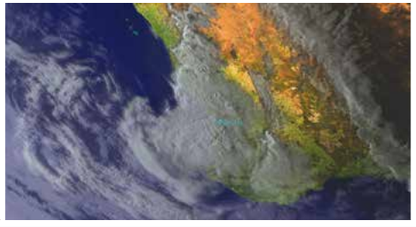
GOVERNMENT OF
WESTERN AUSTRALIA

STATE EMERGENCY MANAGEMENT COMMITTEE WESTERN AUSTRALIA

EMERGENCY PREPAREDNESS REPORT 2013

OCTOBER 2013

Cover images (left - right):

Red Sky at noon - Image courtesy of Ann Klubal

Perth Storm - Satellite image originally processed by BOM from the geostationary meteorological MTSAT-1 Operated by the Japan Meteorological Agency

Wednesday Afternoon Smoke - The beginning of the Margaret River bushfires - Image courtesy of Wendy Castleden

Cover image: *Rain storm Mt Connor - Western Australia - Image courtesy of Allan Fox and the Department of Environment*

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01 FOREWORD

FOREWORD

On behalf of the members of the State Emergency Management Committee, I am pleased to present our second report on Western Australia's preparedness for emergencies.

Building on our inaugural report in 2012, this year's work has refined the capability framework and engaged more organisations in considering the question of preparedness. This has further enhanced the report enabling us to create a basis for future measurement.

An emerging theme in 2012 was of a risk based methodology. This theme continues to be at the forefront of our approach and an area that will remain important.

The State Emergency Management Committee appreciates the cooperation of emergency management agencies in not only continuing to improve preparedness but in helping to document improvement initiatives.

We are grateful to those local governments who participated for the first time this year. We look forward to ongoing collaboration and teamwork in line with our shared responsibility for emergency management.

I would like to acknowledge and thank all who contributed to the report, the team at the Secretariat led by Noelene Jennings who have brought together the content and to my fellow committee members for their excellent contribution and support.

Kerry Sanderson AO

CHAIR

STATE EMERGENCY MANAGEMENT COMMITTEE

31 October 2013

02 EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

This is Western Australia's second Emergency Preparedness Report compiled by the State Emergency Management Committee (SEMC). Prepared annually for the Minister for Emergency Services, the purpose of the report is to provide a broad overview of Western Australia's capacity to deal with large-scale emergencies.

In recent years Western Australia has experienced a range of disasters, both from natural and man-made origin, resulting in loss of life and damage to private and public property, a number of these events being on a large enough scale to require a State-level response.

The emergency management environment is diverse and involves a coordinated effort from a wide range of stakeholders including all levels of government, the private sector (including industry), not-for-profit organisations, volunteers, community groups and individuals. In this regard, this report details the progress and efforts of the whole community in promoting the State's preparedness for emergencies.

The 2013 Emergency Preparedness Report builds on the information and findings of the 2012 Report, further detailing events and activities over the past year and, in particular, detailing the significant work undertaken to improve preparedness and response capability in the State.

An important initiative over the reporting period included the introduction of a Season Review. At the review meeting a number of improvements which occurred during the year were noted including work on coordination, training, joint exercising and lessons learnt from events. The effectiveness of existing and new preparedness and response systems was also reviewed.

In addition to the issues raised by the Keelty (Keelty 2011) and Black Cat Creek (Leading Emergency Services 2013) reviews, other opportunities for improvement were identified and allocated to agencies and SEMC subcommittees for further investigation. Key areas arising from the review include:

- increasing and improving communication
- training of volunteers and staff and further education programs for the community including shared responsibility
- continued effective capacity building across the State with best utilisation of scarce resources
- worker health and safety
- land use planning and
- insurance issues

Although there have been significant structural changes and new initiatives in the 2012–2013 reporting cycles the key focus areas for SEMC remain unchanged. That is to maintain strategic oversight and promote coordination in the sector, cultivate shared responsibility across the community, promote preparedness and continuous improvement and to develop and coordinate a State Risk Framework, and these themes are again strongly reflected in this year's report. These themes reflect the fact that disasters are expected to continue to impact the State, and there is a need to focus on being prepared, response and recovery to reduce the impact and to enhance community resilience.

The 2013 Emergency Preparedness Report is divided into eight chapters comprising Foreword, Executive Summary, Introduction, Focus Areas, Capability Assessment, Conclusions and Future Actions, References and Appendices.

The bulk of the new material for 2013 and comparative updates since 2012 are presented in the two main chapters 4 and 5 (that is, Focus Areas and Capability Assessment). The information, analysis and findings from these two chapters are summarised below.

FOCUS AREAS

Given the likelihood and risk to communities, SEMC members identified **Tropical Cyclone and Storm** and **Bushfire** as key hazards warranting further discussion and analysis in the 2013 Emergency Preparedness Report. Furthermore as **Risk Management** was identified in 2012 as a key focus area for SEMC it is also discussed in detail in chapter 4.

Tropical Cyclone and Storm

Tropical Cyclone and Storm pose a significant risk to the State. The North West of Western Australia between Broome and Exmouth is the most cyclone prone part of Australia's coastline, with about five cyclones forming in this region annually, about two of which impact on the coast. This frequent cyclone activity has ensured that Westplan Cyclone is well practiced.

The Bureau of Meteorology, the Department of Fire and Emergency Services, local governments, and industry work closely to ensure adequate preparedness in relation to cyclone emergencies. At the commencement of the cyclone season, key agencies conduct tours of cyclone prone areas to ensure residents are familiar with cyclone warning systems and preparedness activities. A range of other activities occur across many sectors including the development, review and testing of cyclone plans, as well as regular training. Importantly, specific building standards in cyclone prone areas also ensure reduced damage in the event of a cyclone emergency.

While Western Australia's North West has a long history of cyclone activity, modern remote sensing technologies have the potential to improve our preparedness for cyclone emergencies. In particular, it has been identified that there is a need for increased modelling and mapping in relation to associated storm surge and flash flooding.

Western Australia has a long history of being impacted by severe storms. While areas in the north of the state are impacted more frequently by tropical storms, the South West experiences most of its storms during the winter months. The meteorological conditions ideal for storm formation can be forecast, however, the location and tracking of individual storms is extremely difficult to predict.

Bushfire

State-level risk assessments undertaken in 2013 identified bushfire as Western Australia's preeminent hazard and with risk levels potentially set to rise. Prescribed burning has been on the decline in the South West and correspondingly areas being burnt by bushfire are increasing – a trend of concern. Furthermore fuel ages are on the rise, the accumulation of which is creating the potential for fires of extreme intensity for which suppression may not be possible before major damage occurs. Fuel reduction is highlighted as a key measure to reduce the impact of wildfire on people and property.

Work is underway on aspects of the bushfire risk including managing the complexities of multiple legislation covering fire prevention and suppression. New prescribed burning risk management processes have been implemented by the Office of Bushfire Risk Management (OBRM) to reduce risks and interagency cooperation between Department of Fire and Emergency Services (DFES), Department of Parks and Wildlife (DPaW) and other pertinent agencies has been enhanced. An increased focus on recruitment and training of existing and new fire management personnel has also been a priority to improve safety as have been adopting increased safety measures for firefighters including fire blankets and a program to install additional fire protection measures in vehicles in high risk areas.

The seasonal outlook shows that the State faces a number of challenges in the 2013–2014 fire season. Up until the Cooperative Research Centre for Bushfires (Bushfire CRC) released their outlook, the South West had seen reduced rainfall, soil moisture deficit and increasing fuel loads due to below targeted prescribed burning, while high rainfall in the Mid West had resulted in high grass growth rates. Since this outlook there has been greater than average rainfall in September, despite this there is still an above normal bushfire potential forecast in the South West and the Mid West. Given the increased September rainfall, the 2013 spring prescribed burning season has been challenging, however DPaW are managing to progress their burning in strategic sites. The indicative burn program for South West forest regions for spring 2013 comprises 152 candidate burns, totalling about 180,000 hectares.

The priority one burns (that is, burns DPaW would like to see completed during spring) constitute 83 burns totalling 93,197 hectares, many of which relate to protection of community and high-value infrastructure assets. Up until the time of writing, some 34,800 hectares had been burnt in the forest areas of the South West, including the metropolitan area, and important community protection burns in Collie and Perth Hills, with the focus being targeting the priority one burns.

Between August and October 2013, SEMC also organised a series of Bushfire Risk Management Planning (BRMP) consultation workshops with 45 local governments in areas of the State identified as being at high risk from bushfire. In conjunction with OBRM, DFES and DPaW, the workshops provided local governments with information concerning a proposed tenure blind BRMP process. A series of in-depth pilot studies is planned for 2014 and the implementation of the program will be planned thereafter.

Risk Management

A number of large-scale risk assessment projects have either commenced or been ongoing in Western Australia over the reporting cycle.

SEMC is currently scoping a State-wide, all hazards, risk management project designed to garner a comprehensive understanding of the State's risks over the coming 3-year period. A significant first phase of the project was undertaken in 2013 with analysis at State-level of five sudden onset natural hazards, storm, earthquake, bushfire, tsunami and heatwave with cyclone and flood scheduled to be reviewed in December 2013. From the initial five hazards studied, data graphically presented in the 2013 Emergency Preparedness report reveals that the State's highest risks are in the South West stemming from bushfire and storm.

In particular, risks from bushfire to the social setting, people and environment are deemed to be especially high. Social setting encompasses community and community-based services and cultural, emotional and psychological aspects. This analysis shows that they are deeply affected by a large-scale bushfire event and should be an area of priority concern and treatment (mitigation) focus for the State. Mitigation strategies to protect the ecosystem and biodiversity and the lives and wellbeing of people are a priority.

Extreme storm events are also seen as yielding high risks to Western Australia, particularly to the people, social setting and infrastructure categories. The credible worst-case scenario involving an ex-tropical cyclone tracking across the South West of the State would likely lead to widespread destruction and significant displacement of people. Agencies and the community will need to assess the region's preparedness and consider treatments for storms of this nature and magnitude.

Heatwave shows a relatively high likelihood of occurring, while most of its impacts are of a lower order, the exceptions are impacts to the environment (for example, to wildlife and to water quality) and impacts to people. People in more susceptible circumstance are especially vulnerable and extended heat events globally are known to result in high proportions of hospitalisation and mortality. With forecast climate change and the potential for more extreme weather events in tandem with a growing and aging population, heat stress effects and associated treatment strategies need to be considered. It is important to maintain uninterrupted power supplies during these periods, in particular to support cooling systems to vulnerable people.

CAPABILITY ASSESSMENT

Capability Assessment (chapter 5) looks at the progressive development of the capability assessment methodology in the State. Capability assessment is a process aimed at capturing current data and information concerning the level and effectiveness of strategic and operational aspects of emergency management. The chapter reports that the 16 capability areas of the 2012 report were rationalised to 10 capabilities, comprising of 30 core objectives (see Appendix 3). A number of key findings are also included based on the results of the SEMC Capability Assessment that reinforce and show the relevance of the four central themes established in the 2012 report.

Key themes:

1. developing shared responsibility
2. promoting a risk management approach in the emergency management sector
3. improving coordination particularly in response
4. embedding a continuous improvement ethos

Capability Key Findings

Chapter 6 (**Conclusions and Future Actions**) discusses the findings of chapter 5 (**Capability Assessment**) including strengths and areas for improvement. Across the 10 capability areas, a number of key findings were identified.

The main key findings are outlined below:

1. The Emergency Management Agencies (EMAs), including some local governments, understand their roles and responsibilities within the State's Emergency Management (EM) arrangements. Some of the arrangements are due to be reviewed and additional hazards may be prescribed in the EM Regulations.
2. There has been a commitment by all Hazard Management Agencies (HMAs) to align with the 'AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines' and a framework which provides a pathway for developing a comprehensive and consistent approach to risk management throughout the State has been agreed.
3. Of significance to Western Australia is work towards recruitment, training and pathway development for priority incident management personnel, particularly Level 3 incident controllers together with the opening of the sophisticated DFES State Operations Centre (SOC).
4. Attraction, retention and training of volunteers and continual communication and assessment of their ready responder status have been highlighted as requiring monitoring and further work. Two-way engagement with the community as a whole about preparedness and shared responsibility was also identified as being of marked importance, particularly amongst the more vulnerable groups (for example, Culturally and Linguistically Diverse (CaLD) community members, people with disabilities, the elderly and children).
5. The State has 28 Westplans and 8 Support plans that detail roles and responsibilities for agencies and cover the prescribed hazards and some supporting functions. Exercising of the plans is deemed of high importance and arrangements for improving exercise coordination across all agencies are proposed for 2014.
6. Most agencies have identified Public Information as a priority function and utilise a full range of information sharing platforms to disseminate emergency management information. Social media is one platform identified for greater utilisation. Of particular significance to the State was the activation of the Telstra hosted telephone warning system, *Emergency Alert*. Since coming on-line in November 2012, *Emergency Alert* has been activated on 40 occasions for 14 incidents.
7. The importance of Command, Control and Coordination (C3) has been recognised both within and between agencies in response activities. Of note in 2013 was the national release of Australasian Inter-Service Incident Management System (AIIMS) 4, the nationally recognised system of incident management for the nation's fire and emergency service agencies, that is likely to be adopted in Western Australia. The importance of interoperability has also been emphasised particularly in regard to radio communications, coordination of response assets (such as air support) and of the usage of spatial information data. In the State, six HMAs have also reported access or pending access to a Crisis Information Management System (CIMS) that provides real time information to enhance situational awareness. Furthermore an interface is being developed which will allow different types of CIMS to communicate on a common platform.

8. In response and recovery support services an issue of focus is dealing with surge capacity either in tending to casualties or in supporting the evacuation of people from dwellings. The timely re-establishment of essential services following emergency events is also emphasised and new State Emergency Management Plans (Westplans) in relation to Electricity Supply Disruption and Disruption of Telecommunications are being considered.
9. In terms of recovery in Western Australia, local governments have a key role. Most local governments have formed Local Emergency Management Committees (LEMCs) and possess Local Emergency Management Arrangements (LEMAs) and a proportion of these contain recovery plans. However a number of the LEMCs still need to establish recovery plans. Furthermore there is also some variation in the standard of the LEMAs and their associated recovery plans across the State. There is an increasing awareness of the complexity of the recovery process and the opportunity to improve capability through shared learning and best practice examples.
10. All HMAs and Combat/Support agencies report a culture of continuous improvement and there is evidence of strong networking in the sector with sharing of knowledge both intrastate and interstate. They also report routine evaluations and post incident analysis with identification and monitoring of improvement actions.

Capability Trends

Notably most of the highlighted findings fall within one or more of the key themes areas established in the 2012 report. There is also an analysis of the next incremental steps for the State, in terms of building capacity. We aim to progress towards a more quantitative form of assessment and reporting that can be used for more robust year-to-year comparisons. This may involve development of benchmark scenarios under which agencies rate their capability to respond. This would likely tie closely with the State-wide risk management project concurrently underway.

Against the backdrop of continuing exposure to potential hazards, SEMC is committed to analyse and report annually upon the State's capacity to deal with emergencies and to use the report as a basis for continuous improvement.

03 INTRODUCTION

INTRODUCTION

The 2013 Emergency Preparedness Report provides the annual report to the Minister for Emergency Services of Western Australia's capacity to deal with large-scale emergencies. It reports on progress in the emergency management sector and highlights work underway to enhance capability.

The 2012 report was the first such report to be published. Part 1 of that report captured a wide base of emergency management information for the State including history of the sector, the frameworks in place and their evolution. Each annual edition of the Preparedness reports should be viewed as part of an interconnected series, all available online at www.semc.wa.gov.au.

The positive reception to the 2012 report encouraged SEMC to continue with its approach of mapping emergency management capabilities and further refine the objectives and methodology used to collect and analyse relevant data.

During the year, SEMC Secretariat collated feedback from the 2012 report together with information gathered from internal workshops, research and stakeholder consultation. This resulted in the development of a model based on 10 capability areas, comprising of 30 core objectives (see Appendix 3) and an assessment tool, to enable organisations to capture and present information relevant to their emergency management capability. The development of this capability model involved consultation and research on the capability-based approaches used in other jurisdictions, including the United States, Victoria, and New Zealand.

SEMC has registered unanimous support from State agencies for the usefulness and workability of the SEMC Capability Framework as a method to assess the State's preparedness from year to year.

The framework comprises strategic and operational components that aim to capture current data and information concerning the strategic foundations of emergency management (for example, legislative, policy and governance structures), as well as the more operationally focused aspects of emergency management (for example, issues of command, control and coordination). This capability framework is expected to become more quantitative and develop further in future years as the methodology and agency data collection mechanisms continue to mature.

A number of different capability models are under development in the Australian States and Territories. There is the potential for alignment nationally, leading to the development of a single tool which covers all aspects of emergency management capability and risk. As an early adopter of the capability approach, Western Australia is well placed to contribute to such developments.

In May 2013 SEMC also conducted the inaugural Season Review where a number of improvements which occurred during the year were noted including work on coordination, training, joint exercising and lessons learnt from events. The effectiveness of existing and new preparedness and response systems was also reviewed.

In addition, to the issues raised by the Keelty (Keelty 2011) and Black Cat Creek review (Leading Emergency Services 2013), other opportunities for improvement were identified. These have been allocated to agencies and various SEMC subcommittees for further analysis. Other key improvement areas arising from the review include:

- increasing and improving communication
- training of volunteers and staff and further education programs for the community including shared responsibility
- continued effective capacity building across the State with best utilisation of scarce resources
- worker health and safety
- land use planning
- insurance issues

The 2013 report continues with the natural hazards theme with chapter 5 devoted to **Tropical Cyclone and Storm**, **Bushfire Update** and **Risk Management**. The natural hazards of cyclone together with storm events were chosen by SEMC, with Tropical Cyclone Rusty and the Perth storms, included as case studies. They present a good demonstration of testing of the State's emergency management arrangements.

The **Risk Management** section highlights a number of large-scale risk assessment projects being undertaken in Western Australia. A detailed analysis of five sudden onset natural hazards is included, namely an analysis of storm, earthquake, bushfire, tsunami and heatwave. The data reveals that, of these five hazards, the State's highest risks stem from bushfire and storm.

The section also discusses two developing multi-year projects, one that addresses bushfire risk at the local scale and one that looks to comprehensively and consistently risk assess all prescribed hazards State-wide with a view to using this to evaluate and plan for mitigation.

04 FOCUS AREAS

FOCUS AREAS

TROPICAL CYCLONE AND STORM

Tropical Cyclones

Tropical cyclones are non-frontal low pressure systems that form over warm tropical waters, with average wind speeds above 63 km/h that persist for more than six hours.

The development of tropical cyclones depends on the presence of ideal conditions. These include warm ocean temperatures (above 26.5°C) to provide the energy source, generally a distance of more than 500 km from the equator where the Coriolis force can provide sufficient spin, and particular atmospheric disturbance conditions. The Coriolis force is created by the Earth's rotation that results in the deflection of moving air to the left of its initial direction in the Southern Hemisphere, and to the right of its initial direction in the Northern hemisphere.

Mature and intense tropical cyclones are often known for their circular eye which can vary in size between 10 and 100 km in diameter. Conditions in the eye can be eerily calm, with characteristics of clear skies, warm temperatures and low atmospheric pressure. At the cyclone's surface, wind and convective cloud spirals inwards forming a strong circular vortex around the eye. Surrounding the eye is the eyewall, a thick ring of cloud containing the strongest winds and heaviest rainfall of the cyclone. While the gale force winds can occur hundreds of kilometres from the cyclone centre, the wind speed reduces rapidly outwards from the eye.

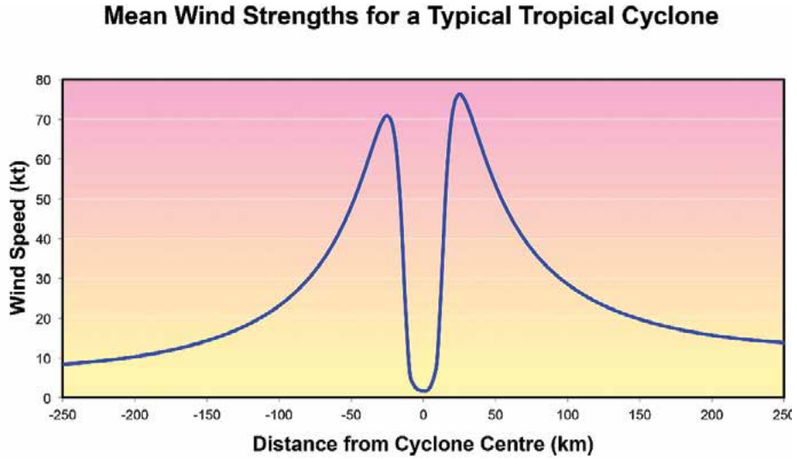


Figure 4.1 – Mean Wind Strengths for Tropical Cyclone

Image courtesy of Bureau of Meteorology
Source: [http://www.bom.gov.au/cyclone/about/intensity.shtml]

In Australia, the severity of a cyclone is measured on a 5-point category system from 1 (weakest) to 5 (strongest). Tropical cyclones of category three or above are referred to as Severe Tropical Cyclones.

The Bureau of Meteorology (BOM) recognises four states of cyclone development for those that reach category three or above. The 'formative', 'immature', 'mature' and 'decay' stages refer to the severity in the zone of maximum winds close to cyclone's eye. The stages follow development from a poorly organised atmospheric disturbance, increasing in organisation and intensification to a mature cyclone, before once again losing organisation and intensity below cyclone status. The decay phase often occurs when the cyclone moves over cold waters, or land, when the warm water fuelling the cyclone is no longer available.

Table 4.1

Source: Bureau of Meteorology [http://www.bom.gov.au/cyclone/about/]

CATEGORY	STRONGEST GUST (KM/H)	TYPICAL EFFECTS
1 TROPICAL CYCLONE	Less than 125 km/h Gales	Minimal house damage. Damage to some crops, trees and caravans. Boats may drag moorings.
2 TROPICAL CYCLONE	125–164 km/h Destructive winds	Minor house damage. Significant damage to signs, trees and caravans. Heavy damage to some crops. Risk of power failure. Small boats may break moorings.
3 SEVERE TROPICAL CYCLONE	165–224 km/h Very destructive winds	Some roof and structural damage. Some caravans destroyed. Power failure likely.
4 SEVERE TROPICAL CYCLONE	225–279 km/h Very destructive winds	Significant roofing and structural damage. Many caravans destroyed and blown away. Dangerous airborne debris. Widespread power failures.
5 SEVERE TROPICAL CYCLONE	More than 280 km/h Extremely destructive winds	Extremely dangerous with widespread destruction.

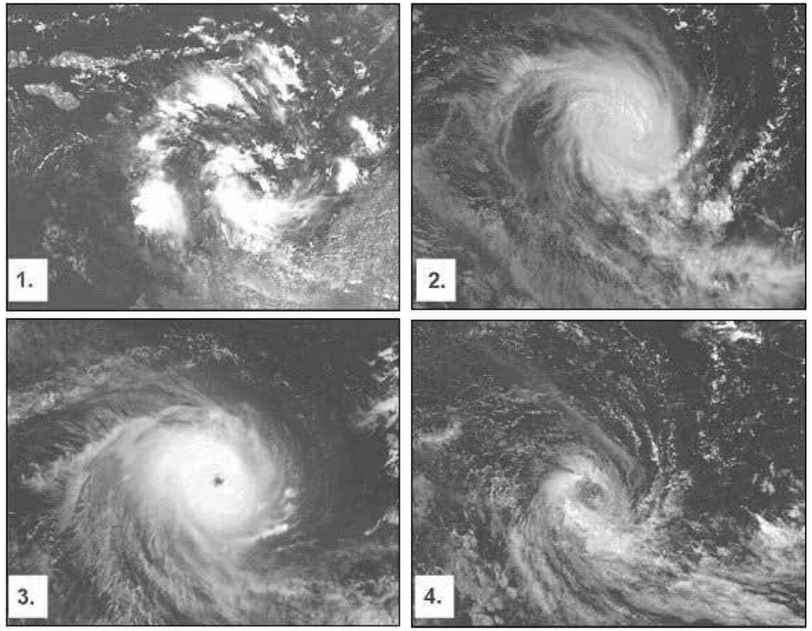


Figure 4.2 – Cyclone lifecycle

Image courtesy of BOM
Source: [http://www.bom.gov.au/cyclone/images/faq/paul_lifecycle-tn2.jpg]

The time period for each stage varies with each cyclone. While some cyclones can take prolonged periods to reach maturity, others can develop very quickly.

Cyclones in Western Australia

Western Australia has an extensive history of being impacted by cyclones, creating significant wind damage to buildings and vegetation, rain damage, flash flooding, severe sea conditions, storm surge flooding and coastal erosion. Cyclones impact on the residential, commercial, industrial and service sectors of our community. They have caused injury and death, disrupted essential services, and resulted in significant financial losses for industry.

The North West of Western Australia between Broome and Exmouth is the most cyclone prone part of Australia's coastline, with around 75 per cent of Australia's severe cyclone crossings between 1970–1971 and 2007–2008 (Figure 4.3). The cyclone season runs from November to April, with the chance of a category four or five cyclone being highest in March and April. Western Australia's North West experiences an average of five cyclones during each season, with an average of two crossing the coast. The remoteness of this location presents additional challenges to emergency services, industry and the community in preparing for, responding to, and recovering from tropical cyclones.

While the majority of cyclones are located in the tropics, cyclones can affect areas further south of the State. Outside of the tropics, tropical cyclones can undergo marked changes in their structure, transitioning to extra-tropical cyclones. Between 1910 and 2013 a total of 14 cyclones have impacted Perth. Cyclones which had a greater impact in the north of the State can often move south, weakening below cyclone intensity but continuing to cause disturbances with heavy rains, winds and higher than usual tides.

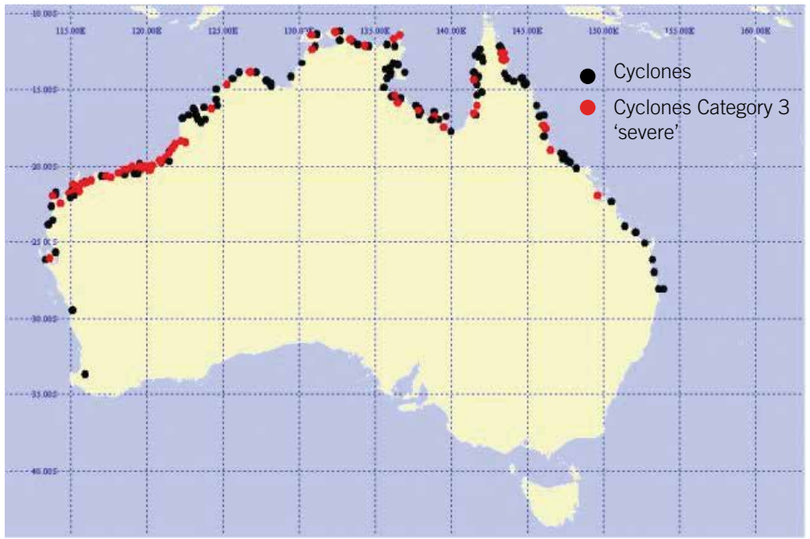


Figure 4.3 – Tropical Cyclone crossings in Australia between 1970–1971 and 2007–2008.

Source: Bureau of Meteorology [http://www.bom.gov.au/cyclone/climatology/wa.shtml]

Significant cyclones that have affected Western Australia in the past include Tropical Cyclone *Joan* (1975), Extra-Tropical Cyclone *Alby* (1978), Severe Tropical Cyclone *Bobby* (1995), Severe Tropical Cyclone *Vance* (1999), Severe Tropical Cyclone *Rosita* (2000), Severe Tropical Cyclone *George* (2007) and Severe Tropical Cyclone *Rusty* (2013).

Outlook for Tropical Cyclones

BOM issues Tropical Cyclone Seasonal Outlooks which provide a rough forecast for the number of tropical cyclones expected in the coming season. The ability to provide a good prediction varies from season to season, depending on global weather patterns and sea temperatures. The existence of El Niño or La Niña conditions can have a significant effect on the expected number and pattern of cyclones in a season.

The Tropical Cyclone Seasonal Outlook for 2013–2014 was issued by BOM on 14 October 2013. The Outlook predicts that near-average tropical cyclone activity is most likely for the North West (the area from 105°E to 130°E) this season. On average, the North West region experiences around five tropical cyclones, with around two of these impacting the coast at some point in their lifecycle.

