Animal or plant pests or diseases** | Exercise APOLLO, May 2016 | Nil |
| 3 | Fire and Emergency Services Commissioner | Westplan Collapse (current) | **Collapse** – injury or threat to life of persons trapped by the collapse of a structure or landform | Exercise Saw Point, 31/8/2015 – 2/9/2015 | Nil |
| 4 | Fire and Emergency Services Commissioner | Westplan Cyclone (current) | **Cyclone** | Exercised through actual incident* | Tropical cyclone Stan, 29–31 January 2016 |
| 5 | Fire and Emergency Services Commissioner | Westplan Earthquake (current) | **Earthquake** | Exercise Magnitude, 22 April 2015 | Nil |
| 6 | Coordinator of Energy | Westplan Electricity Supply Disruption (current) | **Electricity supply disruption** – Loss of or interruption to the supply of electricity that is capable of causing or resulting in loss of life, prejudice to the safety, or harm to the health of a person | Exercise Tasmania, June 2016 | Nil |

| | Hazard management agency | Hazard specific plan (status) | Hazard | Date of Westplan exercise and name | Date of state-level incident and name |
|---|---|---|---|---|---|
| 7 | Fire and Emergency Services Commissioner | Westplan Fire (current) | **Fire** | State Fire Exercise, October 2015 | Esperance fires, November 2015<br>Waroona fire, January 2016 |
| 8 | Fire and Emergency Services Commissioner | Westplan Flood (current) | **Flood** | Exercise Aqua, April 2016 | Nil |
| 9 | Coordinator of Energy | Westplan Gas Supply Disruption (current) | **Gas supply disruption –** Loss of or interruption to the supply of natural gas that is capable of causing or resulting in loss of life, prejudice to the safety, or harm to the health of a person | Exercise Mingled, June 2015 | Nil |
| 10 | State Health Coordinator *(Biological)* | Incorporated in Westplan Chemical, Biological, Radiological and Nuclear | **HAZMAT (biological)** – Actual or impending spillage, release or escape of a biological substance that is capable of causing loss of life, injury to a person or damage to the health of a person, property or the environment | | Nil |

| | Hazard management agency | Hazard specific plan (status) | Hazard | Date of Westplan exercise and name | Date of state-level incident and name |
|---|---|---|---|---|---|
| 11/12/13 | Fire and Emergency Services Commissioner<br>(*Chemical, Radiological* | Westplan Chemical, Biological, Radiological and Nuclear (current) | Actual or impending spillage, release or escape of a chemical, radiological or other substance that is capable of causing loss of life, injury to a person or damage to the health of a person, property or the environment | Exercise Iron Sentinel, June 2015<br>CBRN Tabletop Exercise, August 2015 | Nil |
| | *other substance (HAZMAT)* | Westplan Hazardous Materials Emergencies [HAZMAT]<br>(under review) | | Exercise Drum Plug, June 2015<br>Campbell Barracks HAZMAT Exercise, August 2015<br>Broome Chlorine Exercise, February 2016 | |
| 14 | State Health Coordinator | Westplan Heatwave (current) | **Heatwave** | Exercised through actual incident* | South West heatwave event, February 2016 |
| 15 | State Human Epidemic Controller | Westplan Human Epidemic (current) | **Human epidemic** | Ebola preparedness and exercises, December 2014 – February 2015 | Nil |
| 16 | Commissioner of Police | Westplan Land Search (current) | **Land search** – for persons lost or in distress, that requires a significant coordination of search operations | Exercise Last Known Place (LKP), June 2016 | Nil |

| | Hazard management agency | Hazard specific plan (status) | Hazard | Date of Westplan exercise and name | Date of state-level incident and name |
|---|---|---|---|---|---|
| 17 | Coordinator of Energy | Westplan Liquid Fuel Supply Disruption (current) | **Liquid fuel supply disruption –** Loss of or interruption to the supply of liquid fuel as defined in the *Liquid Fuel Emergency Act 1984* (Cwlth) s. 3(1) that is capable of causing or resulting in loss of life, prejudice to the safety, or harm to the health of a person | Exercise Mingled, June 2015 | Nil |
| 18 | Marine Safety, General Manager | Westplan Marine Oil Pollution (current) | **Marine oil pollution –** Actual or impending spillage, release or escape of oil or an oily mixture that is capable of causing loss of life, injury to a person or damage to the health of a person, property or the environment | Exercise Beadon (Phase 1), June 2016 | Nil |
| 19 | Commissioner of Police | Westplan Marine Search and Rescue [MARSAR] (current) | **Marine search** – for persons lost or in distress on inland waterways within the limits of a port or in a fishing vessel or pleasure craft within the limits of a port or at sea | Exercised through actual incident* | North West WA – MARSAR Incident, July 2015 |
| 20 | Marine Safety, General Manager | Westplan Marine Transport Emergency (under review) | **Marine transport emergency** – Actual or impending event involving a ship that is capable of causing loss of life, injury to a person or damage to the health of a person, property or the environment | Exercise Beadon (Phase 1), June 2016 | Nil |