In August 2013 the Commonwealth Senate's Environment and Communications References Committee published the report 'Recent trends in and preparedness for extreme weather events' (Environment and Communications References Committee 2013). The report, which considered a number of extreme weather events including cyclones, noted that discerning trends in cyclone intensity and frequency is hampered by a lack of reliable long-term cyclone records. Notwithstanding this, the report noted a general consensus in evidence that cyclones are likely to increase in intensity over time, but are unlikely to increase in frequency. The predicted increase in intensity results from increases in ocean temperatures which provide the energy source of cyclones. However, as the temperature gradient of the atmosphere is likely to decrease as the atmosphere warms, the frequency of cyclones may even decrease.

The report made ten recommendations, including recommendation three which notes the linkage between climate change and extreme weather events and recommends that BOM and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) conduct further research to increase understanding of impacts of climate change on rainfall patterns and tropical cyclones.

The report also noted an increased risk of storm surges due to further sea level rise in the future. Storm surges are created when strong onshore winds and low atmospheric pressure cause a rise above the normal water level along the shore. They can have devastating impacts on coastal settlements, infrastructure and ecosystems. Storm surges usually result from cyclone activity but may also be associated with a strong low pressure system. Much of the report's findings are also supported through the work of numerous other bodies including the Intergovernmental Panel on Climate Change (IPCC) and the Garnaut Review (Garnaut 2011; IPCC Working Group 2007; Environment and Communications References Committee 2013).

Severe Tropical Cyclone Rusty was an uncharacteristic cyclone in its remarkably slow approach to the Pilbara coast. While Rusty resulted in little damage to people and property, it kept towns in its vicinity on cyclone alert for more than four days, resulting in significant financial losses for industry.

Development, intensity and path

Rusty started as a tropical low off the coast of the North West on 22 February 2013. The system took more than two days to intensify into a cyclone on the afternoon of 24 February, about 360 km north of Port Hedland.

Continuing to move towards the coast, Rusty intensified to a Severe Tropical Cyclone (Category 3) by the afternoon of 25 February. With its large radius, it was producing gale force winds in Port Hedland by midnight, despite its centre being 210 km away. Due to the slow moving nature of Rusty, these gales would be sustained for 39 hours, an unprecedented event in the wind record which dates back 71 years.

Figure 4.4 – Tropical Cyclone Rusty Satellite image

Satellite image courtesy of the polar orbiting satellite TERRA operated by the National Aeronautics and Space Administration

Rusty continued to intensify as it crept towards the coastline, briefly reaching a maximum intensity at Category 4 on the morning of 27 February. It crossed the coast near Pardoo Station (100 km east of Port Hedland) later that evening as a Category 3 cyclone with wind gusts reaching 200 km/h.

Upon reaching the coast Rusty tracked east of Marble Bar, quickly deteriorating below cyclone intensity about 70 km east of Nullagine early on the afternoon of 28 February.

Emergency management

Coastal communities are issued with a tropical cyclone watch when gale force winds are expected within 48 hours. This is extended to a tropical cyclone warning when the onset of gales is expected within 24 hours, or are already occurring.

Communities began preparing for a potential cyclone on Saturday 23 February when the tropical cyclone watch was issued for a large area of the Pilbara/Kimberley coastline. At this time DFES established incident management teams to help people impacted by the cyclone, and State Emergency Service (SES) units in all Pilbara towns were activated.

The evacuation of the potential storm surge area in low lying parts of Port Hedland was successfully undertaken in a short timeframe as a joint effort between DFES, WA Police and the Army. Volunteers also conducted door knocks to advise residents to relocate as a precaution, with around 110 people choosing to relocate. Additionally, DFES and its SES volunteers liaised with remote Indigenous communities in the Pilbara, assisting to relocate more than 100 individuals.

Following the passage of the cyclone DFES undertook damage assessments and helped in the clean-up of Port Hedland town site. They responded to 17 requests for assistance, mainly involving chainsaw work and removal of debris.

Reconnaissance helicopters were deployed by DFES to survey damage across the region and following assessments of remote Indigenous communities, residents were cleared to return.

In total, the towns of Port Hedland and Pardoo remained on cyclone alert for more than four days, while Port Hedland was on red alert for almost 35 hours, and Pardoo for more than 46 hours.

Impacts

No deaths or significant injuries resulted from the crossing of Tropical Cyclone Rusty, and Port Hedland received only minor property damage, despite gale force winds of up to 119 km/h for 39 continuous hours.

Due to the very slow movement of the system (average speed of 5.5 km/h from the morning of 23 February to crossing) there was significant disruption to onshore mining operations as well as shipping and offshore industries. Port Hedland Port, which exports around $150 million of iron ore per day, was closed for 86 hours as Rusty hovered over the coast.

All flights in and out of Port Hedland and Karratha were cancelled, as were some flights out of Paraburdoo, including the Royal Flying Doctor Service (RFDS). In addition, all roads in and out of Port Hedland were closed, resulting in freight truck delays and subsequent impacts on food delivery to Broome and Derby.

The highest rainfall of 482.5 mm (unconfirmed) was recorded at Pardoo Station with reports of water and structural damage to buildings, as well as stock losses at Pardoo Station. Confirmed rainfalls of over 350 mm were also reported at De Grey Station and Yarrie. Following the deterioration of Rusty, major flooding continued in the De Grey River catchment as a result of the prolonged heavy rainfall.

Rusty had wider reaching impacts as the low pressure system moved south through the State, with heavy rain in southern areas, including Kalgoorlie–Boulder with 88 mm of rain over a 15-hour period.

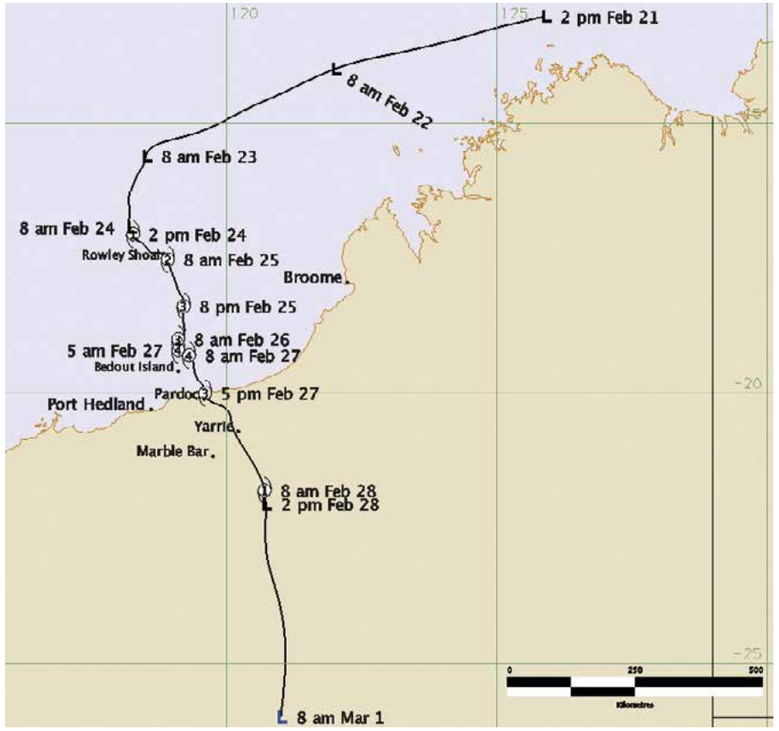


Figure 4.5 – The path of Tropical Cyclone Rusty

Image courtesy of BOM

Storms

A storm is an atmospheric disturbance usually characterised by strong winds and may be combined with rain, sleet, hail, ice, snow, dust, thunder and lightning. As storms are localised events, their impact is often underestimated yet, of all meteorologically related hazards, storms cause the greatest economic impact.

A heavy fall of rain, hail or snow can be considered a storm in its own right, whereas a thunderstorm is a particular type of storm characterised by lightning and a specific cloud type, known as a cumulonimbus. BOM classifies a thunderstorm as 'severe' if it produces wind gusts in excess of 90 km/h, heavy rain leading to flash flooding, large hail (greater than 2 cm in diameter) or tornadoes. If any of these phenomena are forecast to occur, BOM will issue a 'Severe Thunderstorm Warning'. If, however, any of these phenomena are forecast to occur in the absence of a thunderstorm, a 'Severe Weather Warning' will be issued.

While it is often possible to predict that a broad geographical area is conducive to thunderstorm occurrence, it is very difficult to identify which localised area, and at what time a thunderstorm may occur. This is because the location of thunderstorm development is strongly influenced by subtle variations in local winds, and the presence of moisture/humidity zones which are often difficult to observe and forecast.

Once a thunderstorm has developed, predicting its path can also be challenging as its direction and rate of movement depends on subtle changes in environmental wind regimes and changes in thunderstorm intensity. Sometimes thunderstorms can also unexpectedly collapse, while on other occasions they can rapidly intensify, causing pre-existing characteristics and direction of movement to change.

Thunderstorms in Western Australia

Thunderstorms can have devastating impacts on communities and the environment. Lightning activity can directly injure or kill people, damage property and ignite bushfires, while heavy rain can lead to flooding with associated impacts on buildings, waterways and erosion. High winds can bring down trees, which may affect people directly through injury or damage to homes and businesses, or indirectly through interruption to essential services like electricity, communications and transport. High winds may also disperse debris which can pose a threat to people, animals and property. Additionally, storms can cause coastal erosion and damage to the natural environment through the removal and damage to vegetation and wildlife.

Western Australia has a long history of being impacted by storms. The tropical north of the State can experience 60 or more thunderstorm days per year, (Bureau of Meteorology 2012) with the majority occurring in the wet season between November and April. The South West experiences around five to 15 thunderstorm days per year (Bureau of Meteorology 2012), mostly between May and September as a result of cold fronts moving from west to east across the Southern Ocean. The South West also experiences another four days per year, on average, of severe storms which are not associated with thunderstorm activity.

Significant South West storm events include the storm of 23 May 1994 which resulted in around $37 million in damages; the 16 May 2003 storm which resulted in a storm surge of 0.8 m with significant erosion and local flooding (Corby, Jones and Middelmann 2005), and a series of storms from 7–12 June 2012 which resulted in widespread damage including tornadoes, winds of up to 140 km/h and power outages to 110,000 homes (Australian Emergency Management 2012).

The most damaging South West storm occurred in March 2010, affecting the Perth metropolitan area, western parts of the Central Wheatbelt, western Great Southern and South Western parts of the Gascoyne. The storm resulted in extensive flooding, and the largest hail known to have fallen in Perth. Homes, businesses, hospitals, schools and cars were extensively damaged, with an estimated total cost of $1 billion (Insurance Council of Australia n.d.).

Outlook for Storms

Due to the sensitivity of thunderstorm development to small-scale variations in meteorological and oceanographic conditions, BOM does not provide seasonal outlooks for thunderstorms.

While many significant reports warn of increases in the frequency and intensity of extreme weather events (Environment and Communications References Committee 2013; Garnaut 2011; Hennessy et al.) they stop short of making long-term predictions relating to thunderstorms. There is some evidence that the number of thunderstorms has increased over time. However many experts caution against drawing conclusions in relation to future long-term outlooks because methods of recording and measuring storms have not been homogenous over time. This may impact on the quality of data used to make such a determination.

Prevention

While it is not possible to prevent cyclones or storms, mitigation measures contribute to increased community resilience by minimising the impact of these hazards. Such measures include engineering solutions, community awareness and development and enforcement of legislative requirements such as building restrictions.

Prior to the expected commencement of the cyclone season, DFES coordinates a visit to communities by representatives from DFES, BOM, local government and the Department for Child Protection and Family Support (DCPFS). Representatives are available to discuss the tropical cyclone seasonal outlook, community safety and welfare. These visits are combined with appropriate targeted information on the importance of preparedness and personal responsibility in making the necessary preparations. Between October and April each year DFES in conjunction with BOM, local governments and industry, also conducts cyclone public education campaigns through media, schools and industry visits. Media information and other printed materials are also made readily available.

CASE STUDY: PERTH STORM 21–22 MARCH 2010

On the afternoon and evening of 22 March 2010 severe thunderstorms affected the Perth metropolitan region and parts of the South West, bringing the first significant rain in 90 days after a long and hot summer. The storms resulted in flash flooding, destructive winds and the largest hail known to have occurred in Perth. With widespread damage to residential and commercial properties, cars and essential services, it became the costliest natural disaster in Western Australian history with damage estimated at over $1 billion.

The first of the storms reached the Central Business District at around 4 pm, exacerbating peak hour traffic congestion and interrupting public transport services. A subsequent line of storms resulted in heavy downpours and damaging winds continuing into the night.

BOM recorded rainfall of 40.2 mm in Mount Lawley, with 23 mm falling in just 10 minutes, while the highest rainfall in the State was in the South West town of Moodiarrup with 80.8 mm. The rains brought flash flooding to large parts of the metropolitan area, with underground car parks and low lying areas being inundated. One of the University of Western Australia's libraries sustained extensive flooding and hail damage, losing around 15 per cent of the library's collection.

Hail of up to 6 cm in size fell largely across riverside suburbs resulting in significant damage to motor vehicles, hospitals, churches and homes.

Wind gusts of 120 km/h were recorded in Ocean Reef, with the maximum of 128 km/h experienced in Cunderdin in the central Wheatbelt. Wind damage was extensive, with many fallen trees damaging homes and blocking roads.

Figure 4.6 – Approaching Storm

Image courtesy of Peter Lawry, BOM

Lightning strikes to electrical sub-stations, combined with damage to power lines, caused a loss of power at its peak to around 158,000 households and more than 190 traffic lights, further exacerbating dangerous road conditions and traffic congestion.

A landslip at Kings Park caused the evacuation of an apartment tower as mud inundated lower levels, resulting in 68 residents spending the night sheltering at the Perth Convention and Exhibition Centre.

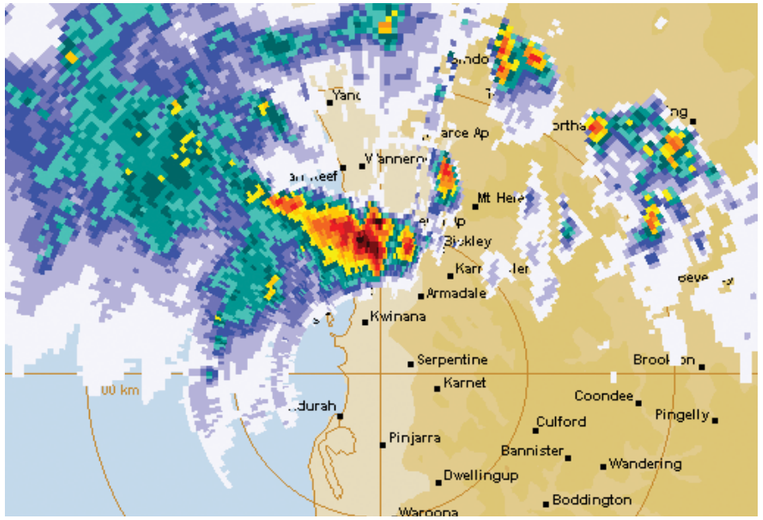


Figure 4.7 – Radar image of Perth Storm

Image courtesy of Peter Lawry, BOM

The storm also resulted in environmental damage after 130 pumping stations lost power and an estimated 43 million litres of wastewater entered waterways, resulting in hundreds of fish deaths.

On 23 March 2010 the area was declared a natural disaster zone by Premier Colin Barnett, allowing access to financial assistance where applicable through the Western Australian Natural Disaster Relief and Recovery Arrangements (WANDRRA).

Preparedness

Preparedness activities focus on developing systems to ensure the delivery of essential emergency response capabilities when hazards occur. These systems include development, testing and review of plans, procedures and resource management systems, as well as the development and implementation of training programs.

DFES, local governments, and BOM also contribute to the development of programs to inform and educate the public in relation to storm risk and storm management. Annual storm awareness campaigns are conducted to raise awareness of storm hazard and encourage community preparedness. The 2013 campaign was launched at the beginning of Storm Awareness Week which was held from 11 to 18 May 2013.

At the start of each cyclone season, hospitals and health services undertake various preparedness activities including site preparation, review of local plans, evaluation of consumables and infrastructure and staff awareness training. When cyclone watches, warnings and community alerts are issued by DFES, consideration is given to discharging low risk patients and transferring high risk and critical patients to facilities outside the potential impact area. High risk and difficult to evacuate community patients are also identified, contacted and supported to make appropriate arrangements.

Community members are also encouraged to undertake preparedness activities for cyclone by preparing a Family Cyclone Plan that outlines an agreed course of action for family members during a cyclone event. Information on the Family Cyclone Plan can be found on DFES website: http://www.dfes.wa.gov.au/safetyinformation/cyclone/CycloneManualsandGuides/FESA_Cyclone-CycloneSmart.pdf

Response

Response activities combat the effects of the event, provide emergency assistance for casualties, help reduce further damage and help speed recovery operations. Response activities involve a high level of coordination between multiple organisations within local, State and Federal governments, industry, volunteer groups and non-government aid organisations.

For example, during a cyclone event, BOM issues ongoing advice to the community on the progress of the cyclone through a cyclone warning advice line and online information. DFES also provides a 4-stage community alert system to assist the community to understand the action that they need to take at each stage. The community alert system is available through ABC Radio, local media, BOM's Public Information Line and through DFES website and recorded information line.

Figure 4.8 – Cyclone Alert System

Image courtesy of DFES

Following the impact of a cyclone or storm the main response tasks include conducting damage assessments, temporary repairs to damaged buildings, clearance of debris from damaged roads, and assessment of the need for post impact evacuation.

Recovery

The arrangements for disaster recovery in Western Australia are set out in the *Emergency Management Act 2005* (EM Act) which determines that local government manages recovery following an emergency affecting the community in its district. Local governments are required to establish a LEMC, and ensure that LEMAs are in place. A local recovery plan, Local Recovery Committee and Local Recovery Coordinator form part of the LEMA.

State level assistance may be required where the delivery of recovery services, or the coordination required to deliver recovery services, exceeds the capacity of the local government.

Emergency Management for Tropical Cyclones and Storms

DFES is the HMA responsible for the coordination of EM of storm and cyclone emergencies. DFES is also responsible for the development and maintenance of Westplans Storm and Tropical Cyclone, both of which are currently under review. These Westplans incorporate organisational responsibilities across the Prevention, Preparedness, Response and Recovery spectrum and include special consideration in relation to special needs groups and emergency warning systems. Westplan Cyclone was activated in February 2013 in response to Tropical Cyclone Rusty (see **Case Study Tropical Cyclone Rusty** and **Appendix 1**).

BUSHFIRE UPDATE

This section summarises developments in bushfire preparedness since the 2012 Emergency Preparedness Report.

Responsible Agencies Update

Part 3 of the 2012 report outlined the responsibilities of various State agencies as landowners and land managers or as a HMA for bushfire.

The identity of one key agency has changed since the last report. On 1 July 2013, following a government review, Department of Environment and Conservation (DEC) was split into two agencies DPaW and Department of Environment Regulation (DER). The bushfire management responsibilities that previously sat with DEC now sit with DPaW. However, reflecting coordination and mutual support DER staff are still rostered for bushfire duty.

This year's report also recognises the role of the Forest Products Commission (FPC) in bushfire management. FPC operates under the *Forest Products Act 2000* and employs approximately 160 staff to manage forestry activities in State-owned native forests and plantations. The majority of FPC's interests are located in the South West of the State on land held or managed by DPaW. In addition to the frequent incidence of bushfire in State-owned native forests, an average of more than 100 fires occur annually within FPC plantations.

For the 2012–2013 southern fire season, more than 60 FPC staff were available for bushfire duties under a DPaW roster. Many of these staff perform frontline duties, develop bushfire management strategies and direct fire response equipment. FPC's role in bushfire preparedness is not recognised in current fire services or emergency management legislation.

FPC has provided a submission to the current review of emergency services legislation (as mentioned in the Legislative framework section), requesting that its role be recognised in any proposals for future legislation.

Legislative framework

Challenges arising from the complexity of the legislative framework that governs bushfire management (noted in the 2012 Emergency Preparedness Report) are being addressed through a review of emergency services legislation. This is in line with recommendations contained in the report prepared by Mr Mick Keelty AO in relation to the 2011 Perth Hills bushfire (Keelty February 2011).

This project is conducted by DFES with oversight from Bushfire Review Implementation Group (BRIG), established by the Government to oversee the implementation of the Keelty report (Keelty February 2011) recommendations. The project aims to provide the basis for a single piece of legislation to replace the *Fire Brigades Act 1942*, the *Bush Fires Act 1954* and the *Fire and Emergency Services Authority Act 1998*. The first stage, which was completed on 30 April 2013, consisted of stakeholder consultation to identify the principal issues. At the completion of the first stage, DFES has consulted widely. Further stages of the project will consider the issues raised during consultation and see the development of a draft concept paper. This draft paper will be the subject of further consultation.

Risk Management

Following the release of the Report of the Special Inquiry into the November 2011 Margaret River Bushfire (Keelty November 2011), the Premier announced the establishment of OBRM in February 2012. OBRM reports directly to the Commissioner of Fire and Emergency Services.

One of OBRM's main achievements over the past 12 months has been the alignment of DPaW's prescribed burning processes and procedures with the international standard 'AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines'. New systems developed by DPaW have been approved by OBRM and an ongoing assurance program has been established to ensure compliance with the new processes and procedures. A number of audits have been carried out which indicate that DPaW's prescribed burning activities have been conducted in line with the new systems. This work has progressed to the establishment of a 'business as usual' program which will continue to be monitored through 2013–2014.

Similar work is being carried out with DFES in order to incorporate a robust risk management process into its prescribed burning practices. The changes introduced into the processes and practices of both DPaW and DFES also meet international standard requirements.

OBRM is also trialling an enhanced 'Permit to Burn' system with a number of local governments across the State. The aim is to introduce a simple risk management process to the system of issuing permits, in order to enhance the safety and effectiveness of prescribed burning on private land. The trial, which started in autumn 2012, continues into the spring of 2013 in order to extend the range of information gathering required to refine the system.

Between August and October 2013 and at the request of the Minister for Emergency Services, SEMC organised a series of BRMP consultation workshops with local governments in areas of the State identified as being at high risk from bushfire, in which OBRM, DPaW and DFES participated. The workshops aimed to provide 45 local governments with information concerning the BRMP process and the subsequent development of tenure blind local government plans. Feedback obtained through the consultation process will inform the further development of BRMP guidelines and templates being prepared by OBRM.

Regional Fire Management Plans have been prepared for six of DPaW's regions and are in preparation for the remaining three. These plans include objectives to be met for fire management in each region's fire management areas. There will be biannual progress reporting for prescribed burning in accordance with these plans.

Climate, Fuel Load and Prescribed Burning

In Western Australia the responsibility for fire prevention activities is shared by a number of agencies. The Department of Lands has responsibility for the overall administration of Crown Lands. DFES and DPaW provide fire management services on Unallocated Crown Land and unmanaged reserves on its behalf. Particularly, DFES manages this land within all town sites, regional centres and the Perth metropolitan area, while DPaW is responsible for the land outside town sites, regional centres and the Perth metropolitan area. In addition, DPaW carries out fire prevention on the lands that they manage while DFES has legislative responsibilities for lands within Gazetted Fire Districts and where some brigades or units are established.

Local governments are responsible for undertaking prevention activities in their district. This includes the prescription and enforcement of bushfire prevention measures in freehold and leasehold lands that fall within their boundaries.

The use of prescribed burning to achieve a range of land management objectives, including bushfire risk mitigation, was described in the 2012 Emergency Preparedness Report. Prescribed burning has proven to significantly reduce the impact of bushfires by reducing fire size and intensity. This is demonstrated by studies described in the 2012 report that show the inverse correlation between the annual area of prescribed burns and the area of subsequent bushfires in the south-west forest regions of Western Australia.

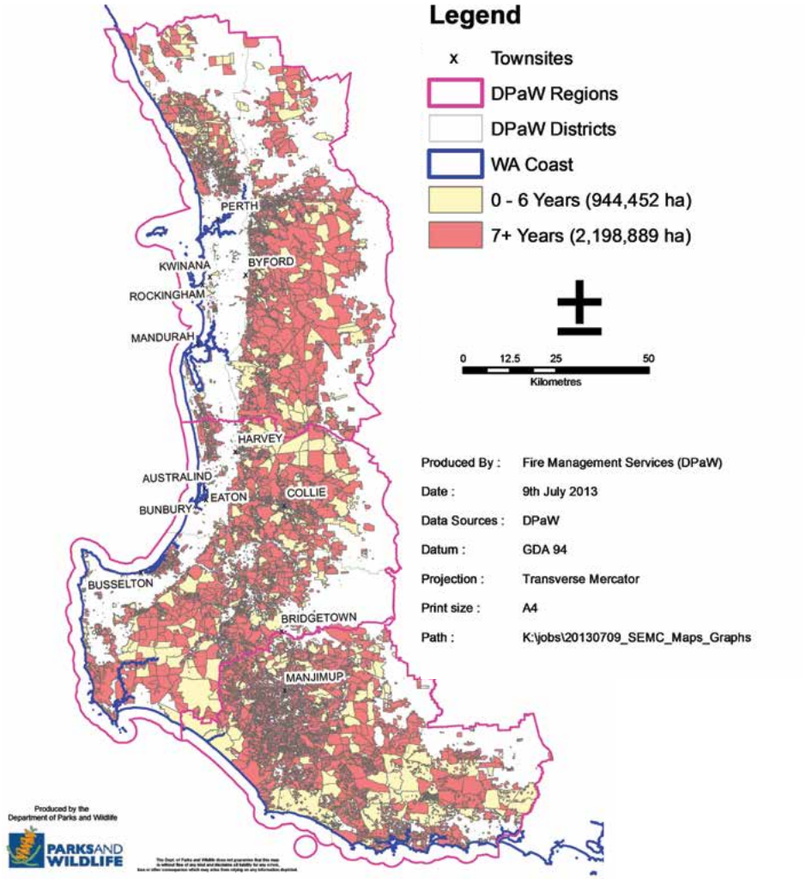


Figure 4.9 – Fuel Age (2013)

Image courtesy of DPaW

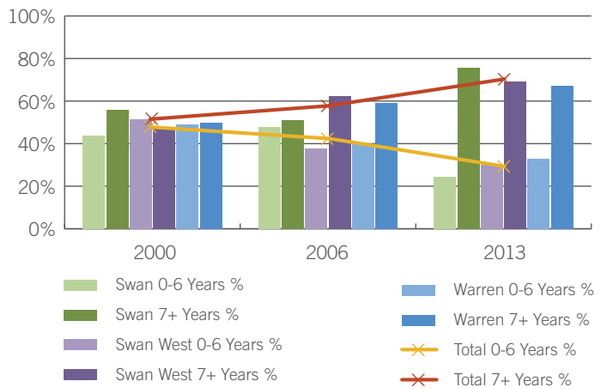


Figure 4.10 – Age Analysis from 2000 to 2013

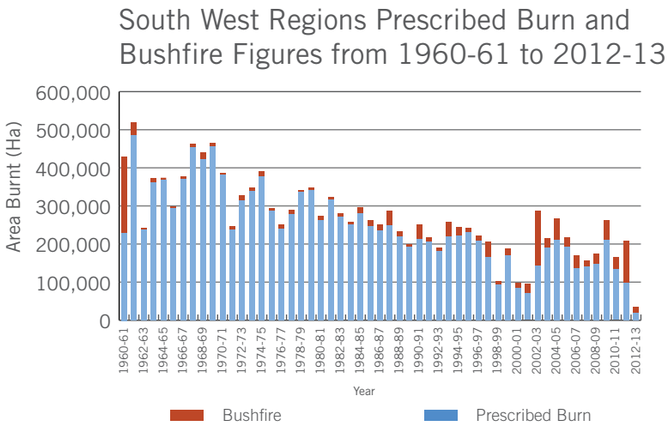


Figure 4.11 – South West Regions Prescribed Burn and Bushfire figures from 1960 to 2012

Fuel age is a significant factor in the management of bushfire. Fires in 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 forest fire managers to control major fire events and prevent serious impact on lives, property and environmental values. Fuel age has been mapped for approximately 2.5 million hectares of DPaW-managed lands in the South West of Western Australia. The state of South West fuel loads in the lead in to the 2013–2014 southern bushfire season is apparent from Figure 4.9 Fuel Age (2013) and Figure 4.10 Age Analysis from 2000–2013.

In managing significant tracts of land in the State, DPaW have a 3-year/6-season prescribed burn program with an annual burn target for the South West forest regions of 200,000 hectares. Over the past 20 years, DPaW and predecessor agencies have on average achieved 79 per cent of this target (Figure 4.11). Failure to achieve annual burn targets (due to weather conditions) contributes to fuel build up. Of the indicative burn target of 200,000 hectares for 2012–2013 in the South West forest regions, DPaW achieved only 23,468 hectares, of which about 6,410 hectares were burnt for pine plantation protection.

Several factors led to the 2012–2013 prescribed burn targets being under the target by such a significant margin, principally the number and intensity of rainfall events during the spring 'burning season' of 2012 followed by a subsequent period when the Soil Dryness Index rose rapidly. A high Soil Dryness Index was maintained until the break of the season in May 2013 when fuel conditions were then too wet for effective prescribed burn activities. The combination of unfavourable weather conditions and dry fuels over the extended summer contributed to a significant reduction in the amount of prescribed burning in the South West forest regions in 2012–13.

Outside the South West of the State, a further 6,023,884 hectares was burnt under a program in the Kimberley, Pilbara, Goldfields, Mid West, Wheatbelt and South Coast regions. The burns were carried out on DPaW managed lands as well as on Unallocated Crown Land and unmanaged reserves.

The amount of burning conducted under local government issued permits in 2012–2013 was relatively low. However, information concerning prescribed burning on lands other than those belonging to DPaW is not yet reliable due to the lack of a comprehensive system for gathering such data. Further development of data capture systems that will improve the availability of such information is being pursued by DFES.

The indicative burn program (priorities one, two and three burns) for the South West forest regions for spring 2013 comprises 152 candidate burns, totalling about 180,000 hectares. The priority one burns (that is, burns DPaW would like to see completed during spring) constitute 83 burns totalling 93,197 hectares, many of which relate to protection of community and high-value infrastructure assets. Up until the time of writing, some 34,800 hectares had been burnt in the forest areas of the South West, including the metropolitan area, and important community protection burns in Collie and Perth Hills, with the focus being targeting the priority one burns.

The Margaret River incident in late 2011, in which numerous properties were destroyed, has had a tangible effect on the morale, confidence and attitude to risk of land managers. Now that systems and processes concerning this have been reviewed and revised, confidence in the effective and safe use of prescribed fire should rebuild. OBRM has advised that it expects future reports to reflect a restoration of confidence on the part of land managers, including State agencies. Community understanding of the ongoing need for prescribed burning to reduce the impact of wildfires will continue to be important going forward, as the risk of bushfire is ever present as indicated by the recent NSW bushfires.

In the recent Tasmanian Bushfire Inquiry (Hyde 2013) the importance of the fuel availability was highlighted as a key aspect in determining the intensity of a bushfire together with prevailing weather conditions and topography. The Inquiry stated that the head fire's spread rate intensity and spotting was stopped or greatly reduced in areas that were recently burnt. "This is a highly relevant outcome for the issue of fuel reduction in preventing or minimising the risk of bushfire."

As outlined previously the critical task of fuel reduction is undertaken by a number of different agencies and is a responsibility shared by all landholders.

Shared Responsibility

The 2012 Emergency Preparedness Report identified the development of a shared responsibility ethos as a key objective in emergency management. Shared responsibility has particular resonance in relation to bushfire because of the extent to which community actions can influence the frequency and outcomes of bushfire incidents. In the last 12 months, efforts have continued to raise landowner awareness both of bushfire risk and landholder responsibilities.

In 2012–2013 the first stages of a research project commissioned by DFES concerning absentee landowners were conducted. Absentee landowners represent a national challenge for emergency services. The number of people with holiday homes in Western Australia is growing. DFES estimates there are at least 11,000 properties in the South West regions that are owned by people who live outside of the immediate area. In communities such as Margaret River, up to 40 per cent of properties are held by absentee landowners. The research being undertaken by DFES is a national first in building a profile of absentee landowners: their connection to the communities in which they own secondary homes, their understanding of emergency services and of how to prepare their homes, families or guests for a bushfire hazard.

The research will be used to build an introductory community engagement program for absentee landowners.

DFES has also undertaken research into the effectiveness of the message and layout of its primary bushfire community engagement document: Prepare. Act. Survive. This research has been applied to enhance the usefulness, comprehension and design of the document.

The 2012 Emergency Preparedness Report drew attention to the role of public information and community warnings associated with emergency events. DFES is currently researching the impact on behaviour change and overall effectiveness of messages associated directly with emergency events including specifically:

- effectiveness of bushfire-specific language used in DFES' bushfire warning system
- community understanding and awareness of bushfire warning terminology and language
- identification of terminology or language that does not support community action in response to bushfire warnings
- strategies to address identified areas of improvement in relation to community understanding, awareness and implementation of the bushfire alerts and warnings.

It is established that significant groups of community members do not understand that they are living in at-risk communities. People who do not recognise that they are at-risk will often not seek out or use information about relevant hazards. Activities such as information mail-outs are costly and unreliable. DFES maintains a suite of hazard specific brochures which are available in hard copy and electronic format via the DFES website. These resources are also distributed by career and volunteer operational staff when they attend events, conduct street meets, undertake door knocks or other community activities. During the 2012–2013 bushfire season, DFES released over 30,000 documents to the community and had over 8000 downloads of documents from the DFES website.

DFES has also developed:

- 'winter burning guidelines' to assist private landowners to effectively and safely undertake burning during prescribed winter periods on forested land holdings
- an At-Risk People Strategy based on a cooperative approach between State agencies, non-government agencies and other service providers to allow for a concerted approach to assisting community members who are most vulnerable during a bushfire (or other hazard) emergency
- a strategy to identify those people and leaders within communities who can assist with the promotion of shared responsibility. For example, the tourism industry, in order to understand the best way(s) to engage with tourists during the passage of a hazard.

A DFES Community Engagement Regional Team was established in January 2013 which includes the placement of community engagement officers in regional centres. They are tasked with understanding and working with the community structures and cultural factors that influence the delivery of programs and campaigns.

DPaW has continued to roll out a communications and engagement strategy with the goal: 'To better inform the community about the complexities and decisions surrounding prescribed burns when they are undertaken in the rural–urban area'. Related to this strategy, DPaW has rewritten and refocused the fire information on their new website, including that regarding prescribed burning, so that it is more concise, clear and consistent. It also contains case studies, diagrams and facts about fire.

Research

The need to maintain the currency and expand the range of scientific research to improve knowledge of fire behaviour in various fuel types in a drying climate was highlighted in the 2012 Report.

Research is undertaken or sponsored by DPaW to improve understanding of the factors that contribute to risk, such as fuel accumulation and fire behaviour. DPaW implements and sponsors research on fire behaviour in all the major fuel types encountered in the State. A significant amount of research is undertaken internally by DPaW's Science Division, and the department also sponsors work at various tertiary institutions and through its membership of the Bushfire CRC.

DFES Environmental Protection Branch also continues to develop and maintain extensive research collaborations within the State and across Australia. Research partners include DPaW, Landgate, Western Australian Local Government Association (WALGA), individual landholders, local governments and Commonwealth agencies such as CSIRO and BOM.

To complement research efforts in bio-physical sciences, DFES is extending its involvement in relevant social research through the fledgling Western Australian Community Emergency Research and Innovation Network, led by researchers from the University of Western Australia, which is working to promote peer review, knowledge exchange and joint research activities.

Interagency Cooperation

The 2012 report noted the importance of arrangements under which the vast Crown land estate in Western Australia is managed for fire. Both DFES and DPaW have Memoranda of Understanding (MoU) with the Department of Lands for fire management of Unallocated Crown Land and unmanaged reserves. DPaW has commenced development of a new management order, which is the legislative instrument underpinning of its MoU with the Department of Lands and a review of the MoU is expected to follow.

DFES has maintained its MoU arrangements with the Department of Lands and the Department of Education to manage bushlands on a cost recovery basis. The aim of both MoUs is to manage bushlands for all high bushfire risk schools and Unallocated Crown Land in the metropolitan area and town sites in Western Australia.

Complementing the formal arrangements a number of other initiatives are operating including joint exercising, group training and interagency working groups and committees.

Enhanced Response Capability

The opening of the DFES SOC in October 2012 has provided the agency with a modern Control and Command Centre, which was tested during the 2012 southern bushfire season. The systems and processes within the centre are being reviewed to ensure DFES is capable of managing all hazards for which it has HMA responsibility, including fire.

Concurrent with the development of the SOC, the seven DFES Regional Operations Centres across regional Western Australia have also been reviewed for operational preparedness. It is important they are configured for operational effectiveness particularly when one of the regional operations centres is operating and its staffing is augmented by another region.

DFES has committed significant resources to a Command, Control, Coordination and Information Systems project which will also fine tune the human processes and systems of the state and regional operations centres.

In relation to a significant capability issue identified in the 2012 report, that of succession planning for fire management practitioners, DPaW has committed 16 of 52 positions funded by a 2012–2013 budget increase to a Fire Management Development Program aimed at accelerating the development of dedicated fire management professionals.

Commencing in 2013, the completion of a comprehensive briefing/training/drill session by the end of September each year is mandatory for all DPaW personnel with a role in fire management. Staff who do not complete the training will not be available for fire management responsibilities. The briefing and training package will be reviewed annually to ensure it addresses all critical issues.

Major Incident Reviews

The 2012 Emergency Preparedness Report summarised the significant work then being undertaken by State agencies to implement the findings of major reviews, including the two reports by Mr Mick Keelty AO (Keelty February and November 2011) in relation to the Perth Hills and Margaret River bushfires of 2011.

Coinciding with the release of the 2012 Preparedness Report, the Minister for Emergency Services released the Report on the Post Incident Analysis of the 2011 Margaret River and Nannup bushfires prepared by Noetic Solutions Limited (2012) for Department of Premier and Cabinet.

SEMC had been requested to advise the Minister for Emergency Services on:

- the extent to which the lessons to be learned in the Noetic reports have been heeded and are being progressed by the agencies responsible
- the significance and implications of the reports' findings in the context of the State's general preparedness for large-scale bushfire emergency in the lead up to the 2012–2013 bushfire season.

SEMC provided its advice to the Minister for Emergency Services in late October 2012. The Minister tabled SEMC's advice in the Parliament on 15 November 2012. The SEMC report found that the majority of lessons contained within the Noetic reports had been acknowledged and adopted by the agencies responsible. The report also noted that the response to the Noetic reports had been significantly influenced by changes implemented across the emergency management sector to give effect to the recommendations of recent enquiries and reviews into bushfire management, in particular the two special enquiries conducted by Mr Keelty (Keelty February and November 2011).

A Major Incident Review (MIR) for the Black Cat Creek Fire, which occurred on 12 October 2012 in the local government district of the City of Albany, was initiated by DFES in partnership with the City and DPaW. During this incident, a number of persons were injured, including an employee of the former DEC, who tragically passed away from her injuries.

The MIR was undertaken by Leading Emergency Services (Leading Emergency Services 2013), an emergency management consultant, and resulted in 10 recommendations. DFES, the City of Albany and DPaW subsequently took a number of actions in response to recommendations concerning:

- the use of 'red flag' warnings (whereby operational crews can be advised of critical hazards on the fireground)
- the training of volunteer and local government fire managers in the Bureau of Meteorology's Next Generation Forecast and Warning System and interpretation of spot weather forecasts
- implementation of fire crew protection measures including additional individual fire blankets and the progressive equipping of appropriate fire appliances with additional protection measures
- measures to enhance training and skills recognition for Level 1 Incident Controllers
- enhancement of coordination, support and control facilities in Albany
- enhancement of a culture of joint Incident Management Teams incorporating DFES, DPaW and local government personnel.

Since early 2012, DFES and DPaW have been implementing fire crew protection programs to improve safety for firefighters in bushfire burnover and entrapment situations. DPaW has committed to a $2.4 million program to retrofit new safety features to its firefighting vehicle fleet. Additionally, the 2013–2014 State Budget includes $12.34 million committed to install comprehensive crew protection systems over the next four years in more than 650 DFES and Local Government firefighting vehicles that operate in high risk bushfire areas.

The agencies involved in this review have also agreed to investigate further the requirements to give effect to recommendations concerning the full implementation of integrated Incident Management Teams, standard operating procedures and training. Consideration will also be given to the need for further regulatory measures to mandate that DFES or DPaW take control of all fires once they have been declared Level 2 incidents. This is an issue which will be monitored at future SEMC meetings.

Agencies responsible for fire management operate under disparate systems, structures and workforce arrangements which necessitate joint exercising to ensure that Incident Management Teams operate cohesively. The maintenance of sustainable rosters and relief arrangements during operations provides additional challenges.

The primary roles and responsibilities of the fire management agencies may require differences in appliances, personal protective clothing, communications and other equipment. Despite increased joint exercising, risk arising from lack of uniformity requires continuing vigilance.

Preparedness for the 2013–2014 Southern Bushfire Season

The 2012–2013 budget increase for fire management, prevention and mitigation for DPaW places the department in a better position to reduce the risk associated with prescribed burning and to successfully combat bushfires. It also provides the means to address recommendation 16 of the 2010 Ferguson Review (Ferguson, 2010), which highlighted the need for succession planning for fire management staff, in order to minimise loss of skills and experience.

DFES, DPaW and local governments have successfully conducted annual exercises over the last two years in a pre-southern fire season context. The State Bushfire Exercise for 2013, held on 21 August, tested State Emergency Management Arrangements inclusive of policies and procedures; interoperability with other emergency management stakeholders; changes to incident management systems; reporting procedures and protocols as well as DFES' ability to coordinate a response to multi-agency bush fire events. The exercise was a scenario-based field exercise with limited deployment of fire fighting resources. It provided regional and State level incident-based training and validation activities designed to exercise Incident Management Teams and their interaction with DFES Regional Operational Centres, the SOC and other incident supporting groups and agencies.

In September 2013, the SEMC endorsed Westplan Fire, which is an amalgamation of Westplan Urban Fire and Westplan Bushfire. DFES undertook extensive consultation with stakeholders in the development of Westplan Fire, which includes clear organisational roles and responsibilities across the Prevention, Preparedness, Response and Recovery spectrum.

2013–2014 Seasonal Bushfire Outlook

The Bushfires CRC has provided the following assessment of the seasonal outlook for the northern and southern regions of the State.

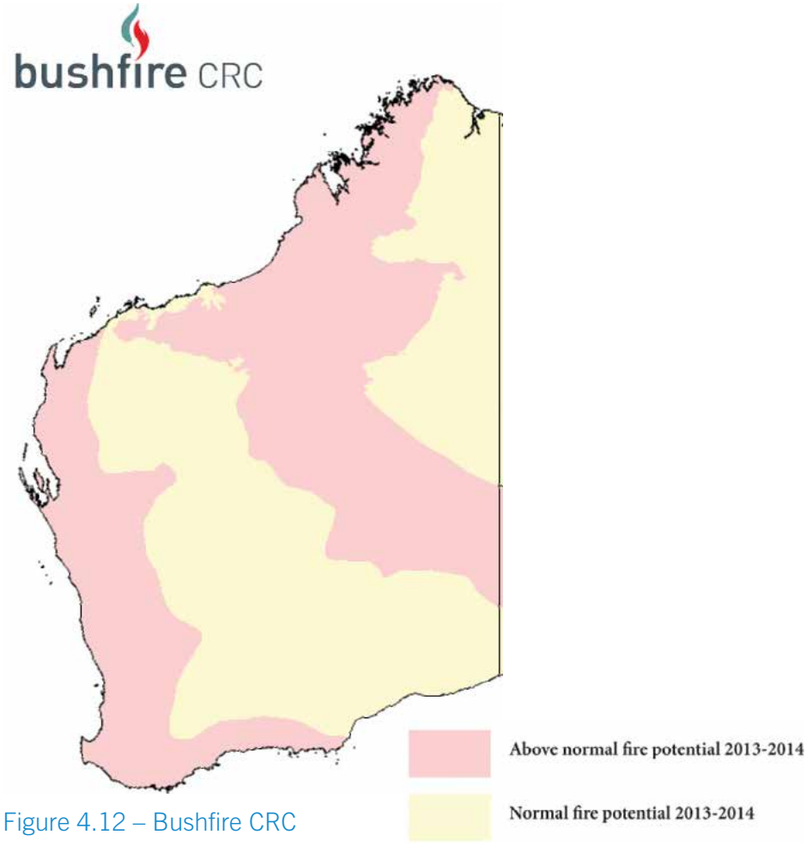


Figure 4.12 – Bushfire CRC

Image courtesy of Bushfire

- Across the Mid West and Desert regions, above normal fire potential is expected as a consequence of high rainfall, which has resulted in very high annual grass growth and high fuel loads.
- Above normal bushfire potential is also forecast in the South West, which has seen, over the entire year, reduced rainfall, soil moisture deficit and high fuel loads.
- The Wheatbelt has been assessed as having a normal fire potential, with average to below average rainfall resulting in average fuel loads. In the Nullarbor, normal fire potential is expected east of the Fraser Range. There is a heightened risk in key interface areas including Perth Hills and Leeuwin-Naturaliste Ridge. Privately held lands may present significantly higher risk than publicly managed lands due to the relative lack, or unevenness, of preparation on private lands. (Bushfire CRC Fire Note 116/ September 2013).
- There is an above average bushfire potential in the central region of northern Western Australia. The areas to the east and west of the central zone are of average fire potential.
- The Kimberley area has been subject to high rainfall in recent months and this will result in significant and widespread grass growth across the region. This assessment is mindful of the increased prescribed burning planned across the region, but the rainfall and consequent regrowth fuel loads are significant.
- Rainfall across the Pilbara has been average or above average in recent months. As a result of this rainfall pattern, there is above average bushfire potential in the central region. The outlook potential is for basically an average season on the western and eastern side of the central zone. (Bushfire CRC Fire Note 113/ July 2013).

Summary

In summary, the State faces ongoing challenges over the 2013–2014 fire season.

These include:

- the adverse effects of seasonal factors on the prescribed burning program that have delayed or prevented burn targets from being achieved
- high average fuel levels across the State.

Overall preparedness levels benefit from:

- ongoing progress in the implementation of recommendations from reviews and post-incident analyses that resulted from the 2011–2012 bushfire season
- increased inter-agency communication and cooperation
- the initiation of work by OBRM to align prescribed burning practices of both DPaW and DFES with international best practice and in the context of a contemporary approach to risk management
- a heightened awareness of the role of community engagement in the development of a shared responsibility ethos and actions taken by agencies to increase community engagement levels
- the initiation of an extensive consultation program of bushfire risk management planning in high risk local government areas, in a way that will build ongoing capacity to plan and identify effective bushfire risk treatments tailored to local conditions and resources.

While the State is better prepared, it still faces an increased bushfire threat this season. The risk of bushfire will be ongoing and, in the medium term, issues such as the ageing demographic of experienced fire staff, the availability of sufficient experienced accredited personnel to fill senior roles in Incident Management Teams, and the currency and range of scientific research underpinning knowledge of fire behaviour in various fuel types in a drying climate, represent risks to be addressed by agencies.

RISK MANAGEMENT

Overview

'Underpinning a disaster resilient community is knowledge and understanding of local disaster risks. We all share responsibility to understand these risks, and how they might affect us. By understanding the nature and extent of risks we can seek to control their impacts, and inform the way we prepare for and recover from them' (National Emergency Management Committee 2011).

Emergency events stem from hazards, both natural and man-made. All hazards have the potential to significantly affect life, property and societal structures in Western Australia. These include injuries and deaths, harm to community and cultural features, economic impairment, infrastructure and property damage, disruption to fundamental administrative operations and loss of ecosystems and biodiversity.

Over the past half century global costs stemming from natural disasters have been on the rise, with the number of weather-related global disasters doubling between 1980 and 2009 (Neumayer and Barthel 2011). In 2011 the catastrophic earthquakes in Japan and New Zealand in combination with other natural disasters world-wide (including the flooding in Queensland) cost in the vicinity of $400 billion globally, a record for aggregated losses (Munich Re 2012).

Western Australian Context

In recent years, Western Australia has also experienced a range of disasters, including bushfire, major storm and flooding, resulting in loss of life or injury, damage to private and public property and cost to the State's economy.

The size and remoteness of Western Australia adds to the range and complexity of potential hazards that may be experienced. Covering nearly one-third of the Australian continent and spanning 2,400 km from north to south (22 degrees of latitude), the State includes a number of climatic zones. Consequently there is a propensity for cyclones, flooding, heat waves, a range of intense storm activity and bushfires.

In addition to the climatic-based hazards, the State is known to be geologically active. The South West Seismic Zone is a well documented zone of activity, and other seismic areas exist in the Gascoyne and Pilbara regions. The coastal areas of the State also have potential exposure to tsunami. The Sunda–Andaman subduction zone which lies north and north-west of the State, triggered, for example, the 'Indian Ocean Tsunami' of 2004.

Overall, including natural and man-made, there are 26 hazards recognised in legislation (as of end 2013 the number of prescribed hazards is expected to increase to 27).

Embedding Risk Management in the Emergency Sector

In 2012, the Emergency Preparedness Report recognised the need for robust planning and coordination in prevention, preparedness, response and recovery operations. Risk management was identified as a key theme.

Following the 2012 report, SEMC considered the adoption of a comprehensive risk management approach to gain a better understanding of the risks to which the State is exposed. Such a strategy would enable more focused policies to be developed specifically targeting the preparation and prevention areas and to ensure effective use of scarce resources. In addition this approach would ensure that emergency management strategies keep pace with growing challenges such as climate change, population growth, infrastructure and resource project expansion and the changing distribution of population.

Risk Management Concepts

In the emergency management context, risk is established when a source of risk and an element at risk coexist. Figure 4.13 depicts this concept as the intersection between hazard and vulnerability. The level of risk that subsequently develops due to this coexistence depends ultimately on the wide ranging factors associated with both the hazard and the vulnerability and the effectiveness of controls (that is, mitigations) that may be in place.

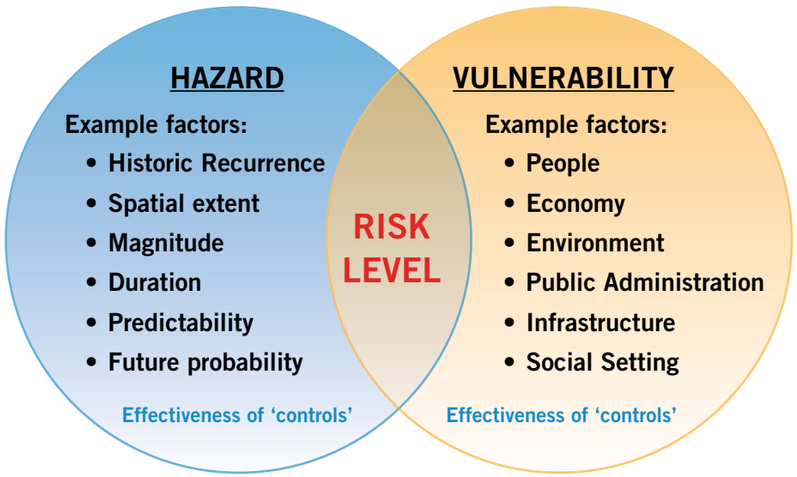


Figure 4.13 – Diagrammatic representation of emergency risk

(Adapted from USGS, 2011)

Risk management is the process whereby within a particular context (for example, at State, district or local scale) the co-existence of sources of risk and elements at risk are identified. These are analysed in detail, reviewing the wide range of variable factors of each to evaluate their associated risk levels (Figure 4.13). Where risk levels are deemed too high, treatment strategies are devised and applied (that is, implementation of controls) to bring those risks within tolerable levels. Open communication and consultation with stakeholders is an imperative as is the continual monitoring, review and continual improvement of the process.

The international standard 'AS/NZS ISO 31000:2009 Risk Management –Principles and Guidelines' captures these risk management processes and also specifies the framework for embedding risk management into standard governance and business practice (Figure 4.14).

SEMC has endorsed 'AS/NZS ISO 31000:2009' as the State's risk management methodology and is looking to promote its usage throughout the Emergency Management sector.

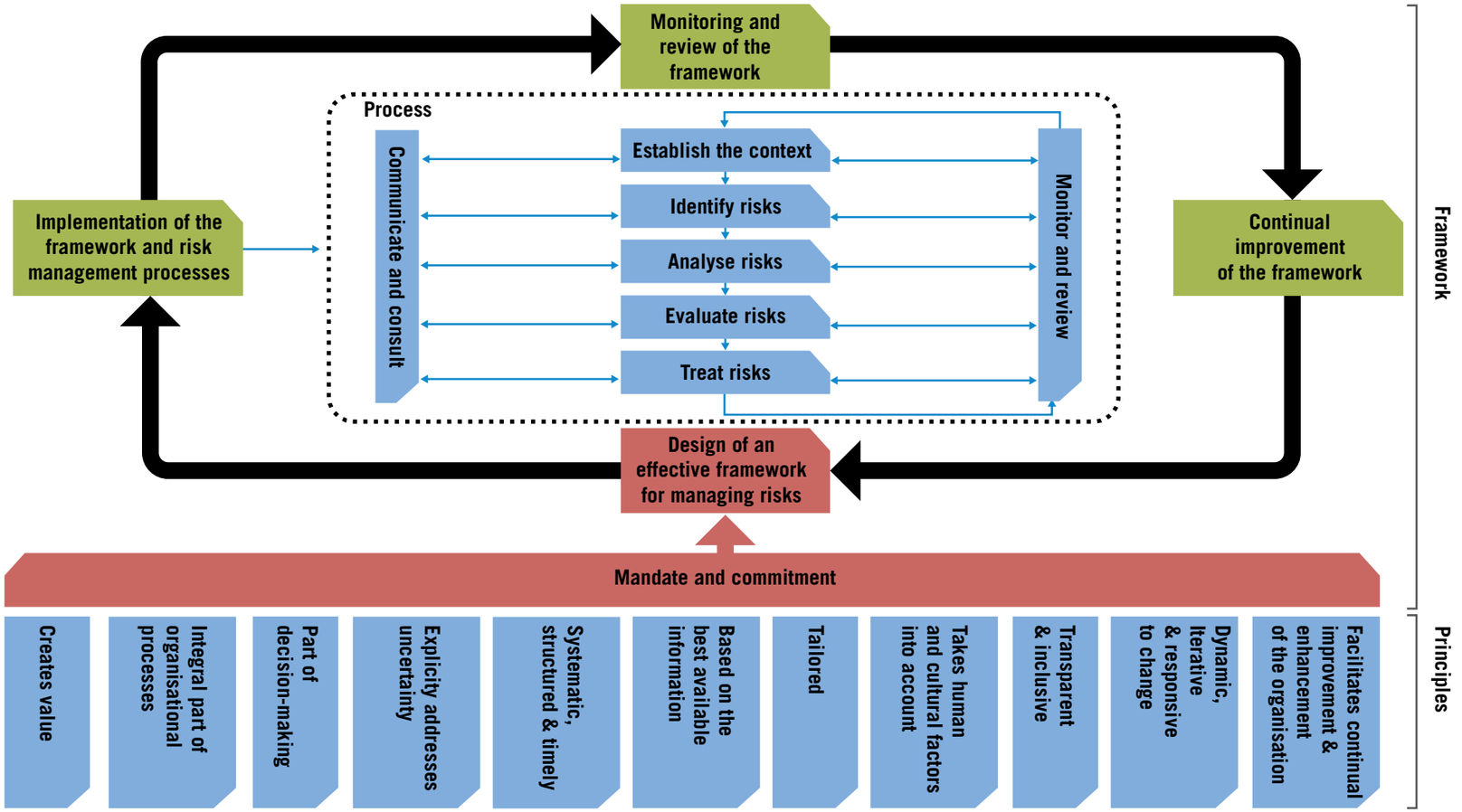


Figure 4.14 – 'AS/NZS ISO 31000:2009' Risk Assessment Framework, principles and process

(Adapted from National Emergency Risk Assessment Guidelines, 2010)

National Perspectives

Globally, over recent decades, the frequency and severity of emergency events has been increasing. In response to these trends the Council of Australian Governments (COAG) commissioned a review of Australia's approach to dealing with disaster mitigation, relief and recovery. The findings called for a 'systematic and widespread national process of disaster risk assessment' (COAG 2004) and subsequently in 2007 the Australian Emergency Management Committee (now Australia New Zealand Emergency Management Committee ANZEMC) endorsed a National Risk Assessment Framework. One of the first outputs under the new framework was the development of the National Emergency Risk Assessment Guidelines (NERAG) (National Emergency Management Committee 2010) which aimed to assist in the following:

- improving understanding of emergency risk issues and ensuring risk treatments show sound return on investment
- standardising risk assessments and developing alternative risk reduction proposals
- Increasing transparency so that assessments are easily undertaken, checked or modified as knowledge and information is improved
- Improving consistency between different geographical regions and/or hazard classes so meaningful comparisons can be made.