| | Hazard management agency | Hazard specific plan (status) | Hazard | Date of Westplan exercise and name | Date of state-level incident and name |
|---|---|---|---|---|---|
| 21 | Commissioner of Police | Westplan Nuclear Powered Warships (current) | **Radiation escape from a nuclear-powered warship** | Exemption granted by SEMC (Resolution 7 July 2015) | Nil |
| 22 | Public Transport Authority (PTA) | Westplan Rail Crash PTA (current) | **Rail crash** (passenger) | Exercise scheduled for Nov/Dec 2016 | Nil |
| | Brookfield Rail Pty Ltd | Westplan Brookfield Rail Crash Emergencies (current) | **Rail crash** (freight) | Nil** | Nil |
| 23 | Commissioner of Police | Westplan Road Crash (current) | **Road crash** | Exemption granted by SEMC (Resolution 77/2015) | Nil |
| 24 | Commissioner of Police | Westplan Space Re-entry Debris [SPRED] (current) | **Space re-entry debris** | Exemption granted by SEMC (Resolution 77/2015) | Nil |
| 25 | Fire and Emergency Services Commissioner | Westplan Storm (current) | **Storm** | Exercise Aqua, April 2016 | Nil |
| 26 | Commissioner of Police | Westplan Terrorist Act (current) | **Terrorist act** | Exercise Spartan, April 2016 | Nil |

| | Hazard management agency | Hazard specific plan (status) | Hazard | Date of Westplan exercise and name | Date of state-level incident and name |
|---|---|---|---|---|---|
| 27 | Fire and Emergency Services Commissioner | Westplan Tsunami (current) | **Tsunami** | Exercise Indian Ocean Wave scheduled for September 2016 | Nil |

* In accordance with State EM Policy Statement 4.8.5, where the response part of a Westplan is activated or arrangements used during an emergency, this activation may satisfy the field exercise requirement. This is provided the agency involved prepares and submits a post-incident report that meets the post-exercise reports requirements, as detailed in State EM Preparedness Procedure 19.

** Brookfield Rail participated in a DFES led exercise in April 2016.

# Appendix I. Recommendation tracking

| | Keelty, 2011 | Keelty, 2012 | | | Noetic Solutions, 2012 | | | SEMC, 2014 | SEMC, 2016 | Ferguson, 2016 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perth Hills | Margaret River | | Margaret River | | Nannup | | Parkerville | O'Sullivan | | |
| | Recommendations | Recommendations | Commitments | Lesson | Action | Lesson | Action | Recommendations | Recommendations | Recommendations | Opportunities |
| Recommendation 1 | | | | | | | | | | | |
| Recommendation 2 | | | | | | | | | | | |
| Recommendation 3 | | | | | | | | | | | |
| Recommendation 4 | | | | | | | | | | | |
| Recommendation 5 | | | | | | | | | | | |
| Recommendation 6 | | | | | | | | | | | |
| Recommendation 7 | | | | | | | | | | | |
| Recommendation 8 | | | | | | | | | | | |
| Recommendation 9 | | | | | | | | | | | |
| Recommendation 10 | | | | | | | | | | | |
| Recommendation 11 | | | | | | | | | | | |
| Recommendation 12 | | | | | | | | | | | |
| Recommendation 13 | | | | | | | | | | | |
| Recommendation 14 | | | | | | | | | | | |
| Recommendation 15 | | | | | | | | | | | |
| Recommendation 16 | | | | | | | | | | | |
| Recommendation 17 | | | | | | | | | | | |
| Recommendation 18 | | | | | | | | | | | |
| Recommendation 19 | | | | | | | | | | | |
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| Recommendation 25 | | | | | | | | | | | |
| Recommendation 26 | | | | | | | | | | | |
| Recommendation 27 | | | | | | | | | | | |
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| Recommendation 48 | | | | | | | | | | | |
| Recommendation 49 | | | | | | | | | | | |
| Recommendation 50 | | | | | | | | | | | |
| Recommendation 51 | | | | | | | | | | | |
| Recommendation 52 | | | | | | | | | | | |
| Recommendation 53 | | | | | | | | | | | |
| Recommendation 54 | | | | | | | | | | | |
| Recommendation 55 | | | | | | | | | | | |
| Recommendation 56 | | | | | | | | | | | |
| Recommendation 57 | | | | | | | | | | | |
| Recommendation 58 | | | | | | | | | | | |

| | |
|---|---|
| | Complete |
| | Intent not fulfilled / in progress / unable to measure |
| | Incomplete |
| | No further recommendations |
| | Progress not assessed by Ferguson review |

# Appendix J. Respondents

| HAZARD MANAGEMENT AGENCIES | | | |
|---|---|---|---|
| **Agency** | | **Agency** | |
| Department of Agriculture and Food | ✓ | Public Transport Authority | ✓ |
| Department of Finance, Public Utilities Office | ✓ | Department of Transport (Marine Safety) | ✓ |
| Department of Fire and Emergency Services | ✓ | WA Police | ✓ |
| Department of Health | ✓ | Brookfield Rail Pty | ✓ |

| EMERGENCY MANAGEMENT AGENCIES | | | |
|---|---|---|---|
| **Agency** | | **Agency** | |
| Australian Red Cross (WA) | ✓ | Department of Housing | ✓ |
| Bureau of Meteorology | ✓ | Department of Parks and Wildlife | ✓ |
| Defence Force (Cwlth) | ✓ | Department of the Premier and Cabinet | ✓ |
| Department of Planning | ✓ | Main Roads WA | ✓ |
| Department for Child Protection and Family Support | ✓ | St John Ambulance Australia (WA) | ✓ |
| Department of Education | ✓ | Water Corporation | ✓ |
| Department of Environment and Regulation | ✓ | Western Australian Local Government Association (WALGA) | ✓ |

| SERVICE PROVIDERS | | | |
|---|---|---|---|
| **Agency** | | **Agency** | |
| ATCO Gas | ✓ | Insurance Council of Australia | ✓ |
| Dampier Bunbury Pipeline | ✓ | Telstra | ✓ |
| Forest Products Commission | * | Western Power | ✓ |
| Horizon Power | ✓ | National Broadband Network – Australia | ✓ |

* Technical issues with the data collection tool did not appropriately capture contributions by the Forest Products Commission

| LOCAL GOVERNMENTS | | | | | | | |
|---|---|---|---|---|---|---|---|
| City of Albany | ✓ | Shire of Bruce Rock | ✓ | Shire of Kellerberrin | ✓ | Shire of Sandstone | ✓ |
| City of Armadale | ✓ | Shire of Capel | ✓ | Shire of Kent | ✓ | Shire of Serpentine–Jarrahdale | ✓ |
| City of Bayswater | ✓ | Shire of Carnamah | × | Shire of Kojonup | ✓ | Shire of Shark Bay | ✓ |
| City of Belmont | ✓ | Shire of Carnarvon | ✓ | Shire of Kondinin | ✓ | Shire of Tammin | ✓ |
| City of Bunbury | ✓ | Shire of Chapman Valley | ✓ | Shire of Koorda | ✓ | Shire of Three Springs | ✓ |
| City of Busselton | ✓ | Shire of Chittering | ✓ | Shire of Kulin | ✓ | Shire of Toodyay | ✓ |
| City of Canning | ✓ | Shire of Collie | ✓ | Shire of Lake Grace | ✓ | Shire of Trayning | ✓ |
| City of Cockburn | ✓ | Shire of Coolgardie | ✓ | Shire of Laverton | × | Shire of Upper Gascoyne | ✓ |
| City of Fremantle | ✓ | Shire of Coorow | ✓ | Shire of Leonora | ✓ | Shire of Victoria Plains | ✓ |
| City of Gosnells | ✓ | Shire of Corrigin | ✓ | Shire of Manjimup | ✓ | Shire of Wagin | ✓ |
| City of Greater Geraldton | ✓ | Shire of Cranbrook | ✓ | Shire of Meekatharra | ✓ | Shire of Wandering | ✓ |
| City of Joondalup | ✓ | Shire of Cuballing | ✓ | Shire of Menzies | ✓ | Shire of Waroona | ✓ |
| City of Kalgoorlie–Boulder | ✓ | Shire of Cue | ✓ | Shire of Merredin | ✓ | Shire of West Arthur | ✓ |
| City of Karratha | ✓ | Shire of Cunderdin | ✓ | Shire of Mingenew | ✓ | Shire of Westonia | ✓ |
| City of Kwinana | ✓ | Shire of Dalwallinu | ✓ | Shire of Moora | ✓ | Shire of Wickepin | ✓ |
| City of Mandurah | ✓ | Shire of Dandaragan | ✓ | Shire of Morawa | ✓ | Shire of Williams | ✓ |
| City of Melville | ✓ | Shire of Dardanup | ✓ | Shire of Mt Magnet | × | Shire of Wiluna | ✓ |
| City of Nedlands | ✓ | Shire of Denmark | ✓ | Shire of Mt Marshall | ✓ | Shire of Wongan–Ballidu | ✓ |
| City of Perth | ✓ | Shire of Derby/West Kimberley | ✓ | Shire of Mukinbudin | ✓ | Shire of Woodanilling | ✓ |
| City of Rockingham | ✓ | Shire of Donnybrook–Balingup | ✓ | Shire of Mundaring | ✓ | Shire of Wyalkatchem | ✓ |
| City of South Perth | ✓ | Shire of Dowerin | ✓ | Shire of Murchison | ✓ | Shire of Wyndham – East Kimberley | ✓ |