Thus the NERAG was designed to provide a national approach for assessing risks and a methodology that could be applied at various scales and levels of complexity throughout Australia.

In 2011 the Standing Council of Police and Emergency Management agreed that NERAG should become the nationally consistent methodology for the assessment of priority hazards in Australia. Furthermore it was agreed that the document be revised, incorporating jurisdictional lessons to date. To this effect an updated version of NERAG is presently being developed and planned for release in 2014.

In 2009 COAG also endorsed the National Partnership Agreement on Natural Disaster Resilience which provides funding to the states and territories to enhance the resilience of communities against the impact of natural disasters. As part of the process the states and territories are required to undertake risk assessments to inform risk mitigation priorities and develop and implement programs to address these priorities. More recently ANZEMC agreed that these risk assessments should be carried out in accordance with NERAG and Western Australia's intention is to follow these guidelines for natural hazard risk assessments.

Western Australian Risk Policy and Projects

Over a number of years, Western Australia has been developing a State Emergency Risk Assessment Framework. To help give effect to the framework, in 2012–2013 SEMC developed the State Emergency Management Policy (SEMP) 2.9–*Management of Risks.*

SEMP 2.9 is designed as an overarching risk policy and identifies the mandate and commitment factors necessary for delivery of comprehensive and consistent risk management throughout Western Australia's Emergency Management sector (refer Principles in Figure 4.14).

Central to the policy is the identification of six key pillars fundamental to the well-being of the State, each of which in-turn may be impacted by an emergency event and hence also represent potential vulnerabilities. These six are consistent with NERAG's Impact Categories and were adopted by SEMC in 2012 as the Core State Objectives.

They are:

- **People:** Protect the lives and wellbeing of persons.
- **Economy:** Maintain and grow the State's productive capacity, employment and government revenue.
- **Social:** Ensure that there is public order, that people are housed and fed in a safe and sanitary manner and have access to social amenity including education and health services and that things of cultural importance are preserved (NERAG term: Social Setting).
- **Government:** Ensure that there is at all times an effective and functioning system of government and societal respect for rule of law (NERAG term: Public Administration).
- **Infrastructure:** Maintain the functionality of infrastructure, particularly key transport infrastructure and utilities required for community health, economic production and effective management of emergencies.
- **Environment:** Protect ecosystems and biodiversity.

In light of this, SEMP 2.9 assigns specific roles and responsibilities to public agencies for the management of risks to the Core State Objectives arising from the hazards for which they are involved.

The policy also details the requirement for a consistent approach to risk assessment State-wide, namely following the 'AS/NZS ISO 31000:2009 Risk Management–Principles and Guidelines' methodology and a consistent and/or transformable risk criteria. The consistency would facilitate comparison of risk throughout Western Australia, in turn assisting the State's planning and allocation of resources. In addition the policy specifies the need for a comprehensive approach, covering all 26 prescribed hazards (with a view towards additional emerging hazards) with the process being undertaken at multiple scales (namely at State, district and local level).

The policy also details that the relevant agencies should develop risk management plans and treatment methods to bring higher risks down to a tolerable level, with capacity to report annually on the activity.

As of the fourth quarter of 2013, SEMP 2.9 is in the process of consultative review with stakeholders and it is anticipated that it will be finalised in early 2014.

Large Scale Risk Management Projects in Development (2012–2013)

In Western Australia in 2012–2013 SEMC through its Secretariat has either commenced or continued a number of large scale risk related projects, with the involvement of several State agencies including DFES and OBRM. These projects include:

- A State-level assessment of the risks posed by seven sudden onset natural hazards (storm, earthquake, bushfire, tsunami and heatwave (assessed 2013) and cyclone and flood (assessed 2012); otherwise known as the State-level Sudden Onset Natural Hazards Risk Assessment Project

- A comprehensive assessment of all 26 prescribed hazards and the risks these pose to the Core State Objectives assessed at multiple-scales (that is, at State, district and local level) otherwise known as the State-wide, All Hazards, Risk Management Project.
- The Bushfire Risk Management Planning (BRMP) project which involves a detailed planning process to be applied to reduce risk in high bushfire risk local government areas.

State-level Sudden Onset Natural Hazards Risk Assessment Project

Under the National Partnership Agreement States have been tasked to complete State wide prioritised natural disaster risk assessments as a condition of the National Disaster Resilience Program (NDRP) funding allocation.

In Western Australia, risk assessments for cyclone and flood were undertaken in 2012 and storm, earthquake, bushfire, tsunami and heatwave were assessed in May and June of 2013. However, the cyclone and flood assessments were made under differing circumstance than those done in 2013. Consequently, it is intended to reassess these two hazards in the fourth quarter of 2013 to gain consistency across all seven hazards.

The State-level Sudden Onset Natural Hazard Risk Assessment Project – 2013 Review section (see below) forms the major portion of this **Risk Management** focus chapter for the 2013 Emergency Preparedness Report. It discusses the processes undertaken in assessing storm, earthquake, bushfire, tsunami and heatwave and the 'interim' findings, including the identification of relative risk levels per hazard in relation to the Core State Objectives. The section also discusses gaps and necessary further iterations to complete a robust process, and until these iterations are undertaken the outcomes should be regarded as preliminary.

State-wide, All Hazards, Risk Management Project

In accordance with the national agenda and the principles encapsulated in SEMP 2.9, SEMC Secretariat, in 2013, has been scoping and developing a State-wide, all hazards, risk management project. This will come into effect in 2014.

The foundation of the project is that over a three year period all public hazard management agencies, combat agencies and local governments will gain a comprehensive understanding of the risks from hazards for which they are involved and the potential impacts to the Core State Objectives as they apply in their agency's context. The project adopts an all hazards approach, covering the 26 prescribed hazards. Risk assessments are to be undertaken at multiple scales (namely at State, district and local level), using consistent methodology (that is, AS/NZS ISO 31000:2009) and consistent criteria (for example, NERAG where applicable) to identify and prioritise key risks and to formulate treatment strategies where necessary.

At present bushfire has been deemed as the first priority hazard leading to the launch of a consultation process for the BRMP Project (see below) in the third quarter of 2013. Concurrently, SEMC Secretariat is scoping and developing an 'Implementation Plan' for roll out of risk management planning for the other hazards across the State.

Bushfire Risk Management Planning (BRMP) Project

The aim of the project is to promote the development of bushfire risk management plans, particularly at the local scale. These plans are designed to document a coordinated and efficient approach towards the identification and treatment of bushfire risk in local areas. Managing bushfire risk effectively in order to protect people, assets and other community values. Local governments are viewed as taking the lead in the planning process in collaboration with other relevant stakeholders (such as State agencies). A comprehensive and integrated planning process is thus envisaged with the aim to develop tenure-blind, evidence-based information. In turn this information can help designate accountability for treatment and provide a sound basis for decision-making in bushfire risk management and treatment planning.

After the consultation process, which will influence how the project is undertaken, the project implementation is envisaged to be managed by DFES and utilise standards and methodologies as developed by OBRM. The initial phase of the project is set to focus on 45 local governments in the southern regions of the State, from Geraldton through to Esperance, deemed to have high bushfire risk. As of September 2013 consultation workshops were underway with 45 designated local governments (led by SEMC and delivered jointly with DFES and OBRM). A series of in-depth pilot studies is planned for 2014 and the implementation of the program will be considered thereafter.

Figure 4.15 – BRMP Consultation Process - Lower South West - Busselton

State-level Sudden Onset Natural Hazard Risk Assessment Project – 2013 Review

In May and June 2013, State-level risk assessments were undertaken for five sudden onset natural hazards to which Western Australia is exposed: storm, earthquake, bushfire, tsunami and heatwave. This section reviews the process along with the interim findings. The full report is expected at a later date following addition of new information (including the reassessment of cyclone and flood) and further data analysis. The information presented here is a first phase State-level assessment.

The analysis of risk was undertaken through a series of qualitative risk assessment workshops that utilised pre-collated quantitative and semi-quantitative data. In the six months preceding the workshops, research into the five hazards was undertaken by the Bushfire CRC, Geoscience Australia and SEMC Secretariat. The research included an assessment of the recurrence and magnitude of previous emergency events, the controls the state had in place to mitigate their effect, and actual impacts incurred. The research also reviewed significant events from other similar jurisdictions (nationally and internationally) to assess what could also potentially unfold in Western Australia.

Scale, Complexity and State's Risk Level

Western Australia's size and geographic expanse means it has exposure to a large range of potential events. However, for the purposes of a first phase, State-level review, only credible worst-case and near worst-case scenarios were assessed.

Taking the concept highlighted in Figure 4.13, the credible worst-case and/or near worst-case scenarios are likely to occur where hazards intersect with areas of large potential vulnerability such as major population centres, key economic hubs, significant infrastructure zones or sensitive environmental areas. The risk levels thereby gleaned from the credible worst-case and/or near worst-case scenarios could be considered as reasonable proxies for the State's maximum risk. It can only be considered as a proxy for the State's maximum risk, and not conclusively as the maximum risk, because it is possible that a frequently occurring moderate impact scenario (rather than worst-case scenario) could generate a higher risk level; but this will take further in-depth research to ascertain.

Worst-Case and Near Worst-Case Scenario Generation

In light of the scale and complexity of issues facing Western Australia, expert panels were convened for each of the five hazards to pre-generate credible worst-case and near worst-case scenarios. These were then used in the state-level risk assessment workshops. Table 4.2 summarises the respective scenarios that were produced and Figures 4.16 to 4.20 depict graphically a selected sample of the scenarios.

Table 4.2 – Scenarios developed and analysed for the assessment of five sudden onset natural hazards (2013)

HAZARD	SCENARIO		CONTRIBUTING AGENCIES
STORM	Credible worst-case (≈1:100 year event)	Ex-tropical cyclone tracking down the coast and merging with a cold front. Crossing the coast in the vicinity of Mandurah and progressing through the South West to east of Albany. Includes coastal erosion, flooding, destructive winds to 165 km/h (possible 180 km/h), and catastrophic fire danger.	Bureau of Meteorology Department Fire and Emergency Services UWA Oceans Institute Western Power SEMC Secretariat Research: Bushfire CRC
	Near worst-case (≈1:30 year event)	Severe thunderstorm warning extending from Lancelin to Merredin and through to Busselton and Katanning. Includes zones of severe activity including dangerous winds, large hail, heavy rainfall and flash flooding.	
EARTHQUAKE	Credible worst-case geographic locality 1 (≈1:1000 year event)	Western edge of the South West Seismic Zone, east of Perth. Magnitude 7.1 quake. 33 to 70 seconds of shaking depending on location with maximum intensity of 10MM (Modified Mercalli Intensity Scale) and between 5 to 8MM in the Perth area. Extensive damage to buildings near the epicentre; damage to certain types of structure in the metropolitan area. Further damage to major roadways, bridges, pipelines and railway infrastructure.	UWA School of Earth and Environment Geotechnical consultant SEMC Secretariat Research: Geoscience Australia; Bushfire CRC
	Credible worst-case geographic locality 2 (≈1:1000 year event)	Coastal Pilbara region with epicentre below major town. Magnitude 7.1 quake with ground shaking lasting for 70 seconds. Maximum intensity of 10MM decreasing with distance. Extensive building damage, some liquefaction affecting roads and damage to operational infrastructure.	

HAZARD	SCENARIO		CONTRIBUTING AGENCIES
BUSHFIRE	Credible worst-case (≈1:100 year event)	Severe to extreme fire dangers. Low pressure trough across the South West with dry and gusty thunderstorms. Multiple bushfire ignitions from the Murchison through to the South Coast with some areas containing high fuel loading. Fresh and gusty north-easterly winds, followed by north-westerlies and westerlies. Fires impact on people, and a wide range of community and industrial infrastructure along the Darling Range.	Bureau of Meteorology Department of Fire and Emergency Services Office of Bushfire Risk Management Department of Environment and Conservation (now DPaW) SEMC Secretariat Research: Bushfire CRC
	Credible near worst-case (≈1:100 year event)	Severe fire danger during summer holiday period. Low pressure trough across the Great Southern generating fresh north-easterly to north-westerly winds. Suspected arson attack near a town. Evacuation of town is required with impacts on people, on dwellings and commercial and service buildings.	
TSUNAMI	Credible worst-case (≈1:10000 year event)	Tsunami triggered by magnitude 9.2 subsea earthquake south of Java. Marine and land area threat from Kuri Bay to Bremer Bay. Impacts include major flooding of foreshore and nearby land and marine emergencies associated with rips, waves and strong ocean currents.	Bureau of Meteorology Department of Fire and Emergency Services UWA Oceans Institute Western Power SEMC Secretariat Research: Bushfire CRC
	Credible near worst-case (≈1:100 year event)	Tsunami triggered by magnitude 8.5 subsea earthquake south of Java. Marine area threat from Wallal to Cape Leeuwin. Impacts include marine emergencies associated with rips, waves and strong ocean currents.	
HEATWAVE	Credible worst-case (≈1:50 year event)	7 consecutive days with average daily temperatures (day and night) in excess of 32°C and with 6 days with maximum temperatures exceeding 40°C. Impacts include health effects on vulnerable people, outdoor events and outdoor work, agriculture and wildlife and faults to power distribution due to prolonged high loads.	Bureau of Meteorology Department of Health Western Power SEMC Secretariat Research: Bushfire CRC
	Credible near worst-case (≈1:5 year event)	4 consecutive days with average daily temperatures (day and night) in excess of 32°C and with 4 days with maximum temperatures exceeding 40°C. Impacts include health effects on vulnerable people, outdoor events and outdoor work and faults to power distribution due to prolonged high loads.	

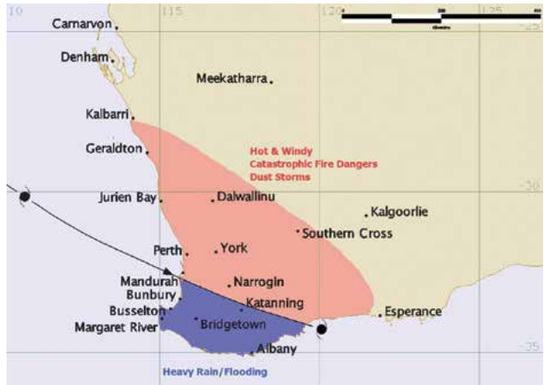


Figure 4.16 – Credible worst-case storm scenario – ex tropical cyclone tracking across the State's South West

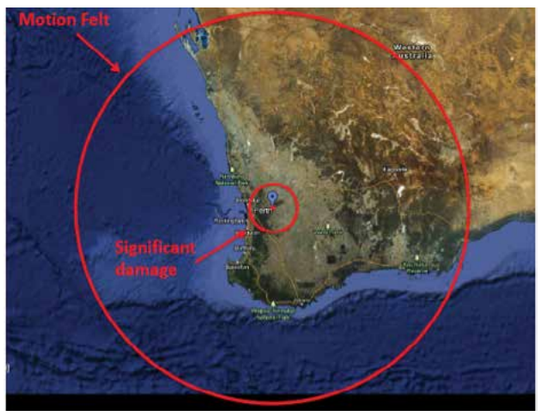


Figure 4.17 – Credible worst-case earthquake scenario – magnitude 7.1 quake east of Perth

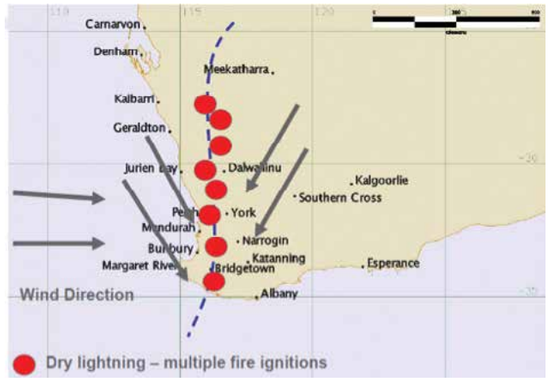


Figure 4.18 – Credible worst-case bushfire scenario – multiple ignitions through the Mid West and South West of the State on a severe to extreme fire danger day

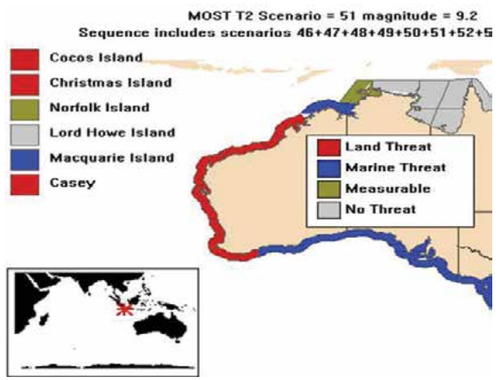


Figure 4.19 – Credible worst-case tsunami scenario – Example warning from Joint Australian Tsunami Warning Centre

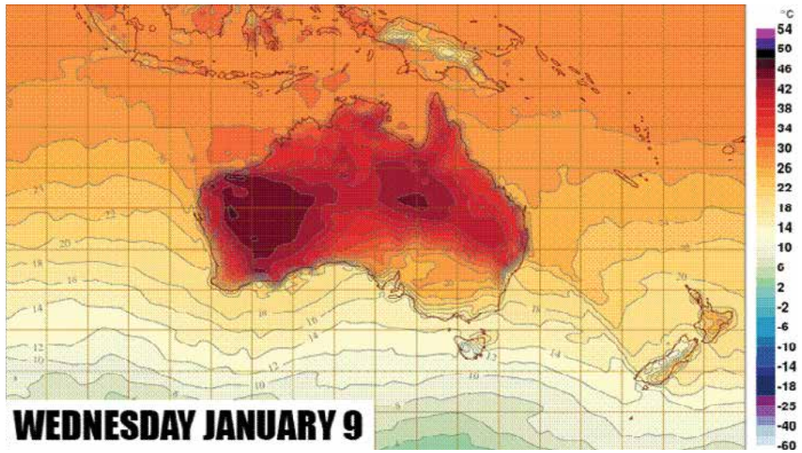


Figure 4.20 – Credible worst-case heatwave scenario – heat map showing temperatures on the seventh day of heatwave

Risk Assessment Workshops

Five facilitated workshops were undertaken for each of the sudden onset natural hazards, engaging broad expertise from the public and private sector (averaging 25 to 35 participants per workshop). The process was co-developed and facilitated by the South Australian Fire and Emergency Services Commission (SAFECOM) whom, over a period of four years, are well advanced in detailed regional-level risk assessments in their State.

At the workshops the worst-case and near worse-case scenarios were analysed, particularly in relation to their potential impact on the Core State Objectives of People, Economy, Infrastructure, Social (NERAG term: Social Setting), Government (NERAG term: Public Administration) and the Environment.

Following NERAG (2010) methodology the workshop participants, in table groups (averaging 5 to 8 people) analysed a thorough range of aspects associated with each scenario, described in comprehensive 'risk statements'. They also overviewed the effectiveness of controls in place for any mitigation. For each 'risk statement', likelihood, consequence, confidence rating and risk levels were determined, utilising NERAG (2010) criteria tables scaled for the Western Australia population size and State budget.

Across the five workshops 882 risk statements were completed by table participants providing a sound population base for preliminary analysis (Table 4.3).

Table 4.3 – Breakdown of risk statements generated and analysed by hazard and impact category

IMPACT CATEGORY	STORM (n)	EARTHQUAKE (n)	BUSHFIRE (n)	TSUNAMI (n)	HEATWAVE (n)
PEOPLE	20	33	33	83	26
ECONOMY	22	38	49	62	22
INFRASTRUCTURE	34	65	45	74	32
SOCIAL SETTING	16	11	44	36	16
PUBLIC ADMINISTRATION	14	16	22	24	18
ENVIRONMENT	6	0	11	0	10
TOTAL = 882	**112**	**163**	**204**	**279**	**124**

The likelihood and consequence levels for each risk statement were converted to numeric ratings (1-5) from which an arithmetic mean ('mean') for each respective impact category could be derived. These were then plotted against a square matrix yielding relative consequence on the 'X' axis and relative 'Likelihood' on the 'Y' axis for which relative risk levels can be derived.

Figures 4.21 to 4.25 show the respective risk levels for the six impact categories by hazard and Figures 4.26 to 4.31 show the respective risk levels for the five hazards by impact category.

The matrix is also sub-divided in to four quadrants (numbered 1-4) representing increasing impact and risk level (that is, top risks plotting in quadrant 4 and the lowest in quadrant 1).

The 'oval' shape surrounding the plotted points represents a graphical (non-statistical) method of grouping impact data so that simple visual comparisons can be made.

A full review of the workshops and risk assessment process will be developed following the inclusion of cyclone and flood and will include detailed findings and an assessment of gaps, issues and resolutions identified throughout the process.

Risk Discussion and Interpretation

Following the analysis of worst-case and near worst-case scenarios across the five hazards, Figures 4.21 to 4.25 yield some significant patterns from which preliminary State-level conclusions may be drawn. It must be reiterated that cyclone and flood as yet are not included in the comparisons (pending reassessment) and it is probable they, too, will show significant results.

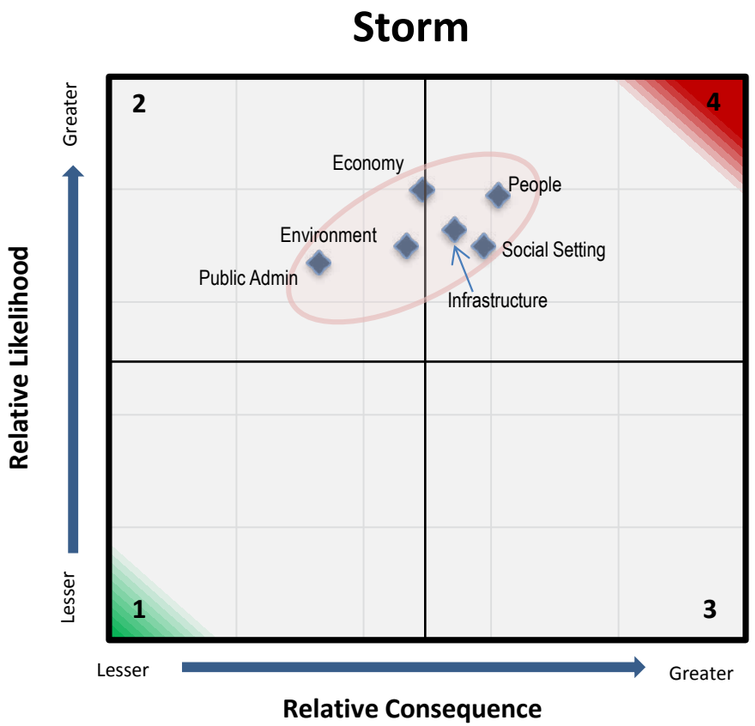


Figure 4.21 – Storm – mean risk levels per impact category

Within the square matrix the highest risks plot towards the top right corner (that is, quadrant 4) which reflects both a relatively high likelihood and consequence. Based on the scenarios reviewed, bushfire and storm pose the greatest risks to the State, with four of bushfire's impact categories and three of storm's impact categories plotting within quadrant 4 (Figures 4.21 and 4.23).

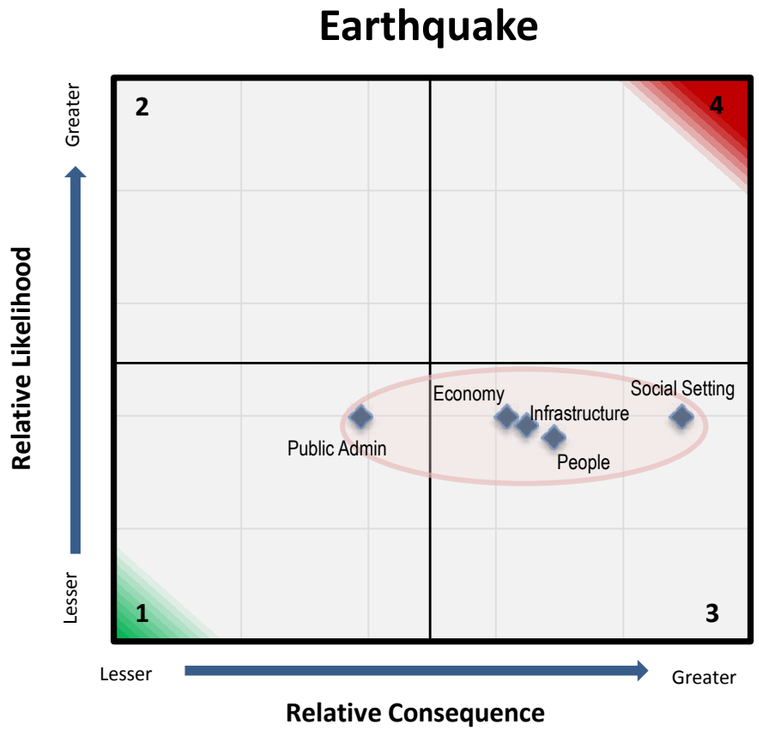


Figure 4.22 – Earthquake – mean risk levels per impact category

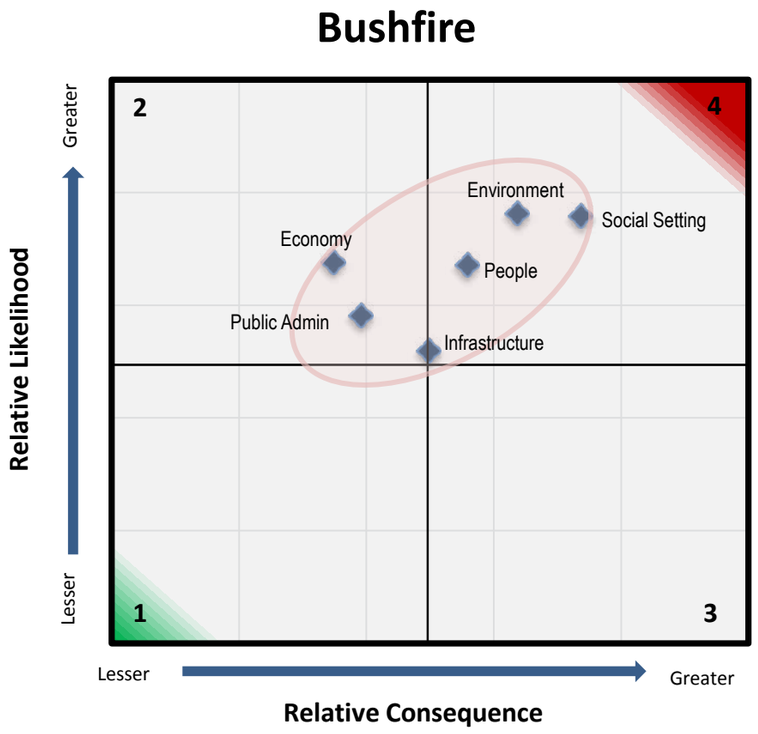


Figure 4.23 - Bushfire - mean risk levels per impact category

The overall highest risk is from a major scale bushfire impacting the social setting of the South West closely followed by impacts on the environment and people in the same area. Social setting encompasses community and community-based services and cultural, emotional and psychological aspects. This analysis shows that they are deeply affected by an emergency

bushfire event and should be an area of priority concern and treatment (mitigation) focus for the State. Mitigation strategies to protect the ecosystem and biodiversity and the lives and wellbeing of people, located in the area, would also be of major concern and treatment (mitigation) focus.

This high bushfire risk is potentially set to become worse in the future. As outlined in the **Focus Area Chapter – Bushfire Update,** prescribed burning has been on the decline in the South West and correspondingly areas being burnt by bushfire are increasing – a trend of concern (Figures 4.11). Furthermore older fuel ages are on the rise in the area (Figures 4.10). The accumulation of fuel is creating the potential for fires of extreme intensity for which suppression, before major damage occurs, may not be possible.