| LOCAL GOVERNMENTS | | | | | | | |
|---|---|---|---|---|---|---|---|
| City of Stirling | ✓ | Shire of Dumbleyung | ✓ | Shire of Murray | ✓ | Shire of Yalgoo | ✓ |
| City of Subiaco | ✓ | Shire of Dundas | × | Shire of Nannup | ✓ | Shire of Yilgarn | ✓ |
| City of Swan | ✓ | Shire of East Pilbara | ✓ | Shire of Narembeen | ✓ | Shire of York | ✓ |
| City of Vincent | ✓ | Shire of Esperance | ✓ | Shire of Narrogin | ✓ | Town of Bassendean | ✓ |
| City of Wanneroo | ✓ | Shire of Exmouth | ✓ | Shire of Ngaanyatjarraku | ✓ | Town of Cambridge | ✓ |
| Shire of Ashburton | ✓ | Shire of Gingin | ✓ | Shire of Northam | ✓ | Town of Claremont | ✓ |
| Shire of Augusta – Margaret River | ✓ | Shire of Gnowangerup | ✓ | Shire of Northampton | ✓ | Town of Cottesloe | ✓ |
| Shire of Beverley | ✓ | Shire of Goomalling | ✓ | Shire of Nungarin | × | Town of East Fremantle | ✓ |
| Shire of Boddington | ✓ | Shire of Halls Creek | ✓ | Shire of Peppermint Grove | ✓ | Town of Mosman Park | ✓ |
| Shire of Boyup Brook | ✓ | Shire of Harvey | ✓ | Shire of Perenjori | ✓ | Town of Narrogin | ✓ |
| Shire of Bridgetown–Greenbushes | ✓ | Shire of Irwin | ✓ | Shire of Pingelly | ✓ | Town of Port Hedland | ✓ |
| Shire of Brookton | ✓ | Shire of Jerramungup | ✓ | Shire of Plantagenet | ✓ | Town of Victoria Park | ✓ |
| Shire of Broome | ✓ | Shire of Kalamunda | ✓ | Shire of Quairading | ✓ | Rottnest Island Authority | ✓ |
| Shire of Broomehill–Tambellup | ✓ | Shire of Katanning | ✓ | Shire of Ravensthorpe | ✓ | | |

# Appendix K. State risk profile

Results of the State Risk Project risk assessments can be shown visually using 'risk matrix graphs'.

The fundamental 'unit' of these graphics is a percentage of risk statements assessed, as the number of statements assessed differs between hazards. It can easily be distributed by consequence or likelihood level, by risk level or by impact category.

The full spectrum of state level risks is displayed in Figure K2. Risk levels for the Great Southern (Appendix C, Figure C1), Kimberley (Appendix C, Figure C2) and Wheatbelt (Appendix C, Figure C3) districts are also shown. These graphs show the risk statements as a percentage as they sit on the NERAG risk matrix.

The matrix depicts the consequence as columns and the likelihood as rows. The resulting risk level as described in the national NERAG is shown in the top right corner of each cell. The matrix cells contain graphs bars, one bar for each hazard representing the percentage of risk statements for each hazard that fall into that cell. Figure K1 explains these features.

The state graph uses the risk criteria set out in the 2010 NERAG and the district graphs use criteria from the 2015 NERAG.

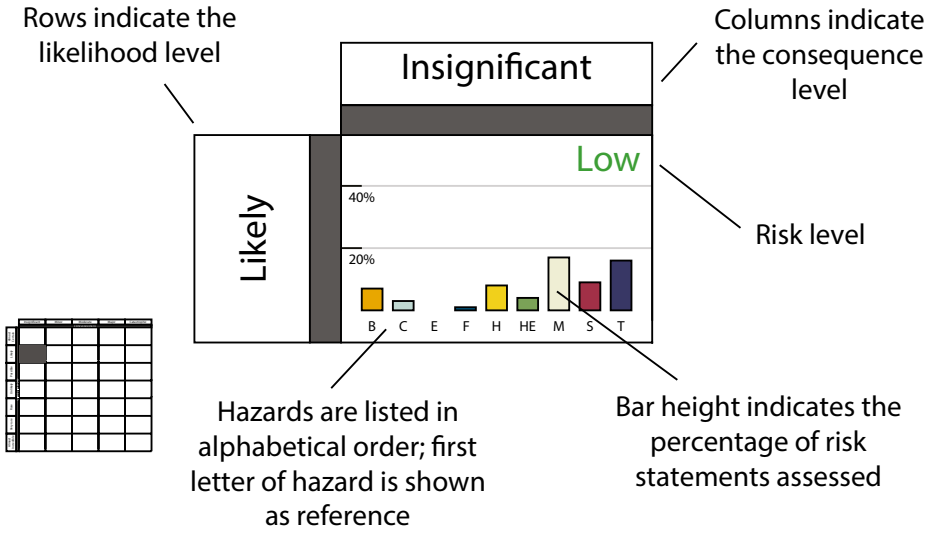


Figure K1. Explanation of risk matrix cells, as seen in the following graphs

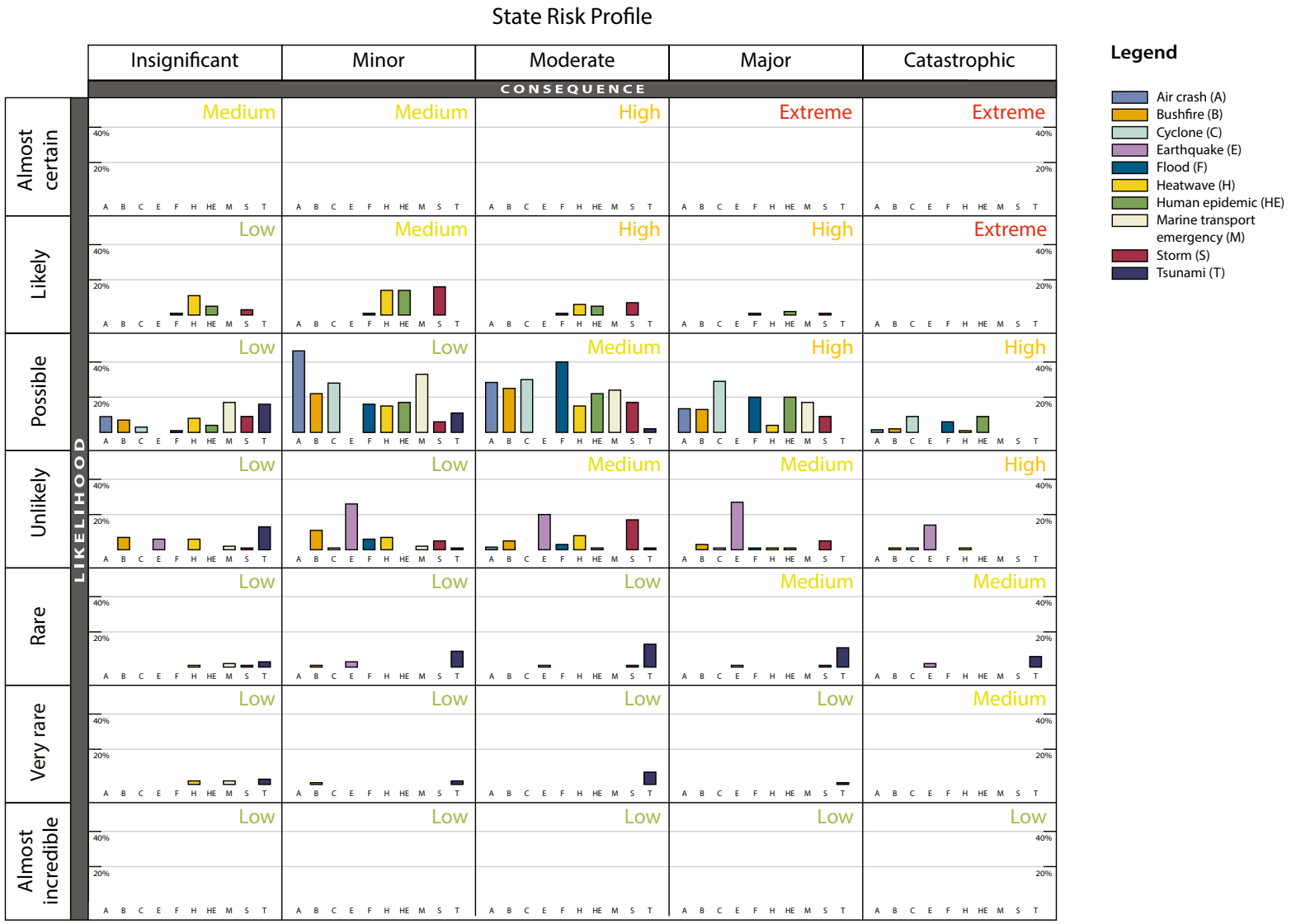


Figure K2. State Risk Profile: percentage of risk statements shown according to their consequence, likelihood and risk level

# Appendix L. Cross-sectoral initiatives

Each year since the inaugural *Emergency Preparedness Report* in 2012, the SEMC has reported upon preparedness against a range of capabilities (the capacity to deliver). The reports have identified trends, issues and themes in EM and tracked their progress over time.

Some matters can be improved easily while others are more complex, involving many agencies and significant investments of time and resources. To complicate matters further, events can sometimes overtake initial recommendations. Always, however, as improvements are made, 'next steps' are identified and a disciplined process of work begins all over again.

## Preparedness progress: SEMC 2015–16

Chief among the issues identified in 2015 were those affecting four major elements of EM:

- governance
- interoperability
- interagency cooperation
- information sharing.

Last year's report also noted general concerns about the capacity of the state to manage multiple, concurrent or prolonged events. Such events were assessed as likely to severely stretch existing resources, particularly in the health sector.

The responses by individual EM agencies to these matters are largely reflected in the chapters on risk, capability and impact in this year's report. Measures developed or implemented by the health sector, for example, are described in the sections on mass casualty management (including the case study on surge planning).

However, some matters are of cross-sectoral significance or are in the domain of the SEMC or one of its subcommittees and working groups. Following is a summary of how the SEMC and EM agencies working in partnership have responded to some of these issues in the past 12 months.