The combination of factors as described above confirm bushfire as the State's preeminent hazard and the priority candidate for treatment (mitigation) processes.

Extreme storm events are also seen as yielding high risks to Western Australia, particularly to the people, social setting and infrastructure categories. The credible worst-case scenario involving an ex-tropical cyclone tracking across the South West of the State would likely lead to widespread destruction and significant displacement of people. Agencies and the community will need to assess the regions' preparedness and consider treatments for storms of this nature and magnitude.

With Western Australia containing a number of seismic zones, particularly in the South West and Pilbara, the earthquake data plots significantly in quadrant 3 (Figure 4.22). This reflects the relatively low likelihood of a major event (for example, ≥7.1 magnitude) taking place near to a population centre. If it did take place the ubiquitous nature of destruction would generate a particularly high consequence.

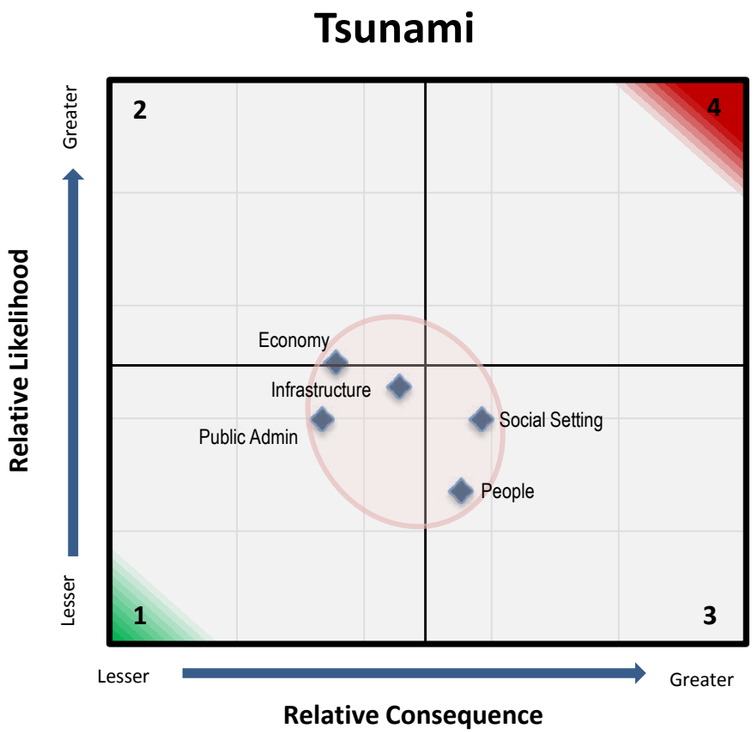


Figure 4.24 – Tsunami – mean risk levels per impact category

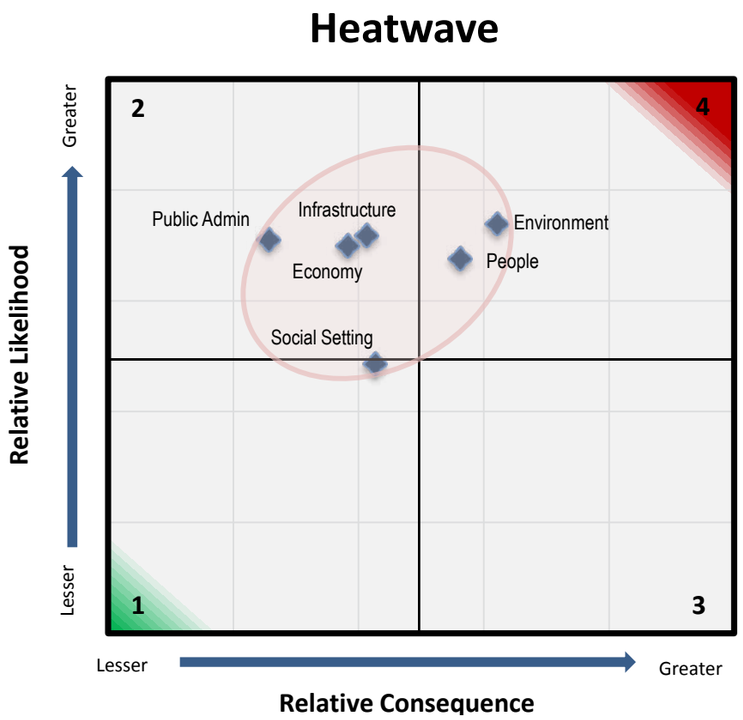


Figure 4.25 – Heatwave – mean risk levels per impact category

Heatwave shows a relatively high likelihood of occurring but most of its impacts are of a lower order (Figure 4.25 quadrant 2). The exceptions are impacts to the environment (for example, wildlife and water quality such as algal blooms) and impacts to people. People in more susceptible circumstance are especially vulnerable and extended heat events globally are known to result in high proportions of hospitalisation and mortality. With forecast climate change and the potential for more extreme weather events in tandem with a growing and aging population, heat stress effects and associated treatment strategies need to be considered. It is important to maintain uninterrupted power supplies during these periods, in particular to support cooling systems.

In recognition of the emerging status of heatwave in Western Australia it was added as a prescribed hazard in 2012.

Tsunami overall is rated as the lowest risk with the bulk of impact categories plotting centrally on the square matrix or towards quadrant 1 (Figure 4.24). Compared to other international localities where destruction and casualties have been severe, the near coastal bathymetry and coastal topography in conjunction with the low and dispersed State population may constrain potential impacts for Western Australia.

Figures 4.26 to 4.31 show the average relative risk positions of the five hazards, plotted by impact category and a number of trends are highlighted.

Of significance across the five hazards is the consistent plotting of the social setting and people data in quadrants 3 and 4; this is likely to reflect human value-sets. That is, impacts to the psychological and emotional wellbeing of people, or to their homes and communities are regarded as of more consequence than, for example, impacts to infrastructure.

Between the social setting and people categories, the former shows a larger disparity of plotted points. This may reflect the greater complexity of community issues which comprise large groups of people (Figures 4.29 and 4.31).

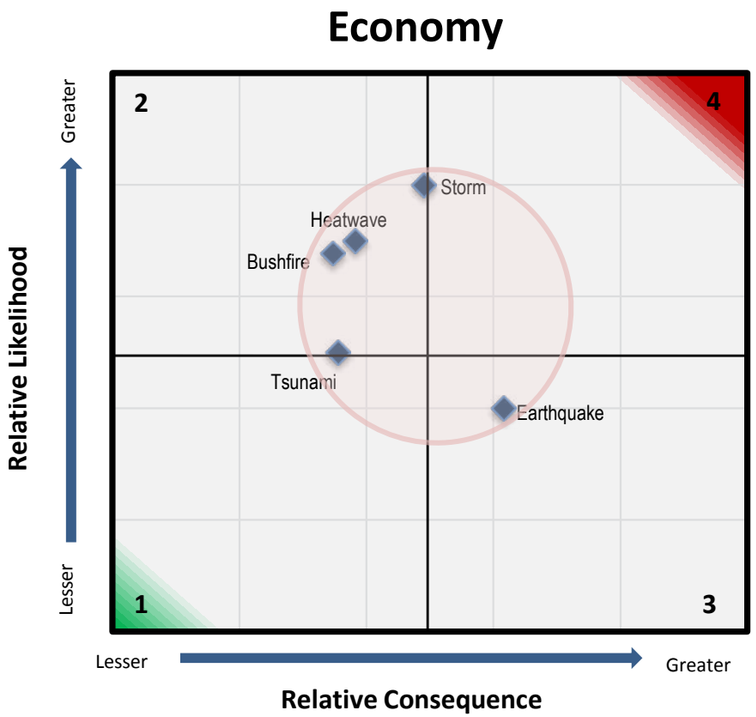


Figure 4.26 – Economy – mean risk levels per hazard

Across the five hazards, the economy and infrastructure data plot centrally on the matrix indicating an overall moderate risk for the State, based on the scenarios reviewed (Figures 4.26 and 4.28). A possible exception is storm, a major event having the capacity to interrupt significant infrastructure and economic activity. Of interest will be the pending review of cyclone and flood to see whether they, too, show higher risk for these two categories.

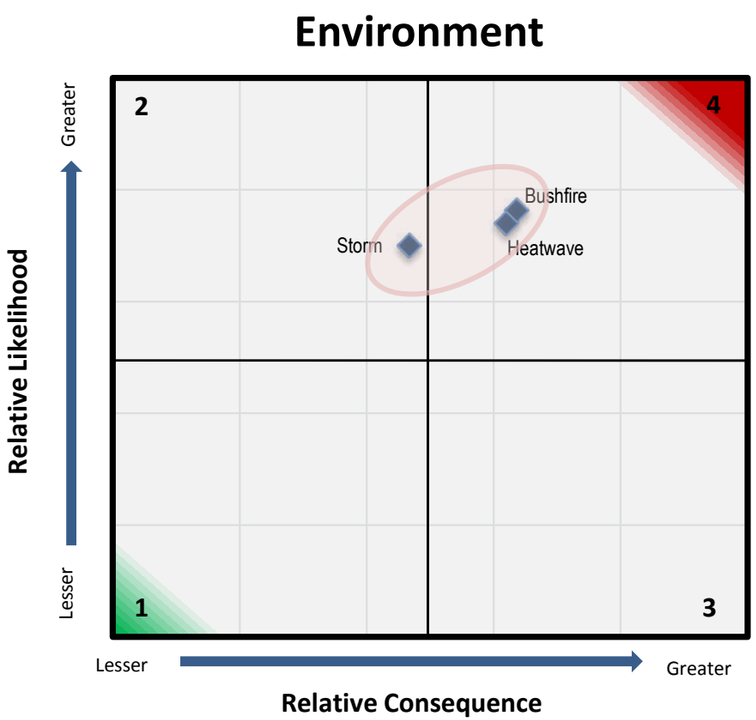


Figure 4.27 – Environment – mean risk levels per hazard

Public administration characteristically plots in quadrants 1 and 2 across the hazards representing a relatively low risk to the State of failure (Figure 4.30). This probably reflects the strong structural, legal and democratic society in which we live. In other jurisdictions with greater dependence on central government or those more prone to civil unrest the maintenance of public administration during and after times of disaster would be paramount.

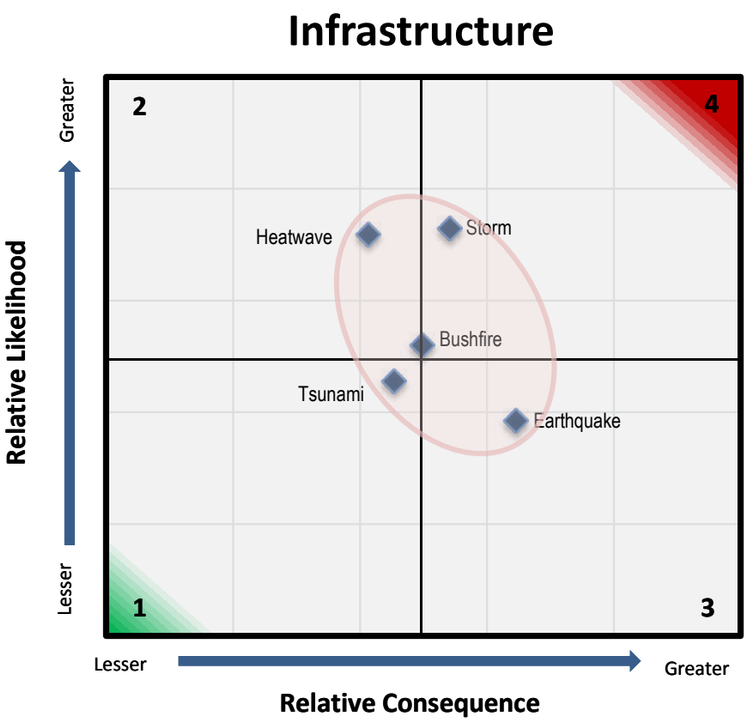


Figure 4.28 – Infrastructure – mean risk levels per hazard

Under such circumstance this category would likely return a high risk rating (that is, a quadrant 4 response).

Of special note are the relatively high plotting positions of hazards within the environment category (Figure 4.27). Further workshop iterations are required to complete the assessments for tsunami and earthquake and

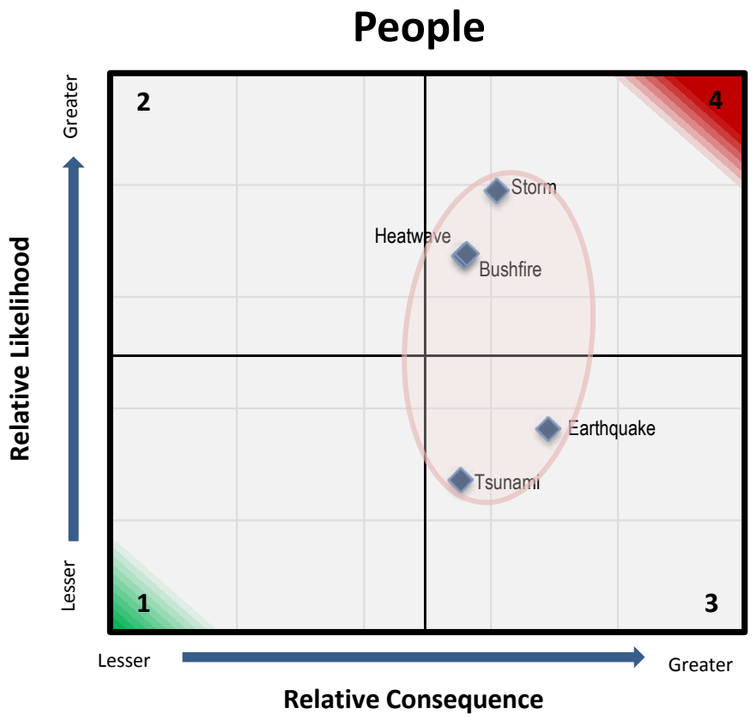


Figure 4.29 – People – mean risk levels per hazard

to build more information around storm, bushfire and heatwave, but in preliminary terms the data is indicating that environment may become another collective high risk category. This may reflect the fragility of the ecosystem to major scale natural disasters given that natural habitats and biodiversity are already stressed within the State compared with pre-human settlement times.

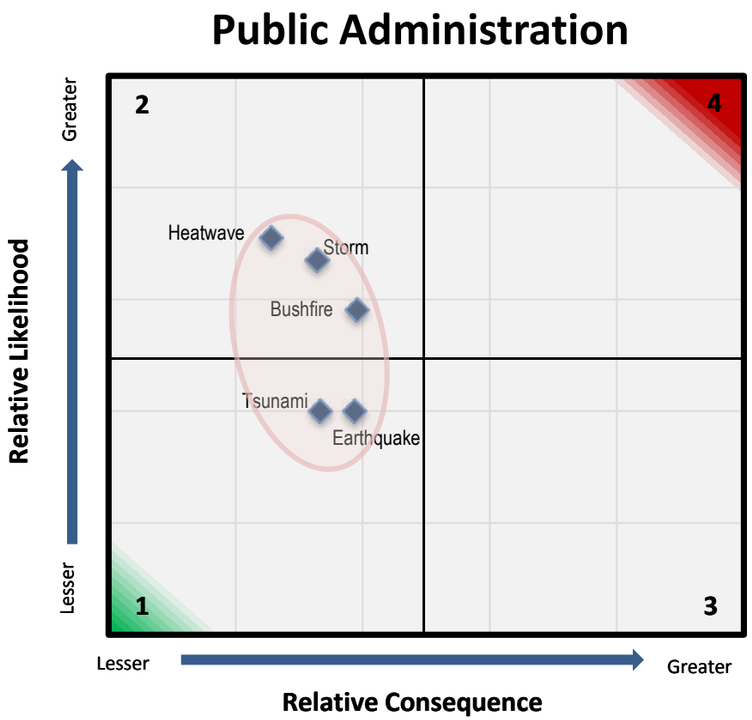


Figure 4.30 – Public Administration – mean risk levels per hazard

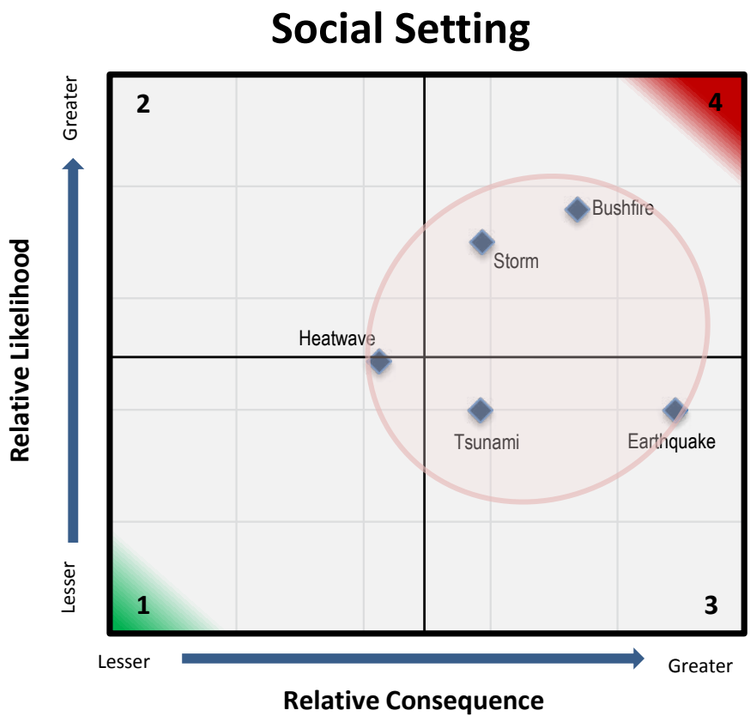


Figure 4.31 – Social Setting – mean risk levels per hazard

Gaps and Moving Forward

The risk assessment processes as undertaken so far have highlighted several issues for Western Australia which need to be addressed.

Firstly, there is a scarcity of comprehensive and easily accessible hazard research information in terms of both occurrence and impact. More work is required in 'quantitative' modelling of hazard recurrence and intensity and in analysing potential impacts, taking into account Western Australia's evolving and developing vulnerabilities. This lack of robust and quantifiable information has overall lowered the confidence of the workshop analysis. In addition a more comprehensive understanding of the 'controls' (or mitigation strategies) that are currently in place throughout the regions and their respective effectiveness is required. As new information is continually developed, it is probable that risk levels of some hazards and impact categories will change.

Additionally it is important for Western Australia to not only capture historic, current and modelled hazard and impact data and associated control information but to also have it easily accessible. To this end, SEMC is scoping the potential for a centralised knowledge hub for risk related issues and for the emergency sector as a whole.

With an anticipated 150 organisations covered under SEMP 2.9, training programs and online training courses will also become a future imperative.

Moving forward, it is anticipated these gaps will be progressively (and iteratively) addressed under the 3-year State-wide, All Hazards, Risk Management project.

05 CAPABILITY ASSESSMENT

CAPABILITY ASSESSMENT

The 2013 SEMC Capability Framework is comprised of 10 capability areas (strategic and operational) that span the prevention, preparedness, response and recovery spectrum. Figure 5.1 represents the 10 capability areas, with segments connected to symbolise how capability areas are interlinked and operate holistically.

In addition to the strategic and operational components of the capability areas, themes carried over from the 2012 Emergency Preparedness Report have also been included, for example, 'Shared ownership' and 'Evaluation, knowledge and continuous improvement'.

An Assessment Tool was structured to support the Capability Framework, and distributed for response to a wide range of stakeholders. HMAs, Combat/Support agencies and some local governments self-analysed and reported to SEMC on their level of preparedness using an excel based reporting tool. From this, common themes are captured allowing significant findings or areas for improvement to be identified.

This synthesis of data helps focus critical attention for the coming year and serves as a snapshot for a continual, year-on-year improvement process. A similar approach has been adopted in other States of Australia and internationally.

Some of the capabilities present a short case study describing good initiatives underway in Western Australia relevant to that strategic or operational area.

Agencies in 2013 responded positively to reporting against capabilities on a yearly basis, particularly using a structured and consistent assessment tool. However much of the captured data is qualitative and moves are underway to migrate to a more quantifiable method of reporting in subsequent preparedness cycles.

A list of agencies which provided a response to the SEMC's Capability Framework Assessment Tool is included in Appendix 4. Their responses are the basis of the information on each of the capability areas and underpin the assessment of the State's preparedness.

Key findings derived from the Capability Assessment (chapter 5) are discussed against a broader backdrop in Conclusions and Future Actions (chapter 6).

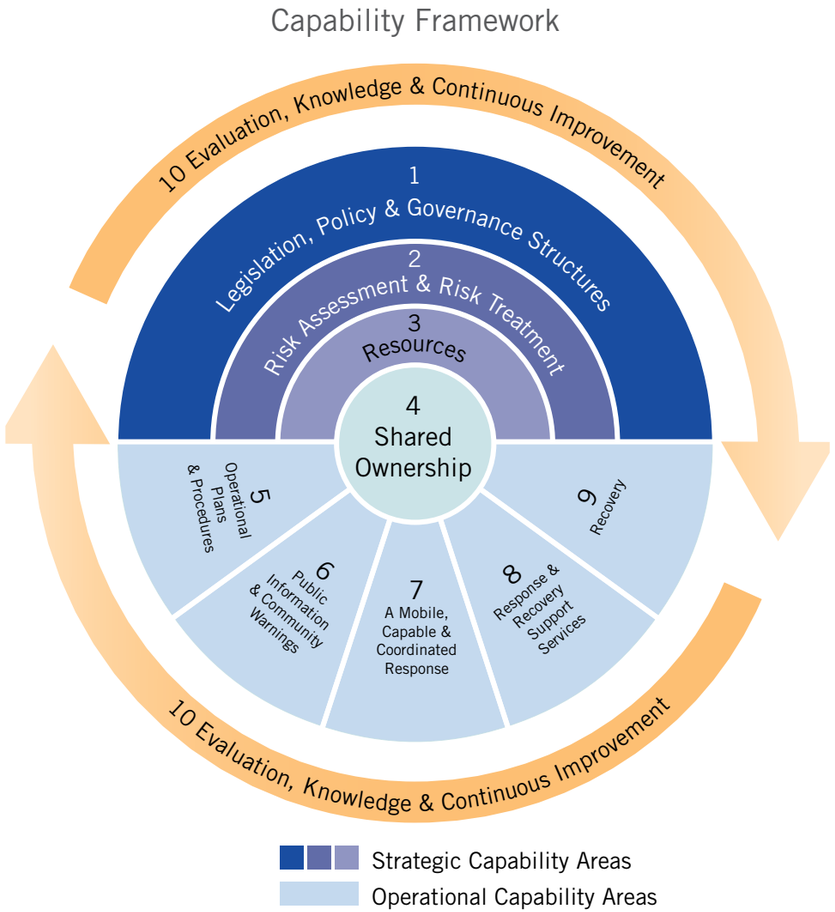


Figure 5.1 – The Capability Framework

CAPABILITY AREA 1
LEGISLATION, POLICY AND GOVERNANCE STRUCTURES

Core Objective 1.1: Legislation, Policy and Governance Structures

Appropriate legislation, State-level policy and governance structures are in place to facilitate effective emergency management arrangements.

Key Finding

The State's EM arrangements comprise the EM Act, the Emergency Management Regulations 2006; SEMPs and Westplans, Administrative and Operational Procedures, Guidelines, and Information Sheets. These arrangements are constantly under review, to ensure they are current and reflect best practice.

EM stakeholders, including some local governments, reported an awareness of these arrangements and had an understanding of their roles and responsibilities within these arrangements.

Detail

The State's EM arrangements document the roles and responsibilities of HMAs, combat agencies, support organisations and other EMAs in preventing, preparing for, responding to and recovering from State-level emergencies. These arrangements are designed to ensure that the State is appropriately prepared for large-scale, multi-agency emergencies that impact the State. The Emergency Management Framework is detailed in Appendix 5.

SEMC is responsible for coordinating reviews of the State's EM arrangements, which involves engaging all relevant EM stakeholders in the review process. All EM stakeholders reported positive engagement in the review process which included the review of SEMPs, Westplans and the EM Act.

Under Section 103 of the EM Act, a review is required into the operation and effectiveness of the EM Act five years after the EM Act came into operation. A review has been conducted and all Western Australian EM stakeholders were invited to make submissions as part of this review. The EM Act was found to be appropriate and effective and should continue to operate. Some suggestions for improvement have been formulated for consideration and several issues which could offer improvements but need further examination have been identified.

In terms of prescribing essential services as a hazard under the legislation, gas supply and electricity supply disruptions have been addressed through legislation and plans are in place for such disruptions. In addition, SEMC is investigating the appropriateness of prescribing a specific hazard for the Disruption of Telecommunications, with the State Emergency Coordinator as the HMA. Moreover, the review of the EM Act considered the extension of emergency arrangements to an emergency emanating from a hazard which had not been prescribed in legislation with the State Emergency Coordinator as the HMA.

SEMC Secretariat also ensures that EM legislation is consistent with other emergency services legislation; such as the legislation administered by DFES.

The effectiveness of the State's arrangements depends on EMAs being cognisant of their roles and responsibilities across their agency. WA Police, for instance, have addressed this through an extensive education process that ensures all employees have access to relevant information on their roles in EM.

Many other EM stakeholders have similar processes in place and, like the Department of Transport (DoT), also ensure that external stakeholders are educated on that department's requirement under the arrangements.

SEMC Secretariat has programmed a review to comprehensively examine SEMC policy, governance and assurance frameworks to ensure it remains contemporary, fit for purpose and well understood across the sector. The review will include all policies, procedures, guides, the procedures applying to Westplans and the inter-relationships between the policy and operational sectors of the State's emergency management framework to ensure that these sectors are working to mutually agreed goals and principles. This major review project is scheduled to commence in 2013–2014.

CAPABILITY AREA 2
RISK ASSESSMENT AND RISK TREATMENT

Over the 2012–2013 reporting cycle, progress has been made in risk management which involves the identification, assessment, evaluation and treatment of risks. The State is presently seeking to adopt a consistent and comprehensive approach to risks across all 26 prescribed hazards and at State, district and local level, as detailed in chapter 4 under Risk Management. To this end, many HMAs, combat agencies and local governments report they are currently active in risk assessments and treatments, or have committed to carry these out in the coming year.

Core Objective 2.1: Risk, Vulnerability and Hazard Identification and Assessment

Hazards and emergency-related risks are identified and assessed to ensure State, community, government, business and individual vulnerabilities have clearly identified arrangements.

Key Finding

There has been a commitment by all HMAs to align with the 'AS/NZS ISO 31000:2009 Risk Management–Principles and Guidelines' and initial steps have taken place toward developing a comprehensive and consistent approach to risk management throughout the State.

Detail

All EMAs that reported were committed to the risk management process, having carried out or scheduled risk assessment for the hazards with which they are involved. Assessments had been conducted using a variety of standards. In the future, the standard for risk assessments in Western Australia will be 'AS/NZS ISO 31000:2009 Risk Management–Principles and Guidelines' as per SEMP 2.9. In the following 12 months, efforts will need to be made by all agencies to align with these standards.

Relevant hazard research and data analysis to aid risk assessments are being undertaken by most HMAs. Tertiary institutions, research bodies and other State and Commonwealth departments are involved in these research activities where possible. Some local governments utilise community surveys and workshops to identify hazard, risks and vulnerabilities in their local communities. Industry standards or annual reviews are useful and assist in the monitoring of hazard-related risks for most HMAs.

Core Objective 2.2: Risk Treatment Activities

Hazard and emergency-related risks are treated through activities and strategies that prevent the occurrence of a hazard and/or reduce its impact should it occur.

Research and data analysis is guiding some of the treatment strategies that are being implemented by EMAs. For example, Public Transport Authority's identification of the major safety risk created by level crossings has led to policy changes so that 'at grade' level crossings are no longer included in any future crossing designs. Existing level crossings will be replaced when resources permit.

Agencies do endeavour to create an integrated approach to risk management. The involvement of stakeholder agencies in the risk management process is improving, and where appropriate, a degree of local community engagement is employed. Involvement in District Emergency Management Committees (DEMCs) and/or LEMCs is the primary way by which agencies participate in risk reduction and mitigation activities that improve community resilience and lessen the likelihood, severity and/or duration of an emergency.