## Governance

The *Emergency Preparedness Report 2014* noted that EM legislation in Western Australia needed to be more responsive to social, demographic and technological change to ensure continuing relevance and effectiveness.

Following a period of review in 2015, a draft bill to amend the *Emergency Management Act 2005* (EM Act) was endorsed by SEMC in August 2015. The Bill passed the Legislative Assembly in June 2016. Having passed the lower house, the Bill is to be considered in the Legislative Council.

Amendments proposed in the Bill would give full effect to the changes in governance arrangements introduced following the landmark Keelty reviews of 2011, including changes that clarify the roles and responsibilities of the SEMC and SECG. (The role of the Coordination Group is to pull together the response to an emergency, while the role of the Committee is to develop policy and undertake strategic planning).

The Bill provides for an important new role for the SEMC, which is to review the implementation of past inquiries and investigations and to provide the Minister for Emergency Services with a report based on such reviews.

Other amendments are designed to increase flexibility and efficiency in relation to the making of emergency declarations and the definition of hazards; and include the extension of powers available under the Act in relation to situations or conditions not specifically named or described in the Act.

An amendment to the definition of 'hazard' would include disruption to essential services. This will allow for the inclusion of widespread disruptions to water, electricity, sewerage and telecommunications services in the EM regulations.

In parallel with the review of the EM Act, a major undertaking of the SEMC Secretariat has been the design and implementation of a Policy and Governance Review Project, with the aim of modernising and streamlining the documents that form the basis of EM in the state.

In 2016 the SEMC also adopted several measures to improve compliance with provisions of the EM Act that require local governments to develop and maintain current EM arrangements. An increased focus on district EM committees and arrangements, together with amendments to the EM Act, will help deal with the compliance issues raised in last year's report.

## Interoperability

The need to improve the ability of systems to work together (interoperability) has been highlighted in several recent reviews and post-incident analyses. It has been a theme of each *Emergency Preparedness Report* since 2012.

Reports noted by SEMC reviews (particularly in relation to bushfire) continue to point to the need for an integrated resource management system for use by key EM agencies. During 2016, progress in interoperability was made in the following areas:

- **Automatic vehicle location** – DFES and P&W investigated options for integrated resource management to extend the use of automatic location systems used to track vehicle movements during a bushfire.
- **Incident databases** – The SEMC endorsed a funding proposal to enable those agencies that currently use the WebEOC incident management system to procure and support an interface that connects WebEOC databases to allow for the seamless sharing of critical information such as tasking, maps and resource availability. The implementation of the interface will represent a considerable advance in interoperability.
- **Communications systems** – The reestablished Emergency Services Communication Strategy Committee, chaired by the Government Chief Information Officer with representation from key EM agencies, engaged a consultant to review the 2009 Emergency Services Communications Strategy and develop an implementation roadmap.

  The scope of the consultant's review included all operational frontline communications and associated operational ICT networks and capabilities. These included emergency 000 and computer-aided dispatch services. An updated strategy was adopted by the State Government in June 2016.
- **Updated strategy** – The Emergency Services Communications Strategy aims to improve service delivery to the community; adopt innovative technology to improve service delivery; and 'mature' the digital capabilities of emergency service agencies.

## Interagency cooperation

The Special Inquiry into the January 2016 Waroona fire recommended the formation of pre-formed multi-agency incident management teams in preparation for the 2016–17 southern fire season. The creation of incident management teams is under way.

The five teams, each consisting of 70 persons, will include a Level 3 structure and extended support roles within DFES regional and metropolitan operations centres. These teams will have roughly equal representation from DFES and P&W personnel and will also make provision for volunteers.

The creation of pre-formed multi-agency teams had been recommendations of the Parkerville (2014) and O'Sullivan Lower Hotham (2015) incident reviews. Other initiatives designed to enhance interagency cooperation arising from the Special Inquiry are expected to be announced by the end of 2016.

## Information sharing

During 2016, the SEMC noted the progress of the Joint Intelligence Capability (JIC) project led by DFES. Work has included a review of current DFES intelligence operations – with participation from key stakeholders such as P&W, WA Police, WALGA, BOM, Landgate, and Main Roads WA – to help define intelligence requirements for emergency services. This work has included the review of an interstate (Victorian) joint operational intelligence model.

The approach requires effective stakeholder engagement with all agencies and will identify efficiencies through collaboration, shared expertise and economies of scale.

In Phase 1, the JIC developed an overview that represents a mature intelligence operating model led by DFES.

The concept includes a roadmap to outline the journey from current state to a mature target state with associated outcomes and benefits. It aims to improve information-sharing capability, with an initial focus on people, knowledge and governance. A business case for implementation (Phase 2) based on the business design is under way.

## Recovery

The past two Preparedness Reports (2014 and 2015) highlighted issues around disaster recovery. Subsequently, events associated with the January 2016 Waroona fire and the Special Inquiry that followed pointed to areas where further work is required. The SEMC Recovery Subcommittee has developed a working plan to address these issues and the SEMC has recognised the importance and priority of this work through the allocation of NDRP funding.

Some of these matters include the development of a comprehensive impact assessment template; measures to improve the speed and efficiency of recovery waste management; recovery-focused public communication arrangements; and the management of public donations.

## Warnings

Previous Preparedness Reports have noted the critical importance of effective and timely warnings in relation to impending emergencies. Recent developments and agency improvements are described in Section 4 of this report. In addition, the SEMC endorsed a proposed distribution of funding obligations for Western Australian agencies that use the national Emergency Alert system. Emergency Alert is the national telephone warning system used by emergency services to send voice messages to landlines, and text messages to mobile phones, warning of likely or actual emergencies within a defined area.

## Westplans

Previous Preparedness Reports have noted the important role of Westplans in documenting the roles and responsibilities of EM agencies in relation to a specific hazard or the activation of a support service during an emergency. An important function of the SEMC Response and Capability Subcommittee has been to provide expertise and sectoral input into the review of Westplans for the guidance of the SEMC.

As part of the Policy and Governance Review Project, current Westplans have been amended to address statements of fact and to align them with the new suite of State EM documents. As part of this reform process, eight support Westplans, were incorporated within the new documents and were removed as separate plans.