The development and implementation of specific risk management plans to address identified hazard-related risks on a prioritised basis is part of our risk management projects documented in the **Focus Areas chapter – Risk Management**. While agencies have reported utilising risk registers, annual reviews or lessons learnt databases to track risk management activities, there are very few formal risk management plans. Because of the lack of standardised documentation, it is difficult to identify how these risks are being reviewed and whether a forward looking mitigation strategy exists.

CASE STUDY: CITY OF WANNEROO – RISK ASSESSMENT AND RISK TREATMENT

The City of Wanneroo has taken comprehensive steps towards assessing and treating their risks. They share a joint LEMC with the City of Joondalup. While the two cities' risks are similar in many aspects, there are differences that need to be addressed separately. The requisite 5-year review of their joint Emergency Risk Register and Treatment Schedule in 2012 led the City of Wanneroo to undertake a further review of its own risks and risk treatments.

An Emergency Risk Management Project Working Group was created and consisted of representatives from the LEMC (WA Police, DFES, DPaW, DCPFS and other relevant City of Wanneroo officers). A project officer from WALGA was contracted using an All West Australians Reducing Emergencies (AWARE) grant to assist with advice and guidance and conduct risk analysis workshops with the City's working group.

During the workshops, the current Risk Register was reviewed and new trends and emerging risks in the community were identified. The identified risks were assessed using the AS/NZS ISO31000:2009 *Risk Management Principles and Guidelines* standard and the process was guided by the National Emergency Risk Assessment Guidelines (National Emergency Management Committee 2010).

Treatment options and strategies to reduce the level of risk to the City were determined, evaluated and scheduled. An ongoing program for review through the LEMC was also established. The emergency risks identified within the City of Wanneroo by this process were Bushfire, Severe Storm, Chemical Spills and Human Epidemic.

Under the process, bushfire was deemed a severe risk and this assessment was further reinforced by the findings of the 2011 Keelty Reports (Keelty February and November 2011). In order to treat this risk, the City of Wanneroo employed two Fire Protection Officers who have identified bushland areas which represent a potential bushfire hazard. A 3-year indicative burning program was developed that aims to protect life and property as well as balancing vegetation management and fauna adaptive capacities. The program ranks and addresses the areas in terms of most serious to least serious threat to the community. Prior to the burning procedures, the Fire Protection Officers monitor fuel moisture levels, soil dryness indices and daily weather to ensure they are carried out under prescribed conditions.

CAPABILITY AREA 3
RESOURCES

Core Objective 3.1: People

Organisations have capable, well trained and supported workforces who are prepared to effectively perform a range of emergency management activities.

Key Finding

EMAs report that they are working towards having sufficient processes in place to ensure that people with the right skills are appointed and developed to perform EM roles safely. A number of organisations also reported having in place specific strategies to provide a culture which supports high performance. Incident management training at different levels is ongoing and opportunities exist to provide consistent and cost effective training.

Detail

State public sector agencies with EM functions and responsibilities work within the Western Australian public sector framework which provides appropriate job descriptions with articulated competencies, and recruitment practices to ensure the most suitable person is selected for the job. The sector is also encouraged to plan for its future workforce, including volunteers, through workforce planning strategies including attraction and retention, equity and diversity, leadership development and succession planning. Some EMAs which are not a part of the Western Australian public sector (for example, local government) also indicated that incident management functions are formally recognised and that the competencies required are integrated into recruitment and development processes.

The application of formal competency based training and assessment to critical response roles, such as Incident Controllers, has been demonstrated recently by the Interagency Bushfire Management Committee. It has developed a 'pathways' model for the development, accreditation and maintenance of currency of all Level 3 Incident Controllers who operate on bushfires in the State. The process is currently being implemented by DFES and DPaW.

Australian Emergency Management Institute provides formal qualifications in EM which are generally delivered in the eastern states. As a result, Western Australian agencies rely on cost effective training delivery solutions utilising shared agency internal training structures. This includes delivery of AIIMS training, which is a nationally recognised system encompassing organisational principles and structures that facilitate an 'all-agencies' approach towards incident management. Online training, particularly for introductory emergency training, is emerging as a useful tool.

AIIMS Incident Controller training was reported by EMAs where it is part of the agency's functions as described in the relevant Westplan. A number of agencies have trained AIIMS Level 3 Incident Controllers including WA Police, DFES, DoT, DPaW, DER and St John Ambulance Australia (SJA). WA Health utilise State Health Coordinators for incident control. Other agencies have trained staff in the different levels of incident management as appropriate to their agency role.

In the local government sphere, WALGA provides training courses to support local governments in meeting the requirements of their role in EM under the EM Act. These include an online course on working in an emergency management context, as well as face to face delivery of emergency management preparation and managing recovery activities for local government. Through the LEMCs and DEMCs, SEMC Secretariat Community Emergency Management Officers (CEMOs) provide information and awareness of the principles, concepts and operation of EM functions. The SEMC is continually reviewing and identifying training needs for the sector. In 2013–2014 it is researching opportunities to develop linkages with agencies to support the training needs of emergency services practitioners and volunteers.

Agencies report that Occupational Safety and Health requirements which relate to the broader agency responsibilities are also applied to EM functions, including volunteers. Some agencies provide periodic health monitoring and physical fitness assessment and programs to support EM staff to perform their role safely and effectively.

There is potential to examine further synergies in required competencies, particularly in relation to incident response, across agencies with EM functions and to reinforce alignment with Westplan responsibilities. Shared arrangements in terms of training delivery and online courses are already occurring and there may be opportunities to further develop these arrangements.

Core Objective 3.2: Equipment and Infrastructure

Organisations have access to the equipment and infrastructure required to effectively manage emergencies.

Key Finding

All HMAs and Combat/Support agencies report having access to equipment in a response ready state for all aspects of EM. These agencies report emergency operating centres and backup centres, in the metropolitan area, which have appropriate facilities and are adequately resourced.

Detail

All HMAs and Combat/Support agencies report that access to adequate equipment has been identified and exists for all aspects of EM. The equipment is in a response ready state, including regular testing, maintenance and replacement where appropriate. The primary and secondary assets available for emergency response may be managed by another party. Agencies also have a range of maintenance programs in place to appropriately maintain core equipment such as PCs, servers, networking equipment, phones and radios.

Some EMAs, such as WA Health, DoT and DCPFS, have disaster equipment stores across the State, to support a Western Australian response capability and in some cases to support national and international deployments.

All nine HMAs reported that they have emergency operating centres. All six Combat/Support agencies have centres or access to centres that:

- have appropriate facilities and are adequately resourced
- are regularly maintained and tested
- can effectively operate 24/7 for an extended period of time.

All nine HMAs reported that backup emergency operations centres in the metropolitan area exist or have identified alternative locations, for which formal and informal arrangements have been made. This includes sharing arrangements with other EMAs or use of standard operational facilities. In addition, all six Combat/Support agencies have backup emergency operations centres or access to facilities.

Some local governments report that details of access to emergency operating centres and backup centres are included in their EM arrangements.

Core Objective 3.3: Finance and Administration

Robust financial and administrative processes and adequate funding arrangements exist to support the effective prevention, mitigation, preparation, response and recovery from hazards.

Key Finding

HMAs and Combat/Support agencies report utilising existing internal finance systems and processes to track and monitor response effort expenditure. The practice of determining EM funding and allocation of resources within the context of business needs and risk is well entrenched in most agencies. However, it is recognised that the financial resources of the State are finite and resourcing decisions are made within these constraints. Additional EM sector resourcing performance indicators would assist in better assessing adequacy of resourcing relative to benchmarked scenarios and will be incorporated in the review of the capability assessment tool. Improvements to the processes associated with relief funding arrangements are being progressed.

Detail

The total economic cost of natural disasters in Australia in 2012 is estimated to have exceeded $6 billion. Further, these costs are expected to double by 2030 and rise to an average of $23 billion per year by 2050, even without any consideration of the potential impact of climate change (Deloitte Access Economics 2013). The Deloitte report demonstrates that the budgetary impact of responding to and recovering from natural disasters could potentially be significantly

reduced through carefully considered and directed investment in pre-disaster resilience. This highlights the need to prioritise EM funding and the allocation of resources based on reliable risk assessment.

The basis for determining EM funding and the allocation of resources by EMAs is influenced by a number of variables such as agency role and budget, access to government funding (for example, supplementary funding and natural disaster arrangements), funding source agreements, existing processes and governance frameworks. The majority of EMAs reported that EM funding and allocation of resources is based on a business case and prioritised by risk, recognising that financial resources are finite. The development of resourcing performance indicators would be useful in better assessing adequacy of resourcing, relative to benchmarked scenarios and will be incorporated in the review of the capability assessment tool.

All HMA and Combat/Support agencies reported internal finance systems and processes to track and monitor response effort expenditure.

SEMP 4.2–Funding for Emergencies details the principles and criteria for meeting costs associated with the response and recovery activities to emergencies in Western Australia. It discusses ways to assist EM agencies to effectively manage these costs by identifying appropriate funding processes.

The Australian Government provides funding through the Natural Disaster Relief and Recovery Arrangements (NDRRA) to help pay for natural disaster relief and recovery costs. Each State and Territory determines the criteria and level of assistance provided to individuals and communities. DFES manages WANDRRA which provides financial assistance to Western Australian communities whose social, financial and economic wellbeing have been significantly affected by an eligible natural disaster event.

For the financial year ending 30 June 2013, 165 WANDRRA claims totalling $122,394,774 were processed as detailed in Table 5.1. In line with the recommendations made in the Auditor General Western Australia's report (2012), DFES is currently formalising arrangements with partner agencies, including developing procedures to ensure WANDRRA payments are made to eligible recipients in a timely manner, and are made only for eligible purposes. DFES maintains a WANDRRA webpage on the internet to make disaster relief funding arrangements accessible to those in need.

SEMC Secretariat also administers NDRP which is part of an ongoing, funding program under which the Australian Government matches (on a 50:50 basis) funding provided by the State, local government or other organisations. NDRP aims to help communities improve their level of preparedness and self-reliance through, for example, strategic plant and equipment purchases or undertaking prevention and mitigation works.

The AWARE Program has been developed by SEMC to enhance Western Australian EM arrangements. The funding program aims to build local level EM capacity and assist local government, in consultation with their respective LEMCs, to conduct the emergency risk management process.

Table 5.1 presents WANDRRA expenditure for 2012–2013 by hazard category

Hazard	$
BUSHFIRE	6,752,060
CYCLONE INCLUDING ASSOCIATED FLOODING	11,045,216
FLOOD	63,434,826
STORM	41,162,673
TOTAL	**122,394,775**

CASE STUDY: DFES STATE OPERATIONS CENTRE

The DFES State Operations Centre (SOC) is located in a state of the art, purpose built facility in the DFES Emergency Services Complex in Cockburn Central. The SOC provides the State with 24/7, multi hazard, State-wide, situational monitoring. Its enhanced response capability supports DFES Command teams, Regional Operations Centres, Incident Management Teams, external State or Federal agencies, and the operational Command, Control and Coordination requirements for major disaster events throughout Western Australia. The SOC is supervised by the recently created Chief Superintendent State Operations position.

The SOC was activated during the 2012–2013 bushfire and tropical cyclone season in preparation and response to the pre-impact and impact phases of Tropical Cyclone Rusty in the North West, simultaneous Level 3 bushfires in the lower South West and the response to the Avon Valley fires in the Perth metropolitan area earlier this year.

DFES EM teams working across shifts used these incidents to validate and improve multi-agency arrangements, information flows, technology and support activities within the facility. The lessons learned have enabled DFES and supporting agencies to better prepare for the coming 2013–2014 northern cyclone and southern bushfire seasons.

The continued evolution of the SOC will ensure that DFES remains prepared to provide an enhanced response to natural and manmade emergencies well into the future.

Figure 5.2 – DFES SOC has the latest technology and support facilities

Image courtesy of DFES

Figure 5.3 – DFES SOC supports multi-agency response teams

Image courtesy of DFES

CAPABILITY AREA 4
SHARED OWNERSHIP

Core Objective 4.1: Volunteering

There is a sufficient network of capable, prepared and supported volunteers who are utilised effectively throughout all aspects of emergency management.

Key Finding

HMAs and Combat/Support agencies which utilise and support volunteers report that they have strategies in place to attract, retain, train and communicate with them. Maintaining currency of volunteer details, and the associated issue of certainty about the number of ready responders, with adequate training, has been identified as an issue which continues to require monitoring and work.

Detail

The role of volunteers in our State is critical in ensuring sufficient capacity to respond to disasters, making the recruitment, development and management of volunteers central to effective EM. It is estimated that there are over 29,000 volunteers in the sector, including approximately 27,900 registered operational volunteers. Due to the specific physical and technical capabilities required to perform their role, the number of active ready responders are likely to be less than the number of registered volunteers. In addition, SJA Western Australia has more than 400 events volunteers and approximately 3,500 volunteers in country areas. Their volunteer contact details are reviewed on a regular basis. Regional volunteers provide an ambulance service in many of Western Australia's small and remote country towns, and in larger country centres, volunteers may be part of an ambulance crew.

As well as performing crucial roles in regional fire protection and country ambulance services, volunteers provide key operational services in marine and land search rescue, road crash rescue, emergency repairs on buildings and restoration of essential services, as well as numerous support roles.

Managing the majority of volunteers, DFES has a range of strategies to ensure that a sufficient network of active and capable volunteers is available. These include a dedicated volunteer and youth services branch to assist in the recruitment of volunteers, cadet and juniors programs, reward and recognition programs, volunteer engagement surveys, and the provision of personal accident insurance arrangements and wellness and injury management support services.

While some EMAs rely on and support large numbers of volunteers to protect against hazards such as bushfires, other EMAs support volunteering by releasing staff to attend emergencies. DCPFS, for example, engages with volunteer agencies through the State Welfare Emergency Committee and has policies in place to support those agencies whose volunteer staff may assist DCPFS, including adequate volunteer insurance and volunteer support systems. The Local Welfare Emergency Committees ensure engagement with volunteer groups at the local and district level, by promoting support systems so that volunteer groups are aware of them.

HMAs and Combat/Support agencies which manage volunteers report providing regular, often monthly, training to their volunteers. For example, DFES has embarked on a 3-year project to develop a structured framework for professional development of all its staff and volunteers. This will provide visibility of pathways for each role that includes competencies to ensure role requirements and expectations are met. The Volunteer Pathways will be completed in the 2013–2014 financial year and will incorporate

skills and knowledge from new member requirements such as induction, through to National Qualifications for a Captain. This initiative will enhance interoperability between services and agencies by providing aligned training and a website to manage and deliver consistent Volunteer training across the State of Western Australia. SJA volunteers are provided with a set training program at progressive levels as well as appropriate refresher training, and each country region has its own training coordinator.

Along with regular circulars, bulletins and emails, some agencies provide website portals to facilitate communication between volunteers, volunteer organisations and EMAs. DFES reports that mobilisation of volunteers is undertaken by using database contact details to notify volunteers of a need to respond. There are a number of activation mechanisms to advise volunteers of incidents, including conference call services, mobiles, SMS and pagers. For local governments (which administer Bushfire Brigades) there are also Triple Zero (000) Agreements and processes for the transferring advice of an incident requiring attendance.

Maintaining accurate records of volunteer contact details has been reported as an area requiring improvement.

The SEMC Community Engagement subcommittee has responsibility to monitor and report to SEMC on the implementation of the National Emergency Management Volunteer Action Plan (Australian Government Attorney-General's Department 2012) in Western Australia. The Plan updates work previously undertaken in relation to the attraction, support and retention of EM volunteers, to ensure that volunteers will continue to be available, well prepared, appropriately trained, equipped and resourced to help their communities into the future. Coordination of reporting through the SEMC subcommittee will assist the development of the volunteer sector in Western Australia in ways that are consistent with national goals and strategies. It will encourage the investigation of specific issues of concern at a national level, such as legal impediments to volunteering and the management of spontaneous volunteers.

Core Objective 4.2: Public Education

The public is educated about relevant hazards and their possible consequences, existing or potential prevention, treatment and response controls, and the role of the community in emergency management.

Key Finding

Public education about relevant hazards can be achieved in many different ways, depending on the nature of the hazard and an understanding of how individuals and the community are likely to respond to risk. The benefits of engaging the community in the process, rather than the one-way provision of generic information, are well researched. Opportunities exist to further integrate into programs the assessment of whether community education initiatives have resulted in behavioural change and encouraged individuals to adopt greater ownership in emergency management activities.

Detail

All HMAs report preparing and delivering hazard specific public education materials in a variety of formats and through a variety of publishing and media tools.

DFES has responsibility for a range of hazards and has outlined its approach to building the resilience and preparedness of local communities through its Community Engagement Framework. These programs involve the community in problem solving and decision making rather than relying on a one-way provision of information that does not address issues such as how people respond to risk. Community education is considered as one

component of a broader suite of activities required to achieve behaviour change. DFES provide regular annual education and communication campaigns on a number of hazards such as fire and broader EM issues.

WA Health carry out regular public health information campaigns at appropriate times of the year, and provide media releases pertaining to specific hazards, such as heatwave. They also maintain a public website containing information regarding topics such as public health, heatwave, chronic disease and mental health. Factsheets pertaining particularly to influenza and heatwave are available and loaded onto the website as required.

EMAs have reported that the assessment of whether community education initiatives have led to a change of behaviour and encouraged individuals to adopt greater ownership in all EM activities is an area for development. Currently post incident reports, post exercise reviews and customer surveys are also utilised to assess effectiveness.

Core Objective 4.3: Community Involvement

The community has an understanding of and takes responsibility for hazard related-risks they may be exposed to, has strategies to treat those risks, and are engaged with the response and recovery process.

Key Finding

A number of formal mechanisms such as MoUs, contracts, agreements and LEMCs are in place to support shared responsibility and ownership. Current approaches of engaging with the community to raise their awareness of risks and then empowering and enabling them to reduce those risks reinforce the entire community and whole of government approach.

Detail

EMAs reported a number of MoUs, agreements and plans with the community, not for profit and industry groups to supplement and assist with response and recovery activities. These include MoUs and contractual arrangements regarding roles in disaster response with private health providers and hospitals, the Royal Flying Doctor Service, Silver Chain and port authorities.

Shared responsibility and emergency preparedness are also promoted through Local and District Emergency Management Committees throughout Western Australia, which are supported by regionally based SEMC Secretariat Community Emergency Management Officers. Local and district committees consist of representatives of HMAs, essential service providers, welfare support agencies and non-government organisations, local government agencies and other community based organisations. SEMC Secretariat also administers a funding program (AWARE) to enable local and district committees to undertake research, analysis, planning and promotion to aid the adoption of shared responsibility and emergency preparedness. Through LEMCs and Local Welfare Emergency Committees, DCPFS engages with the local community and identifies any vulnerable groups (for example, CaLD community members, people with disabilities, the elderly and children) that may require additional support in emergencies including planning and preparedness activities at a State and local level.

Consistent with the types of hazards for which DFES are responsible, community preparedness and building resilience are promoted through a series of hazard specific programs and communication and education campaigns. These programs are directed at school aged children and specific neighbourhoods and localities. DFES' programs and campaigns are based on building community capacity to prepare their properties and homes for a hazard and on developing community connectivity and resilience in the preparation and response to a fire. For example, the Bushfire Ready

program brings together people from local neighbourhoods to discuss and learn about the bushfire hazard and its local implications. Community members then work together to build individual and community action plans and implement preparedness activities. Central to this work is ensuring that community members know each other. These local connections will improve the likelihood of individuals preparing their properties for a hazard and their effectiveness in responding to the hazard.

The Flood Mitigation Project, undertaken by the Town of Bassendean and DFES Bassendean SES Unit, provides an example of recent community engagement activities conducted by local government. In 2010 the Town's LEMC reviewed the Community Risk Hazard Profile for the town and riverine flooding was deemed the hazard of highest risk to the town. Mitigation strategies were developed that included raising community awareness of the extent of the hazard and also to assist the most vulnerable households in the town with personal preparedness planning. Bassendean successfully applied for a NDRP grant to implement the community awareness and preparedness project. To raise awareness of the risk, officers of the town and Bassendean DFES volunteers attached fluorescent bands to Western Power poles to indicate the extent of the land which would be impacted by a once in 100 year flood. All households within the flood prone region were door knocked by volunteer DFES officers delivering at no cost, a personal preparedness 'Flood Ready Kit'.

The Flood Ready Kit contained publications on how to prepare one's house and family, including pets, for both scenarios of 'staying put' and 'going' scenarios. Several useful items in the kits included a battery-free torch/radio/siren, multi tool, thermal blanket and water proof bags. A USB memory stick for copies of photos and important documents was also included. A local community group has continued the work by independently organising a workshop on preparedness planning for flood.

Figure 5.4 – Bassendean SES Unit banding the Western Power poles with Flood Zone markers and delivering Flood Ready Kits.

Image courtesy of DFES

Core Objective 4.4: Resilience

The State stands resilient to the consequences of an emergency (or emergencies) through the existence of strong stakeholder relationships and support, business continuity planning, integrity of structures and systems and a holistic approach to emergency management.

Key Finding

The majority of HMAs and Combat/Support agencies report having business continuity plans in place. Through informal networks and formal mechanisms such as MoUs, committees, national plans and regional placement, EMAs report having very robust and established networks for support in the event of an emergency.

Detail

Most HMAs and Combat/Support agencies report having business continuity plans, informed through a risk assessment process, in place. In addition, a number of local governments also reported having contingency plans in place.

While some agencies have reported that in the event of concurrent emergencies additional resources would be called in and services prioritised, some EMAs have indicated that major concurrent emergencies would test their capacity for effective response. Agencies such as WA Health report having surge management plans in place. Defence Joint Operation Support Staff WA has a network of Defence Liaison Officers within Western Australia and around Australia that can be called on to provide a surge capability when required.

All EMAs that reported have established networks for support in the event of an emergency. Agencies have established inter-jurisdictional support networks, MoUs with EMAs and other agencies, international affiliations and national plans to assist with personnel and equipment from around Australia. A number of agencies also have regional offices and personnel in regions, which has facilitated the establishment and maintenance of local networks within communities.

Western Australia also benefits from strong national support networks for EM through a national framework which coordinates policy and operational response. This includes plans for the strategic coordination of specific hazards, for example, the Commonwealth Disaster Plan (COMDISPLAN). This is the primary mechanism for Australian states, territories and offshore territories to request official Australian Government non-financial assistance in an emergency or disaster. Research and best practice is supported through the Australian EM knowledge hub, which is an interactive online resource providing research, resources and news on EM issues and allowing users to share ideas and information. In addition, each year approximately $27 million is provided to states and territories through the NDRP to enhance the resilience of communities against the impact of natural disasters.

The EM sector in Western Australia is also supported by BOM, which provides EMAs (such as DPaW and DFES) with a range of forecast products and services to assist with hazard mitigation and response. These include Emergency Services weather briefings, spot forecasts, specific routine forecasts, weather warning systems, seasonal outlooks and regional visits with DFES to local governments in relation to hazard preparedness. BOM has an agreement in place to have a meteorologist at the SOC in Cockburn. The practice of embedding BOM capability within coordination centres was recommended in the recent Keelty Police and Safety Review for Queensland (Keelty 2013)

Essential services network operators in Western Australia, such as Water Corporation, have a strong network group which improves preparedness and response to emergencies through a trusted network, exchange of knowledge and collaboration. The group provides advice to SEMC and its subcommittees and undertakes and participates in exercises, workshops and seminars to build understanding and capability of essential services network operators in emergency management.

CAPABILITY AREA 5
OPERATIONAL PLANS AND PROCEDURES

Core Objective 5.1: Operational Response and Recovery Plans

Comprehensive, documented and pre-determined processes and procedures exist that are employed in response to and recovery from an emergency.

Key Finding

Westplans are established under Section 18 of the EM Act. They clearly document the roles and responsibilities of EMAs 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 is largely dependent on the currency, accuracy and the general awareness of agencies to these State-level plans.

There are currently 28 hazard and 8 support Westplans, covering all prescribed hazards and some EM support functions; such as emergency public information, health, welfare and recovery. EM stakeholders, including some local governments, reported an awareness of these operational plans and had an understanding of their roles and responsibilities under the plans. A majority also reported ensuring their agency-specific emergency plans were consistent with these State-level plans.

Detail

Section 18 of the EM Act provides that SEMC is to 'arrange for the preparation of State Emergency Management Plans as SEMC considers necessary'.

Accordingly, SEMC has assigned responsibility to the most appropriate HMA for the preparation of 28 hazard Westplans for all the prescribed hazards. The most appropriate HMA is defined in the EM Act as 'a public authority or other person who or which, because of that agency's functions under any written law or specialised knowledge, expertise and resources, is responsible for emergency management, or the prescribed emergency management aspect, in the area prescribed of the hazard for which it is prescribed'.

It is the responsibility of the nominated HMA to develop the Westplan in consultation with all stakeholders who would have a role under that plan. Further, all Westplans must be consistent with SEMP. SEMP 4.1– *Operational Management* is the overarching SEMC policy on operations and, as such, all Westplans must be consistent with the command, control and coordination structure within this policy. Finally, all Westplans must be exercised annually and reviewed every five years.

HMAs, such as WA Police, DFES, WA Health, DoT and PUO, all report a strong internal governance process to ensure that the hazard management plans under their responsibility are regularly reviewed and are consistent with all SEMC policy.

SEMC Secretariat is responsible for ensuring the currency of State Emergency Management Policies and Plans. SEMC Secretariat works closely with HMAs to ensure that Westplans are reviewed in a timely manner. Table 5.2 shows the current status of all 28 hazard Westplans and 8 support Westplans.

Table 5.2 – State Emergency Management Plans – Westplans

HAZARD PLANS	HAZARD MANAGEMENT AGENCY	DATE OF ISSUE	DUE FOR REVIEW
WESTPLAN AIR CRASH	WA Police	1 December 2009	1 December 2014
WESTPLAN ANIMAL AND PLANT BIOSECURITY	Department of Agriculture and Food	11 March 2008	Under Review
WESTPLAN BROOKFIELD RAIL	Brookfield Rail	6 December 2012	1 December 2013
WESTPLAN BUSHFIRE	DFES	13 December 2010	To be revoked
WESTPLAN CHEMICAL BIOLOGICAL RADIOLOGICAL AND NUCLEAR **RESTRICTED CIRCULATION**	DFES	27 June 2008	Under Review
WESTPLAN COLLAPSE	DFES	10 June 2008	Under Review
WESTPLAN CYCLONE	DFES	4 December 2007	Under Review
WESTPLAN DAMBREAK	Water Corporation	1 September 2004	To be revoked
WESTPLAN EARTHQUAKE	DFES	14 June 2011	1 May 2016
WESTPLAN FIRE	DFES	3 September 2013	3 September 2018
WESTPLAN FLOOD	DFES	21 September 2010	1 September 2015
WESTPLAN GAS SUPPLY DISRUPTION	Office of Energy	11 June 2013	11 June 2018
WESTPLAN HAZMAT	DFES	13 December 10	13 December 2015
WESTPLAN HEATWAVE	DPMU – Health	4 December 2012	4 December 2017
WESTPLAN HUMAN EPIDEMIC	Department of Health	8 June 2010	1 December 2013

Table 5.2 – State Emergency Management Plans - Westplans (continued)

HAZARD PLANS	HAZARD MANAGEMENT AGENCY	DATE OF ISSUE	DUE FOR REVIEW
WESTPLAN LAND SEARCH	WA Police	11 June 2013	11 June 2018
WESTPLAN LIQUID FUEL SUPPLY DISRUPTION	Office of Energy	6 September 2011	6 September 2016
WESTPLAN MARINE OIL POLLUTION (2010)	Department of Transport	8 June 2010	8 June 2015
WESTPLAN MARINE SEARCH AND RESCUE	WA Police	11 June 2013	11 June 2018
WESTPLAN MARINE TRANSPORT EMERGENCY	Department of Transport	14 June 2011	14 June 2016
WESTPLAN NUCLEAR POWERED WARSHIPS (VISITS)	WA Police	20 December 2012	1 April 2015
WESTPLAN RAIL CRASH PTA	Public Transport Authority	1 December 2009	1 December 2014
WESTPLAN ROAD CRASH	WA Police	11 June 2013	11 June 2018
WESTPLAN SPACE RE-ENTRY DEBRIS (SPRED)	WA Police	9 March 2010	9 March 2015
WESTPLAN STORM	DFES	30 September 2004	Under Review
WESTPLAN TERRORIST ACT **RESTRICTED CIRCULATION**	WA Police	1 September 2009	1 September 2014
WESTPLAN TSUNAMI 2010	DFES	21 September 2010	1 September 2015
WESTPLAN URBAN FIRE	DFES	1 January 2000	To be revoked

Table 5.2 – State Emergency Management Plans - Westplans (continued)

SUPPORT PLANS	HAZARD MANAGEMENT AGENCY	DATE OF ISSUE	DUE FOR REVIEW
ISOLATED COMMUNITIES PLAN	DFES	1 November 1999	Under Review
WESTPLAN EMERGENCY PUBLIC INFORMATION	State Emergency Management Public Information subcommittee	3 July 2012	1 July 2017
WESTPLAN HEALTH	DPMU - Health	4 December 2012	4 December 2017
WESTPLAN RECEPTION	Department for Child Protection	1 December 2009	1 December 2014
WESTPLAN RECOVERY COORDINATION	SEMC Recovery subcommittee	1 March 2008	Awaiting Review
WESTPLAN REGISTRATION AND REUNIFICATION	Department for Child Protection	9 March 2010	9 January 2015
WESTPLAN TELECOMMUNICATIONS	DFES	1 March 2005	Under Review for revocation
WESTPLAN WELFARE	Department for Child Protection	1 September 2009	10 March 2014

Core Objective 5.2: Training and Exercising of Plans

Plans, processes and procedures are regularly and appropriately exercised to assess and improve capability.