During 2016, the SEMC approved revised Westplans for Nuclear Powered Warship and Earthquake and approved the revocation of the obsolete Westplan Freight Subsidy support plan. Westplan Dambreak was removed from circulation.

The SEMC also noted the outcome of strategic reviews of Westplans CBRN (Chemical, Biological, Radiological and Nuclear hazards), HAZMAT (Hazardous Materials), Human Epidemic, Nuclear Powered Warship and Terrorist Act.

## Post-incident analysis and interagency cooperation

Previous Preparedness Reports have noted the important role of post-incident analysis in promoting continuous learning and improvement in the EM sector. In early 2016, the SEMC released its review of the 2015 O'Sullivan Lower Hotham bushfires and associated implementation plan, which made recommendations concerning improvements in interagency cooperation, interoperability and improvements to recovery. The O'Sullivan Lower Hotham review was able to report on effective interagency cooperation in connection with the first-ever deployment of interstate firefighters to Western Australia in connection with this incident.

As reported in Appendix I of this report, the SEMC has continued to monitor the implementation of recommendations from major reviews, including the inquiries conducted by Mr Mick Keelty AO into the Perth Hills and Margaret River fires of 2011 and the SEMC-led review of the 2014 Parkerville Stoneville Mt Helena fire. The Waroona Special Inquiry included findings that indicated the need for improvements in the implementation and monitoring of incident review recommendations, including the development of key performance indicators as a gauge for the measurement of implementation.

The SEMC continues to seek opportunities to derive lessons from emergency events occurring elsewhere in Australia, such as the 2014 Hazelwood Mine fire. Consideration of reviews and inquiries from other jurisdictions supplements the SEMC's Season Review process.

## Funding

Previous reports have noted the significance of Commonwealth and state funding programs in enabling EM agencies and local governments to pursue natural disaster resilience and address issues of mitigation, response and recovery.

Of particular importance to risk assessment and resilience building in Western Australia is the allocation of joint Commonwealth and State funding under the NDRP. The NDRP is governed by a National Partnership Agreement between the Commonwealth and the Australian states and territories.

In August 2016, the SEMC endorsed grants under the program to a total of $3.2 million for 2016–17, including $1.6 million for continuation of the State Risk Project; $0.7 million for commencement of a State Capability Project; $0.3 million for progression of strategic projects by SEMC Subcommittees and $0.6 million for allocation to a competitive grants program (with an emphasis on support for projects designed to improve the attraction, support and retention of emergency volunteers – a priority area identified in the *Emergency Preparedness Report 2015*).

In March 2015, the SEMC responded to a request from the Minister for Emergency Services to conduct a stocktake of bushfire risk. The aim of the stocktake was to identify activities and resources allocated by the State Government to manage bushfire risk and to identify funding and policy options.

## Appendix M. Acronyms

| Acronym | Term in full |
|---|---|
| AIIMS | Australasian Inter-Service Incident Management System |
| ANZEMC | Australia – New Zealand Emergency Management Committee |
| BOM | Bureau of Meteorology |
| C3 | Command, Control and Coordination |
| CALD | Culturally and linguistically diverse |
| DAFWA | Department of Agriculture and Food, Western Australia |
| CPFS | Department for Child Protection and Family Support |
| DER | Department of Environment Regulation |
| DEMC | District Emergency Management Committee |
| DFES | Department of Fire and Emergency Services |
| DoD | Department of Defence |
| WA Health | Department of Health |
| DoP | Department of Planning |
| DoT | Department of Transport |
| ED | Emergency Department |
| EM | Emergency Management |
| EMA | Emergency Management Agency |
| EM Act | *Emergency Management Act 2005* |
| HMA | Hazard Management Agency |
| LEMA | Local Emergency Management Arrangement |
| LEMC | Local Emergency Management Committee |
| MRWA | Main Roads Western Australia |

| Acronym | Term in full |
|---|---|
| MoU | Memorandum of understanding |
| MTE | Marine Transport Emergency |
| NDRP | Natural Disaster Resilience Program |
| PTA | Public Transport Authority |
| P&W | Department of Parks and Wildlife |
| RFDS | Royal Flying Doctor Service |
| SECG | State Emergency Coordination Group |
| SEMC | State Emergency Management Committee |
| SEMP | State Emergency Management Policy |
| SES | State Emergency Service |
| WAERN | Western Australian Emergency Radio Network |
| WALGA | Western Australian Local Government Association |
| WANDRRA | Western Australian Natural Disaster Relief and Recovery Arrangements |
| Westplan | State Emergency Management Plan |

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