Key Finding

Regular testing of emergency plans is a critical component of the State's level of preparedness for emergencies. EMAs that reported have a strong focus on regular testing of emergency plans whether they are in-house, agency-specific, local or State-level plans.

HMAs are required under SEMC policy to exercise their respective Westplans annually. To manage this, HMAs such as WA Police and DFES establish an exercise calendar, to map out future Westplan exercises for the year.

Detail

Exercising an emergency plan can take many forms. From in-house, table-top, discussion exercises to full scale, multi-agency coordinated exercises in the field, testing plans maintains them as best practice. Exercising plans also ensures that the operational personnel most likely to have to activate the plan in an emergency are familiar with the plan's operation.

Under Section 36 of the EM Act, local governments are required to ensure that 'effective local emergency management arrangements are prepared and maintained for its district.' Further, it is a requirement under SEMP 2.5–*Emergency Management in Local Government Districts* that these local arrangements are exercised annually.

To facilitate this, SEMC Secretariat, through its CEMO network, encourages and supports LEMCs and DEMCs to develop and maintain business plans which provide for annual exercising of emergency arrangements (including joint exercises between local government areas). In some cases SEMC Secretariat officers assist directly by writing and/or facilitating such exercises.

Arrangements for improving exercise coordination across all agencies are proposed for 2014.

CASE STUDY: WESTPLAN HEATWAVE

Health impacts associated with extreme heat events, including heat related deaths and infectious diseases, are projected to increase. Vulnerable populations are at a significantly greater risk of suffering adverse effects from extreme and prolonged heat exposure.

Extreme heat can also impact industry, both economically and functionally, through damage to infrastructure (roads, railways, bridges), along with loss of livestock, crops and power supply. Financially, disruption to normal business, absenteeism, health impacts and loss of tourism, as consequences of the extreme heat conditions, may result in significant economic loss.

The need for the development of Westplan Heatwave was based on two risk factors:

1. Heatwaves have killed more people than any other natural hazard experienced in Australia (Coates 1996).
2. Australian climate change projections–based on international climate change research and build on a large body of work undertaken for the Australian region–identified that Australian average temperatures have increased by 0.9°C since 1950. Extreme heat events are likely to become increasingly common in Western Australia as a result of climate change (CSIRO and BOM 2007)

While heatwaves cannot be prevented, their adverse effects on communities can be mitigated through the implementation of community resilience and education strategies.

Following extensive consultation with key stakeholders, WA Health undertook the development of Westplan Heatwave to detail Western Australia's strategic arrangements for the control of the emergency response, in the management of a heatwave. Widespread consultation was undertaken during the development of the Westplan. WA Health, via the State Health Coordinator, is the prescribed HMA responsible for the response to a heatwave emergency.

Key aspects of Westplan Heatwave include identification of triggers for activation, roles and responsibilities of individual agencies, response strategies of public messaging and identifying, accessing and supporting vulnerable populations, and clear notification and communication protocols.

Since its endorsement in December 2012, Westplan Heatwave was activated on two occasions during the summer of 2013.

Table 5.3 – Westplans exercised during 2012–2013

AGENCY	WESTPLAN	DATE EXERCISE PROPOSED	DATE EXERCISE CONDUCTED	EXERCISE/INCIDENT NAME
BROOKFIELD RAIL	Brookfield Rail Emergencies	25 September 2012	25 September 2012	Exercise Avon Rail 2012
DFES	Bushfire	Actual incident	13 February 2013	Blackwood 61
DFES	Tsunami	20 September 2012	20 September 2012	Exercise Ausnami 2012
DOT	Gas Supply Disruption	11 June 2013	11 June 2013	Gas Supply Disruption Ex 2013
DOT	Liquid Fuel Supply Disruption	14 September 2012	14 September 2012	Liquid Fuel Disruption Ex 2012
DOT	Marine Oil Pollution	13/15 August 2012	13/15 August 2012	Exercise Protect Koombana Bay
DOT	Marine Transport Emergency	13/15 August 2012	13/15 August 2012	Exercise Protect Koombana Bay
WATER CORP	Dambreak	27 March 2013	27 March 2013	Exercise Dam Break New Victoria and Bickley
PTA	PTA Rail Crash	05 April 13	05 April 2013	Exercise Crossing Over
WA POLICE	Air Crash	26 July 2012	26 July 2012	Exercise Dark Sky
WA POLICE	Road Crash	April 2013	13 February 2013	DiscEx Road Crash Emergency 2013
WA POLICE	Land Search	Actual incident	Various Dates 2013	Sawyers Valley/Brookton/Menzies
WA POLICE	Nuclear Powered Warships	5/6 June 2013	5/6 June 2013	NPW Exercise 2013
WA POLICE	Space Re-entry Debris	May 2013	13 June 2013	SPRED Exercise 2013
WA POLICE	Terrorist Act	25 September 2012	25 September 2012	Exercise Avon Rail 2012
DCP	Welfare	18 October 2012	20 November 2012	Airport Welfare
DFES	Bushfire	21 August 2013	21 August 2013	State Bushfire Exercise

CAPABILITY AREA 6
PUBLIC INFORMATION AND COMMUNITY WARNINGS

Core Objective 6.1: Public Information and Community Warnings

Systems and processes are in place that allow the broader community to be warned of impending danger and actions that should be taken during or after an emergency.

Key Finding

Communities threatened or impacted by emergencies have an urgent and vital need for information and direction. Affected communities need to know what is likely to happen (or has happened), what to do and what to expect. They expect to know, where appropriate, what the responding authorities are doing; how, when, where and why.

Providing this information and direction from the authorities is an integral part of the State's EM arrangements. It is known as the emergency public information function.

EMAs, including some local governments, report a strong emergency public information focus within their agency. Many identify specific positions and plans within their agency dedicated to this function. HMAs also report that emergency public information functions are a focus of planning, and guidelines for this function are outlined within their respective hazard Westplans.

Detail

Emergency public information is considered such a critical EM function that it is supported by a Westplan Emergency Public Information. This Westplan is managed by SEMC's reference group Public Information. The Westplan clearly documents the emergency public information function and describes the roles of State, district and local emergency public information coordinators during an emergency.

The designated controlling agency is responsible for the provision and management of the emergency public information function. The scope and complexity of this function will be determined by the magnitude of the emergency. In small and localised emergencies affecting smaller communities, the controlling agency may be able to manage this function within its own resources. In larger, more complex emergencies, a whole of emergency strategy is developed to guide the public information function.

SEMC has also developed SEMP 4.6–*Emergency Public Information* which documents the guiding principles of emergency public information in the State. Local governments, in particular, reported a clear understanding of their roles and responsibilities under this SEMC Policy and the Support Westplan; such as nominating a Local Emergency Public Information Coordinator and forming Emergency Public Information Groups as required.

SEMC conducted a review which identified that, while the dissemination of emergency public information during an emergency was effective; a gap existed in relation to the provision of non-incident specific public information, regarding emergency preparedness. This gap will be the focus of future work which will be assisted by the Public Information Reference Group representative on the newly established Community Engagement subcommittee.

EMAs report the use of various means for communicating emergency public information to affected communities, including:

- *Emergency Alert*
- Radio and television media alerts
- Agency website updates
- Emails
- Social media (for example, Facebook; Twitter)
- RSS feeds and smart phone applications
- Recorded information lines
- Emergency call centres
- Media interviews
- TV crawlers
- Fact sheets
- Print media
- Variable message signs

The DFES website is a well utilised means of delivering up to date public information about incidents where there is a possible threat to lives or homes. It refreshes every five minutes.

Social Media

Social media is becoming increasingly important to the timely delivery of vital information to the community during an emergency. Effective and appropriate use of social media can have a significant impact on the gathering and dissemination of emergency public information.

EMAs acknowledge this and are developing projects, publishing protocols and working with a range of tools to engage, inform and support Australian communities' disaster resilience.

CaLD and Vulnerable Communities

In May 2012, the Australian Bureau of Statistics released the results of its 2011 State Supplementary Survey that assessed Community Preparedness for Emergencies in Western Australia. (Australian Bureau of Statistics 2011)

The following results from the survey are relevant to public messaging arrangements:

- 3 per cent of Western Australian households report that they have at least one member unable to speak English, 2.7 per cent unable to understand English, and 1 per cent unable to understand emergency instructions in English.
- 22.9 per cent of Western Australian households do not have landline telephones.
- 82.9 per cent of Western Australian households have internet access, with persons living alone least represented in this group.
- 56.7 per cent of Western Australian households would seek emergency information from the radio, 44.1 per cent from the internet, and 43.3 per cent from the TV. Only 13.9 per cent of Western Australian households would seek emergency information from telephone hotlines.

The Western Australian EM arrangements acknowledge the importance of appropriate and effective engagement with vulnerable communities, including CaLD communities. Accordingly, EMAs, including some local governments, consider these communities in EM planning, including emergency public information.

CASE STUDY: NEW NATIONAL *EMERGENCY ALERT* SYSTEM

As reported in 2012, *Emergency Alert* is the new national telephone warning system, used by EMAs to alert communities to present or impending emergencies. *Emergency Alert* replaces the *State Alert* system, which had operated in Western Australia under the direction of DFES and WA Police.

The new national system, which is hosted by Telstra, sends voice messages to landlines and text messages to mobile phones within a defined area, about likely or actual emergencies such as fire, flood or extreme weather events.

Since commissioning *Emergency Alert* on 30 November 2012, the system has been activated on 40 occasions for 14 incidents. For these activations, a total of 153,209 voice messages and 404,253 service and location-based SMS messages were sent.

Further enhancements to *Emergency Alert* will be pursued via the national Emergency Alert Steering Committee. At this stage, the focus for *Emergency Alert* development is on expanding the Location Based Solution to include Optus and Vodafone.
This is on track to be implemented by 31 October 2013.

CAPABILITY AREA 7
A MOBILE, CAPABLE AND COORDINATED RESPONSE

Core Objective 7.1: Command, Control and Coordination

Pre-established and well understood protocols and structures exist that define the inter-relationships between stakeholders during an event and facilitate orderly giving of directions, undertaking of key tasks and reporting

Key Finding

EMA's, including some local governments, reported incorporating the principles of Command, Control and Coordination (C3) in their plans, policies and procedures, and these align with the State Operational Management policy.

Detail

The process to achieve interoperable C3 is outlined in Westplans and these align with SEMP 4.1–Operational Management (currently under review). The EMAs, including some local governments, understand and incorporate the principles of C3 within their operational doctrine. This ensures congruency with the relevant Westplans and SEMP 4.1. Part of the process to maintain consistent terminology, is adherence to SEMP 4.1 and participation in the review of National Emergency Management plans.

Most EMAs, including some local governments train relevant staff in AIIMS, the nationally recognised system of incident management for the nation's fire and emergency service agencies. WA Police use AIIMS for all hazards except Terrorist Act for which Incident Command and Control System is used. Police jurisdictions throughout Australia, including Western Australia through the Australia New Zealand Policing Advisory Agency, are currently examining Incident Command and Control System Plus command and control system. In April 2013, the Australasian Fire and Emergency Service Authorities Council approved the use of the fourth iteration of AIIMS, namely AIIMS 4. This is likely to be adopted in Western Australia.

Core Objective 7.2: Effective and Interoperable Communication Systems

Effective and interoperable communication systems exist to allow emergency responders to communicate seamlessly during an emergency.

Key Finding

While the current radio communications equipment supports an interoperable network, the use of common frequencies utilising trunked and conventional networks is being progressively rolled out.

Detail

As highlighted in past post incident analyses (Noetic Solutions Pty Ltd 2012), communications are often identified as an area needing improvement. EMAs, including some local governments, acknowledge the importance of robust communication systems and continue to work to develop appropriate communication redundancy. Communication methods may include 2-way radios, satellite phones, mobile phones and email. Agency communication equipment requirements are periodically reviewed and maintained and tested on a regular basis. The majority of respondents have appropriate communications training programs in place.

EMAs are undertaking significant work within their agencies at local, regional and State level to develop and maintain communication business continuity and surge plans. Appendix 2 outlines some of the communication work currently in progress. Two EMAs have acknowledged communication gaps and areas for improvement to reduce their dependence on other agencies' communication systems during an emergency response. Smaller agencies have indicated that maintaining an independent 2-way radio network is cost prohibitive and will continue to rely on HMAs to provide 2-way radios on site. To maintain an awareness of communications projects being undertaken, the National Broadband Network Co is now a member of the SEMC Essential Network Operators Reference Group.

Despite agencies working towards robust communications systems within their agencies, EMAs acknowledge gaps in communications systems and coverage, particularly in regional Western Australia. To address these gaps, EMAs are participating in discussions and decisions at a national and State level in relation to projects such as the National Public Safety Mobile Broadband and WA Regional Mobile Communications Project. This 3-year project commenced in January 2012 and 72 of the planned 113 towers have been activated as of August 2013. Other work in progress includes the development of a strategic communications plan by DFES, which will include a review of the WA Emergency Radio Network to enhance command and control at major emergencies and WA Police are continuing the expansion of the Community Safety Network.

It is evident that agencies consider robust communications a priority and, where possible, embrace and plan for technical interoperability. The current radio communications equipment in WA supports an interoperable network and common frequencies for interoperability, utilising the metropolitan trunked network, are scheduled to be rolled out by the 2014-2015 bushfire season for WA Police, DFES and Corrective Services. The WA Police state wide conventional network also continues to roll out and will be finalised over a four year period. See Appendix 2 for full detail of communication projects currently underway.

Core Objective 7.3: Mobilisation

The mobilisation of a response effort, including the transportation of personnel, equipment and services in response to an emergency is effective.

Key Finding

EMA's report that the mobilisation of resources to rural and remote emergencies remains a challenge. A number of strategies are in place to address the logistical issues of a response effort. These include the formation of a logistics network group, plans and MoUs for access to equipment and assistance, mobile operations facilities and pre-positioning equipment.

Detail

In the event of an emergency, the mobilisation of personnel, equipment and resources to save lives, combat the hazard and service the needs of the community is challenging–particularly in rural and remote areas of the State.

WA EMAs utilise rosters and on call systems to ensure that personnel are available to respond to an emergency and it is apparent that CIMS have a role in the management of personnel during an incident. A variety of methods are utilised to activate staff, including an Emergency Call Out system to alert response personnel of an emergency via a SMS as used by the Public Transport Authority.

The mobilisation of a large number of staff within a contracted timeframe requires a significant logistics effort. For example, WA Health requires assistance from the RFDS, SJA or WA Police to move field medical teams to the site of a major emergency. A second rescue helicopter in the South West of the State will assist in the mobilisation of rescue personnel. Its funding was announced in a joint statement by the Hon. Joe Francis, MLA and the Hon. Brendan Grylls, MLA on 15 August 2013.

Rural and remote emergencies require a significant coordinated effort from all EMAs and, as such, they ensure preparedness through the maintenance of contracts, plans or MoUs for access to rotary, fixed wing or commercial aircraft. Access to DACC and SEMP 4.9 – *Australian Government Physical Assistance* processes are incorporated in Westplans and agency response plans.

To mitigate the risk of delayed response time to an emergency, agencies may pre-position equipment and pre-deploy staff ahead of a known hazard such as a storm or cyclone. Additionally, some agencies pre-identify areas suitable for operational command. Brookfield Rail has maps detailing access points for the entire 5100 km rail network within its jurisdiction. It maintains a spatial database to identify pre-determined areas to be used as Incident Control Centres, staging areas and aircraft landing sites.

To enhance the coordination of their incidents, DPaW has 11 mobile office sea containers fitted out with desks and cupboards to suit the requirements of the incident. They are used as a logistics office, operations office or incident control office to support the Incident Management Team (IMT), Incident Support Group or Operational Area Support Group.

Additionally, DPaW have a mobile communications facility that provides a number of levels of communication and Information Technology capacity dependent on the network services provided at the incident site. SJA has two vehicles that can be deployed within the metropolitan area as SJA command posts.

EMAs acknowledge the importance of operational awareness of each other's resource capability and maintaining currency of knowledge. They have established a logistics network group, an informal gathering of interested agencies to share information on each agency's equipment and logistics capabilities.

Figure 5.5 – DPaW mobile communications facility

Image courtesy of DPaW

Figure 5.6 – DPaW mobile office sea containers set up to support an Operations Area Support Group

Image courtesy of DPaW

Core Objective 7.4: Situational Assessment and Acquisition of Critical Resources and Services

Situational assessments are undertaken to accurately inform decision makers about the nature and extent of a hazard, and the critical resources and services that are needed, or may be needed, at different stages of a response and recovery effort.

Key Finding

Some EMAs report developing business continuity and surge plans to combat rapidly changing and escalating situations. The coordinated adoption of technology such as CIMS and increasing utilisation of spatial information support the assessment process.

Detail

EMAs acknowledge the benefits of technology to coordinate incidents, including the capacity to rapidly and regularly assess resource and service availability and requirements. Three initiatives being embraced by EMAs are State CIMS, Spatial Information and surge planning.

Currently six out of nine HMAs have access to or are in the process of procuring a CIMS that provides real time information to enhance situational awareness, improve communications and monitor and track incident response. To ensure interoperability between CIMS, the SEMC Response subcommittee is establishing a State CIMS Implementation Group.

This group plans to implement an interface, hosted by WA Police, which will allow different types of CIMS to communicate on a common platform, at a State and national level. Other States using compatible CIMS will be able to communicate and share information with EMAs.

Spatial information can help assess the situation and decide emergency response. To improve all hazard preparedness, DFES plans to expand the Information and Communication Technology, and Geographic Information System/spatial information support capability across all regions in Western Australia. Table 5.4 details current spatial information systems that contribute to multiagency situational awareness in Western Australia.

Table 5.4 Examples of spatial information systems used in Western Australia

FIREWATCH MAP SERVICE	Landgate manages this resource which provides emergency services personnel with an online mapping application to help manage bushfires across Australia. Datasets are updated daily or weekly and include burnt area maps, greenness images and fire hotspots from MODIS (Moderate Resolution Imaging Spectro-radiometer) and NOAA (National Oceanic and Atmospheric Administration) satellite imagery.
FLOODMAP SERVICE	Landgate manages this service which provides emergency services personnel with an online mapping application to help in the management of floods across Australia. Datasets include recent archival flooding, Digital Elevation Models, hydrology and infrastructure layers and other useful map layers. Landgate also provides rapid response aerial photography and satellite imagery to assist DFES during and post emergency.
SPATIAL LAND INFORMATION PLATFORM (SLIP) – EMERGENCY MANAGEMENT (EM)	SLIP – EM is a spatial information initiative under the Western Australian Government's Shared Land SLIP project to establish infrastructure for the sharing of and access to the Government's spatial information. It provides access to consistent and authoritative base mapping and imagery for all agencies, a service to enable real time sharing of operational incident mapping (currently used by DFES and DPaW to provide external access to their operational mapping data) and the establishment of common mapping standards (symbology and map templates) for a range of hazards including bushfires. In 2012, WA Police confirmed that they had established an internal operational mapping capability for their specific business needs. Another aspect of SLIP – EM is the Emergency Services Directory, a synthesis of relevant data (for example, the location of essential services) resulting in maps specifically for Emergency Management purposes. These maps cover the more densely populated areas of the State and are printed in hardcopy form for use in the field by Emergency Services. The map book for the South West region was last updated four years ago.

FESMAPS	To augment its situational awareness, DFES has FESMaps. This web based map viewer is used by DFES as its Common Operational Map View and is configured for DFES' multi hazard responsibilities. FESMaps accesses the authoritative base mapping and imagery via SLIP and real time incident data and environmental data from DPaW, BOM and other information providers.
SPATIAL SUPPORT SYSTEM (SSS)	DPaW has their Spatial Support System (SSS) which provides a Common Operation Map View configured for their specific business requirements. Other agencies have their own specific business driven operational map views. FESMaps provides information to graphically assess fires and share maps between DEC and DFES ensuring interoperability.

To ensure an appropriate response to a rapidly changing or escalating situation, EMAs have established or are developing business continuity and surge plans to allow for internal mobilisation of resources, or agreements to access resources from other agencies within Western Australia or interstate. Collectively, the State's arrangements to provide or accept interstate assistance were tested during the Commonwealth Heads of Government Meeting in 2011.

DCPFS has surge, pre-deployment and pre-positioning strategies including trained Early Response Teams who can be deployed at short notice to support local activations, or who can and have been pre-deployed in anticipation of an event such as an impending cyclone, to support and supplement existing local resources. DFES pre-deploy staff and equipment ahead of every cyclone.

Some agencies that do not have the capacity to develop business continuity and surge plans internally or with other EMAs have developed agreements with private companies or industry groups. For example, WA Health has MoUs with private hospitals in Perth to increase its capacity during a major emergency. RFDS has a Rio Tinto sponsored jet that provides additional aeromedical capacity.

CASE STUDY: ROYAL FLYING DOCTOR SERVICE LIFE FLIGHT JET

In Western Australia, the RFDS covers a 2.5 million square kilometre area, which is one-third of the Australian continent. The RFDS made history with the requisition of its first aeromedical jet which provides faster and more efficient aeromedical support for rural and remote communities. The acquisition was made possible through a ground breaking partnership with mining company, Rio Tinto, and additional funding from the Western Australian Government's Royalties for Regions program. It is the only permanently configured aeromedical jet in Australia with the capacity to carry three stretcher patients and up to three clinical staff at once.

This jet enhances Western Australia's capacity to respond to rural and remote mass casualty incidents such as the Christmas Island asylum seeker boat tragedies and the Kimberley ultra-marathon burns incident as well as the movement of casualties from the State to other Australian jurisdictions should an emergency overwhelm Western Australia.

Figure 5.7 – Rio Tinto Life Flight Jet

Image courtesy of RFDS

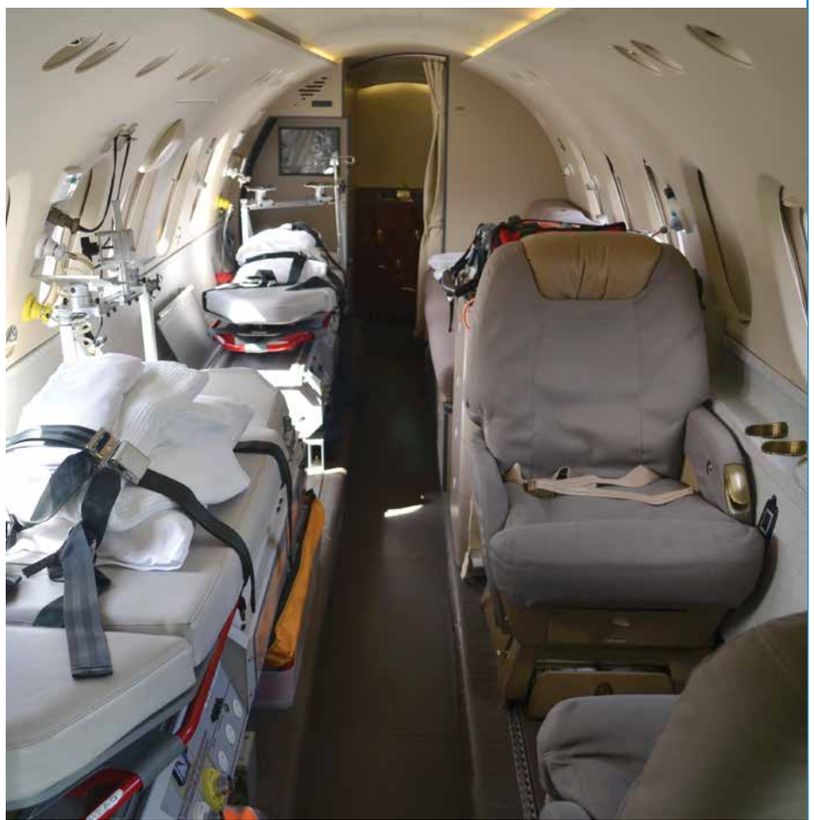


Figure 5.8 – Inside RFDS jet showing 3-stretcher capacity

Image courtesy of RFDS

CASE STUDY: POLLUTION RESPONSE DATA COLLECTION UNIT SYSTEM

The Department of Environment Regulation (DER) contributes to situational awareness at hazardous materials emergencies through its data collection system, called GPAC, which sends streaming video and air monitoring data from the PRU to a secure website, which can be viewed by authorised staff. It was used at the 2009 Maddington fuel tanker fire and explosion, where Police requested DER to position one of its vehicles to view the incident scene allowing WA Police access to images to gain situational awareness. A YouTube video is available to illustrate this capability (http://www.youtube.com/watch?v=lLFNeH4AttQ)

Figure 5.9 – Pollution Response Vehicle showing its GPAC video and chemical real time data system and chemical detecting

Image courtesy of DER

CAPABILITY AREA 8
RESPONSE AND RECOVERY SUPPORT SERVICES

Core Objective 8.1: Evacuation and Public Protection Measures

Arrangements are in place to ensure lives are protected in an emergency through directed or voluntary action such as evacuation of people and animals or other public protection measures.

Key Finding

HMAs report that community evacuation messaging is consistent with State and national evacuation policy. The State policy is currently being reviewed in line with national best practice. The Australian Bureau of Statistics 2011 State Supplementary Survey (Australian Bureau of Statistics 2011) results highlighted that 20.9 per cent of Western Australian households would require assistance to exit a dwelling. Households with children represent the highest proportion of this group. Mechanisms exist in policy, plans and processes to support appropriate decision making about whether to evacuate or administer alternative public protection measures.

Detail

SEMP 4.6–*Emergency Public Information* and Westplan Public Information give guidance on information provided to the community during emergency situations. Community evacuation messaging is more specifically addressed in SEMP 4.7–*Community Evacuation.* EMAs understand that it is the responsibility of the controlling agency to provide community warnings and timely advice to the community. HMAs report that they have aligned their systems and processes with SEMP 4.7 and National policies.

SEMP 4.7 is currently being reviewed in line with the national *Evacuation Planning Handbook* (AEMI 2013). AEMI, under the Attorney-General's Department, has updated the *Evacuation Planning Handbook,* which examines the key evacuation concepts of preparation, types of evacuation, alternatives to evacuation and stages of the evacuation process. Other review issues identified by the SEMC sponsored Multi Agency Working Group for Evacuation include:

- clarity around spontaneous self-evacuation
- recommended (voluntary) evacuation
- directed (compulsory) evacuation
- assisted evacuation (rescue)
- consideration for special groups/individuals
- provision for animals in evacuation.

DFES' Community Liaison Unit provides 2-way communications between the IMT and the affected community during the response phase. As a Combat agency, WA Police are involved in door to door evacuations and have established processes to ensure effective communication.

All Westplans refer to evacuation arrangements where they are relevant. Some HMAs have developed additional resources to support appropriate evacuation and return decision making. For example, WA Police have developed an evacuation guide for use by IMTs for situation specific evacuation planning, which includes consideration of alternatives as appropriate and SEMC has endorsed an Evacuation Flagging Project as detailed in the following case study. The DCPFS works with the HMAs to assist in the decision making processes on evacuation and return, and have identified state and local welfare centres for receiving people evacuated by an emergency.

WA Police refer to the LEMAs for the area within which an emergency occurs for local evacuation plans and resource lists. DFES are researching the issue of community shelters for bushfire and considering the potential benefits versus the costs and possible risks. There are also arrangements in place for further assistance from the Department of Defence through the Defence Assistance to the Civil Community process.

Hospitals and health services have plans for part of hospital evacuation in place which are tested regularly. The Commonwealth Department of Health and Ageing is working in consultation with WA Health to reinforce Aged Care Facility Emergency Procedures in Western Australia, including evacuation planning. WA Health has requested that Department of Health and Ageing consider strengthening the requirement for Emergency Procedures in Aged Care Facility accreditation standards.

To facilitate the accounting of people affected by such incidents and to provide for individuals to be traced, families reunited and the answering of large volumes of inquiries from friends and relatives, a system for registration and reunification exists at both the State and national level. This is called the National Registration and Inquiry System.

The system provides for the registration of affected people using standardised forms, copies of which are held by DCPFS offices throughout the State, the State Welfare Coordination Centre and the State Central Registry (Australian Red Cross) in Perth and with local Red Cross teams. These registration forms are then matched with telephone inquiries received through the State Inquiry Centre, which is a call centre operated by Red Cross to take telephone inquiries from family and friends. This process is coordinated through Westplan Registration and Reunification for which DCPFS has delegated responsibility. Information is currently manually transmitted and the automation of this process has been identified as an opportunity for improvement.

Core Objective 8.2: Fatality Management Services

Arrangements are in place for effective management of fatalities in the event of an emergency, including body recovery, victim identification, mortuary, burial and cremation services, information between authorities and family members, and the provision of bereavement counselling.

Key Finding

WA Police have responsibility for Disaster Victim Identification in Western Australia and work with WA Health to provide fatality management services. Contingency planning is currently underway for surge capacity and dependencies have been highlighted in relation to transport and storage issues. WA Police adhere to INTERPOL standards for victim identification and reunification.

Detail

The Western Australian Coroner chairs the Disaster Victim Identification committee, whose membership includes all relevant stakeholders. WA Police have responsibility for Disaster Victim Identification in Western Australia and work with WA Health to provide fatality management services. In the event of a fatality at an incident, EMAs report that they would contact WA Police to manage the fatality situation. WA Police are currently establishing a comprehensive contingency plan for the surge capacity required for an incident resulting in a death toll beyond State capability.

WA Health has included fatality management as a key component in their WA Health Management Plan for Pandemic Influenza, and has in principle agreements with WA Police, Australian Defence Force and the Metropolitan Cemeteries Board for alternate fatality management services, including the development of a rapid burial technique. Resource issues relating to surge situations of storage and transportation involve dependencies between agencies.

DCPFS provide community support following mass fatality events through a 'Family Assistance Centre' model, which relies on the overarching principles of Westplan Welfare.

WA Police are represented on the National DVI committees, and through this relationship, develop a strong network for surge planning. The ANZPAA has a brochure titled 'The Disaster Victim Identification Process' which explains the process for families of victims.

Core Objective 8.3: Health and Medical Services

Deliver emergency medical treatment and health services in response to an emergency, including the management of environmental and public health to avoid additional injury and disease to the community.

Key Finding

WA Health and SJA have jurisdiction for the provision of health and medical services, and work closely with each other and other EMAs in planning for emergencies. First responders such as WA Police, DFES and other HMAs are trained in first aid. WA Health has a Surge Management Plan which is regularly reviewed and tested. The National Registration and Inquiry System is utilised for registration and reunification during an emergency.

Detail

The health and medical support arrangements during emergencies are outlined in Westplan Health. WA Health and SJA have jurisdiction for the provision of health and medical services.

SJA and RFDS have jurisdiction in relation to the initial treatment and movement of casualties from the scene of an emergency. WA Health has a Mass Casualty Aeromedical Transport Plan to assist with the coordination of aeromedical transport of a large number of casualties to definitive health care facilities. In addition, SJA has access to approximately 400 first aid trained event staff to provide additional support if required.

While WA Health delivers services across the State, including regional areas, the geography of Western Australia presents unique challenges and the RFDS assist in the provision of these services in remote areas. Aboriginal medical services play a key role in emergency medical service delivery in some communities. These communities have medical and pharmaceutical stockpiles available for use in an emergency.

EMAs support the role of WA Health and SJA through strategies such as having first responders trained in first aid. Western Power has arrangements in place with WA Health for the priority restoration of power to medical facilities and their priority contractors such as medical gas suppliers.

WA Health has a Surge Management Plan which is regularly reviewed and tested. The PTA has plans to manage mass transits of people, which includes a contingency to call for assistance from WA Police, SJA and WA Health in the event of a mass casualty incident.

WA Health uses a CIMS to capture and disseminate responder information during an emergency. Disaster flags are created on hospital Patient Administration Systems that allow for the tracking of disaster victims through the hospital setting.

SJA State Operations Centre keeps a record of every ambulance transport undertaken and works closely with WA Health in keeping track of casualty movements.

Core Objective 8.4: Welfare and Social Services

Deliver welfare and social services during or immediately following an emergency, including the provision of critical goods and services to individuals affected by disaster (food, potable water and shelter) and critical support services that contribute to the wellbeing of the community (psychological first aid and financial assistance).

Key Finding

Relevant Westplans are managed by the DCPFS to provide support to HMAs and the community during emergencies. Local Welfare plans are maintained, tested and reviewed.

Detail

The DCPFS manage Westplan Welfare, Westplan Registration and Reunification and Westplan Reception to provide support to HMAs and the community during emergencies. The DCPFS manages the six welfare functional areas defined in Westplan Welfare, with the assistance of other organisations that have agreed to responsibilities under that functional area. The functional areas are emergency accommodation, catering, clothing and personal requisites; personal services; registration and inquiry; and financial assistance.

The DCPFS has offices located throughout the State and has the capacity to deploy staff and resources to isolated or remote locations within a short time frame.

Local governments have a Local Welfare Plan that has been developed, tested and reviewed in conjunction with DCPFS. The Local Welfare Plans identify suitable evacuation centres during emergency events. A local welfare liaison officer is also identified to liaise with DCPFS at a designated evacuation centre. Local governments assist the initial welfare and registration until handover to DCPFS.

Some local governments have developed their own toolboxes to assist in the delivery of the Local Welfare Plan. For example, the City of Belmont has produced an evacuation centre support kit with basic non-perishable supplies, outdoor/4WD first aid kits and an animal welfare support kit. The City of Stirling has established emergency arrangements for aged care facilities, to assist in the evacuation and care of residents from these facilities in appropriate accommodation after evacuation.

The ability of agencies to assess the needs of the community in order to deliver the required welfare services depends on factors such as the initial impact assessment conducted by the controlling agency and the subsequent needs assessment made by local government. The SEMC Recovery subcommittee is currently reviewing these arrangements, as well as other transition to recovery issues.

Core Objective 8.5: Essential Services and Critical Supplies

Deliver and/or return essential services and supplies to the community during and after an emergency, including access to power, mains water, gas, sewerage, telecommunications, food security and liquid fuel.

Key Finding

Planning for potential disruption and restoration of essential services and supplies is undertaken through structural arrangements and formal networks by HMAs, and at the local level through LEMCs.

Detail

HMAs maintain close working relationships with critical infrastructure suppliers. These relationships are formalised through specialist branches, representation at operating centres and formal networks such as the SEMC Essential Services Network Operators Reference Group.

The EM and Counter Terrorism Division of the WA Police contains a unit for the protection of critical infrastructure. This unit is responsible for developing and maintaining an all hazards response in the coordination of police roles and responsibilities.

Part of the planning regularly undertaken by DPaW is to maintain datasets showing the location of fire sensitive infrastructure and agreement with infrastructure managers on protecting it from fire. For example, biannual meetings are held with Telstra to update information pertaining to telecommunication infrastructure within DPaW managed lands.

Western Power has relationship managers for major/critical electricity users (Telstra, Water Corporation and WA Health). Western Power is a member of the SEMC Essential Services Network Operators Reference Group and provides some of these organisations with a portal so they can see power outages affecting their assets.

At a local level, the LEMAs identify potential risks in risk registers and risk evaluation criteria which may include the identification of critical and essential service priorities. Some local governments report that they maintain business continuity plans which address issues such as essential services. Some local Recovery Committees include essential service operators in the initial stages and work together to restore essential services as quickly as possible.

During major incidents, essential service providers are consulted by DFES through regular briefings and as appropriate representatives form part of the 24-hour Emergency Coordination Centre. WA Police, in their role as District Emergency Coordinators, typically manage this through the appropriate Support Groups during an emergency.

Future work in this area will include the development of a new Westplan in relation to Electricity Supply Disruption. Further consultation will be undertaken with essential service providers to assess their liquid fuel requirements and a review of Westplan Freight Subsidy.

CASE STUDY: EVACUATION FLAGGING PROJECT

In Western Australia the *"Green Means I've Gone"* project was endorsed by SEMC to establish a practical and achievable evacuation flagging model which could be standardised and consistent. The intent was to substantially save time for those agencies tasked with evacuating homes within an emergency area, by means of door to door warnings. This initiative would provide greater clearance rates in time critical operations and potentially saves lives.

This concept involves residents that self-evacuate to display a visible sign that the property is vacant, that is no occupants remain. This requires the resident to leave a green recyclable shopping bag at the front of the property. This method was chosen as these bags are widely available and are common items in households, easily located, and not normally left outside of properties.

Local governments in high bushfire risk areas were invited to trial the initiative. The Shire of Bridgetown-Greenbushes was selected, embraced the project and launched the trial of the use of green shopping bags as a flag during the South West bushfire season 2012–2013. The Greenbushes area of the shire used the system during an actual fire threat, namely Kings/Southampton Fire. Surveys indicated that the trial was successful and supported locally by DFES, WA Police and DPaW.

The next stage of this project is to conduct further trials incorporating additional participants. Local governments will be encouraged to champion and drive the project, utilising provided 'starter packs' for consistency. The trials will be launched in November 2013, following the launch of the DFES Prepare / Act / Survive campaign and are expected to be completed in mid–2014.

Figure 5.10 – Evacuation Flagging Project

Image courtesy of WA Police

Figure 5.11 – Evacuation Flagging Project

Image courtesy of WA Police

CAPABILITY AREA 9
RECOVERY

Core Objective 9.1: Restoration of Local Services and Consumer Goods

Return to a functioning community, including access to public and private services such as schools, banking, grocery stores, pharmacies and public transportation

Core Objective 9.2: Infrastructure Recovery

Restore and rebuild critical infrastructure to a level consistent with a resilient and normal functioning community.

Core Objective 9.3: Psychosocial Recovery

Provide assistance to individuals, families and communities to re-establish their intermediate to long-term emotional, social, spiritual, financial and physical wellbeing after an emergency.

Core Objective 9.4: Economic Recovery

Restore the affected economy, including regenerating stable business activity and employment.

Core Objective 9.5: Environmental Recovery

Protect, rehabilitate and restore the environment, both natural and culturally significant, in accordance with relevant environmental protection and conservation standards.

Key Finding

Local governments are well positioned in terms of recovery, with the majority having LEMAs which include recovery plans. Support for local governments in their role of managing recovery is available from Commonwealth and State government agencies and not for profit agencies.

Detail

The arrangements for disaster recovery in Western Australia are set out in the EM Act, State Emergency Management Policy (SEMP) 4.4–*State Recovery Coordination* and Westplan Recovery Coordination. A recent review of SEMP 4.4 more clearly identifies the role of local government in recovery and the key considerations for transition from response to recovery.

Local government is well positioned to ensure that recovery efforts are underpinned by the National Principles for Disaster Recovery (Community Services Ministers' Advisory Council 2009).

Legislation exists to ensure that effective LEMAs are prepared and maintained by local governments for their districts to manage recovery in their community. Legislation also requires local governments to establish one or more emergency management committees for its district.

Of the 138 local governments in Western Australia, 126 report that they have established a LEMC. This number includes individual or combined LEMCs. In 2012–2013, 103 LEMCs reported to SEMC. Of the 103, 100 reported having LEMAs and 84 reported having recovery plans for the local governments they represent.

Some local governments have established an ongoing Recovery Committee or working group to manage recovery specific training. The training ensures local capacity, reviews and tests the local recovery plan and develops relevant policies and processes.

Local governments are supported in their responsibilities by State policy which provides for a State Recovery Controller, and the State Recovery Coordination Group where appropriate. Transition to recovery arrangements are detailed in every Westplan.

Local and District Emergency Management Committees are supported by WA Police in their role as Coordinators on the DEMCs and by SEMC Secretariat CEMOs, who assist with the preparation of recovery plans.

There is currently a great deal of variation in the level of comprehensiveness and fitness for purpose of the recovery plans of the various local governments. The standard of format and content of the plans must continue to improve. The plans must be practical and recognised as useful tools to assist in the recovery process. Through the committees, CEMOs provide information and develop awareness of the principles, concepts and operation of recovery management. They also conduct more extensive briefings through tailored workshops and seminars; in particular, CEMOs facilitate workshops that develop awareness of particular recovery management issues and 'lessons learnt'.

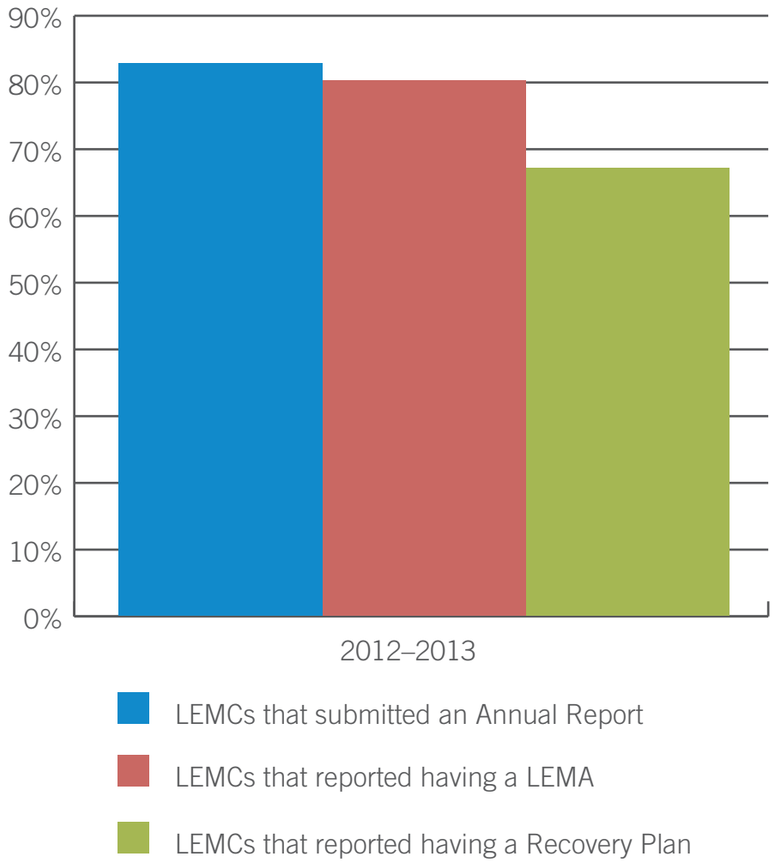
DCPFS coordinates the welfare components of the recovery process, including emergency food, clothing, essential personal items or temporary accommodation. If an event is assessed as an eligible natural disaster DCPFS has a role in essential accommodation and psychosocial recovery aspects.

The lead role of local government and the importance of support from other agencies was reinforced recently by the 2011 Margaret River bushfires recovery experience. A survey of the local community about their recovery experience (conducted in May 2012) praised the Shire for its recovery communication and commended the Recovery Team, comprising the Shire of Augusta-Margaret River, DCPFS and Red Cross employees for their support. The survey highlighted the deep sense of connection to the coastal environment of the Margaret River community and the resultant significance of the environmental recovery aspect. Importantly, the survey results were also used to assist in preparing the community for the upcoming fire season.

Future development of recovery capacity will include work being undertaken by the Recovery subcommittee of the ANZEMC, which is overseeing the development of a National Impact Assessment Model. The model will help to improve the process of impact assessment and subsequent needs assessments during the transition from response to recovery. It is anticipated that the model will better inform disaster impact assessment to facilitate more consistent, effective and targeted recovery assistance and services to disaster impacted communities. ANZEMC has also identified a national project to develop a monitoring and evaluation framework to measure effectiveness and value for money of relief and recovery assistance, which will benefit Western Australia's continuous improvement strategies.

The work at national and State levels reflects a growing awareness of the inherent complexity of the recovery process due to the wide range of effects and potentially long-term impacts of disasters.

Table 5.5 – Percentage of LEMCs with reported LEMAs and recovery plans in place



CASE STUDY: LORD MAYOR'S DISTRESS RELIEF FUND

The Lord Mayor's Distress Relief Fund was established in 1961 to provide relief of personal hardship and distress for Western Australians arising from natural disasters occurring within the State. The perpetual fund is a registered charitable body with approval from the Australian Taxation Office for tax deductibility of contributions.

The fund has assisted communities across the State when facing adversity resulting from natural disasters such as floods, bushfires and cyclones. Since 1996, the Lord Mayor's Distress Relief Fund has disbursed in excess of $11.7 million to over 1300 applicants.

The fund has assisted with relief appeals for many natural disasters, including the Dwellingup Fires in 2007, the Toodyay Fire Appeal in 2010, and three appeals in 2011 for the Gascoyne and Mid West Floods, the Perth Hills Fire and Margaret River. In 2002 the fund assisted Western Australian victims of the Bali bombings through publicly raised donations.

Upon the formal announcement of an appeal, the Board of the Lord Mayor's Distress Relief Fund liaises directly with the local government of the affected district or districts. The affected local government is required to form a Local Recovery Committee to work with the Board to establish criteria for the assessment of claims.

Local Recovery Committee members are drawn from representatives of local and State governments, the immediate community and lead combat authorities. It works with its community and acts as a communication channel to the Lord Mayor's Distress Relief Fund Board. The Local Recovery Committee follows Board guidelines, receives and assesses claims and makes recommendations to the Board on the disbursement of funds. Based on these recommendations, the Lord Mayor's Distress Relief Fund Board makes the final decisions on the disbursement of the funds.

CAPABILITY AREA 10
EVALUATION, KNOWLEDGE AND CONTINUOUS IMPROVEMENT

Core Objective 10.1: Evaluation

Rigorous, customary and transparent evaluation of all emergency management activities is undertaken, including post incident analysis, to assess and improve performance.

Key Finding

EMAs report EM activity evaluation processes (including post incident analysis) are routinely undertaken. Agencies utilise existing agency or specialist systems to manage this process in a wide variety of ways.

Detail

Most EMAs report having formal processes and systems in place to review EM activities, which in some cases are integrated into existing corporate planning processes. Agencies report that exercises and incidents are subject to a debrief and post incident analysis and subsequently improvement actions are allocated and monitored.

Agencies indicate that evaluation processes reflect the significance of the incident. A number of agencies report utilising a database system to manage the reporting, analysis and improvement process, which may also be a part of a broader agency quality system.

Some agencies have adopted specialist systems, such as WA Police, who have adopted the People, Process, Organisation, Support, Technology, Training and Exercising framework to ensure lessons learnt are evaluated under a risk-based assessment and then actions raised based on the risk level. Other HMAs, such as Brookfield Rail, report that the risk management process is applied to post incident analysis outcomes.

Evaluation of the effectiveness of recovery activities has been identified as an area for future work nationally by the ANZEMC Recovery subcommittee and also as a project for the SEMC Recovery subcommittee.

Core Objective 10.2: Knowledge Management

Knowledge and information are captured, managed and shared in a way that contributes to effective and coordinated emergency management at a State and local level.

Key Finding

Most EMAs benefit from the use of broader agency systems to manage EM data and knowledge, while others are able to utilise purpose built systems. There is evidence of a strong EM network which operates at a State and national level, effectively sharing information both formally and informally.

Detail

All EMAs report utilising a system to store and manage EM related data and information. In some cases a corporate electronic records system is utilised, supported by incident reporting databases and web based communication systems. Larger agencies with significant EM responsibilities, such as WA Police, have established specialist units to capture and analyse data and information.

Most HMAs and Combat/Support agencies indicated that they had the capacity to provide information expediently in response to an external request relating to a hazard, with some, such as DFES, in the process of developing systems to facilitate the sharing of information during incidents.

DPaW and DER report having sophisticated corporate data record keeping to allow rapid reporting on incidents. Throughout the fire season, suitably trained staff are maintained on standby to facilitate access to corporate information. Information such as the age of fuels, location of resources and status of incidents is available to registered users via a web enabled portal.

Landgate has developed websites and web mapping systems to make accessible location information available to EMAs, with the aim of disseminating and sharing knowledge.

Representation on EM related committees and working groups is a key strategy utilised by agencies to ensure that knowledge is shared between agencies and jurisdictions, and to address interoperability issues.

In its recent review of the subcommittee structure, SEMC reinforced the importance of the exchange of EM information through industry forums. All four subcommittees included as a function the provision of a forum for continuous improvement, collaboration and exchange of knowledge, practice and research on initiatives and issues relating to capability. EM in Western Australia is consistent with the national model in effectively utilising cross agency committees, working and advisory groups as a way to ensure decision making is informed by appropriate knowledge and expertise, and also to ensure information is shared to improve outcomes.

The LEMCs and DEMCs assist in the establishment and maintenance of effective EM arrangements at the local and district level. They provide a formal network for local EM representatives, local government and community members to share expertise and information.

Through the Committee meetings and their established networks, SEMC Secretariat's CEMOs promote regional partnerships and provide information on the principles and operation of EM aspects.

Local governments have also been proactive in establishing formal networks to improve resilience in local communities as well as exchange ideas and strategies on emergency management. For example, the South West Local Government Emergency Management Alliance is established as a group of 12 local governments who provide a forum for the coordination, promotion, enhancement and sharing of comprehensive EM strategies within the South West of Western Australia.

The Planning Institute of Australia recently launched the Post Disaster Planning Program for better preparing remote area planners for natural disaster events. The initiative was funded through the Commonwealth Attorney General's Department and aims to create a system that gives planners in the regions better access to valuable knowledge and mentoring support for disaster mitigation, preparedness and response.

The website (http://www.aemi.edu.au/pia/default.html) consists of online seminars and interviews. While the program responds to recent flood events, there are also professional development seminar presentations on the role of land use in emergency risk management, bushfire hazard mapping, and managing the psychological impacts of bushfire.

Emergency Management Australia have developed a Knowledge Hub www.emknowledge.gov.au which provides research, resources and news relevant to Australian emergency management. This will be complemented by future SEMC plans to further develop its website.

Core Objective 10.3: Continuous Improvement

Continuous learning and improvement are achieved through informal and formal mechanisms to strengthen the overall preparedness of the State to deal with large scale emergencies.

Key Finding

All HMAs and Combat/Support agencies report a culture of continuous improvement in their organisation which is supported by a variety of processes and systems. There is scope for greater coordination of some continuous improvement functions.

Detail

All HMAs and Combat/Support agencies report a culture of continuous improvement in their organisation and in some cases cite the use of systems to support continuous improvement cycles.

WA Police have adopted the People, Process, Organisation, Support, Technology, Training and Exercising framework in order to develop a consistent evaluation process of lessons identified across disparate emergency management activities and this drives a continuous improvement cycle.

Some agencies report that they conduct ongoing scanning of reviews conducted by the Auditor General and other review bodies to ensure that findings are evaluated and considered as part of the strategic planning and risk management processes.

To ensure centralised coordination, the BRIG (which includes EMA representatives) was formed by the State Government to oversee the implementation of the 55 recommendations of the 2011 Perth Hills Bushfire Review (Keelty February 2011). Information on the progress of the implementation of the recommendations can be accessed by the public through stakeholder briefing documents on the DPC website.

In the last 12 months SEMC has developed a Strategic Plan which identifies Continuous Improvement as a key area, with a number of priority projects identified for action.

Improvements in the tracking and monitoring of State-level exercise recommendations will also be enhanced through the creation of a central coordinating body for exercise writing in Western Australia.

CASE STUDY: 2013 SEASON REVIEW

In May 2013 SEMC undertook its inaugural Season Review meeting. The meeting reviewed a number of improvements which occurred during the year including work on coordination, training and joint exercising from each agency and shared lessons learnt. Detailed briefings were provided by the relevant agencies on fire, tropical cyclone, heatwave and storm events and considerable input was provided from all agencies around common issues. The meeting also considered key findings from recent national and international incidents.

Opportunities for improvement were identified in the following key areas:

- Communication
- Interoperability
- Documentation
- Safety
- Training
- Insurance
- Capacity
- Education
- Land-use planning

Regular reporting from HMAs on the status of their significant safety issues related to emergencies and associated action plans was discussed.

In addition, a number of matters identified through the research into other jurisdictions were referred to the SEMC subcommittees and the SEMC Secretariat for further review including:

- Specific bushfire reviews in relation to analysis of the report and recovery
- Hospital evacuation
- Evacuation by sea
- Insurance issues
- Use of social media, website and community tools
- Disaster proofing
- Review of the Australian Rainfall and Runoff guide

The Season Review meeting process supports SEMC's commitment to continuous improvement, and will remain a key improvement process in reviewing the effectiveness of preparedness strategies.

06 CONCLUSIONS AND FUTURE ACTIONS

CONCLUSIONS AND FUTURE ACTIONS

Utilising the SEMC Capability Framework, this report indicates the current level of preparedness across the range of emergency management capabilities, and identifies areas that require further improvement. The observations and future actions included in this report point to further opportunities for all EMAs to build and maintain their capacity across the capability areas. The capability methodology also reinforces the value of a coordinated approach in addressing issues of preparedness.

CONCLUSIONS

Capability Review

Western Australia has adopted a capabilities assessment approach to bring a higher level of consistency, measurability and reporting to the complex field of emergency management. This systematic approach has been adopted nationally and in other international jurisdictions such as the United States and New Zealand.

The Capability Assessment Tool is described in detail in chapter 5. As the self-assessment tool utilised to date is qualitative (non-benchmarked) there could be a wide variety of interpretation of capability among the various reporting agencies. In effect some of the State's strengths may not be, in reality, as robust as reported. SEMC intends to progressively move towards a more quantitative assessment in subsequent years.

In addition only a relatively small proportion of local governments reported in this cycle. It is likely that those that did report are more advanced in emergency management practices and as such may skew the data towards a more positive assessment of the State's readiness.

Across the 10 capabilities, a number of key findings have been identified which include strengths for the State and potential areas for improvement. In summary, key findings by capability area include:

1. The Emergency Management Agencies (EMAs), including some local governments, understand their roles and responsibilities within the State's Emergency Management (EM) arrangements. Some of the arrangements are due to be reviewed and additional hazards may be prescribed in the EM Regulations.
2. There has been a commitment by all Hazard Management Agencies (HMAs) to align with the 'AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines' and a framework which provides a pathway for developing a comprehensive and consistent approach to risk management throughout the State has been agreed.
3. Of significance to Western Australia is work towards recruitment, training and pathway development for priority incident management personnel, particularly Level 3 incident controllers together with the opening of the sophisticated DFES State Operations Centre (SOC).
4. Attraction, retention and training of volunteers and continual communication and assessment of their ready responder status have been highlighted as requiring monitoring and further work. Two-way engagement with the community as a whole about preparedness and shared responsibility was also identified as being of marked importance, particularly amongst the more vulnerable groups (for example, Culturally and Linguistically Diverse (CaLD) community members, people with disabilities, the elderly and children).
5. The State has 28 Westplans and 8 Support plans that detail roles and responsibilities for agencies and cover the prescribed hazards and some supporting functions. Exercising of the plans is deemed of high importance and arrangements for improving exercise coordination across all agencies are proposed for 2014.
6. Most agencies have identified Public Information as a priority function and utilise a full range of information sharing platforms to disseminate emergency management information. Social media is one platform identified for greater utilisation. Of particular significance to the State was the activation of the Telstra hosted telephone warning system, *Emergency Alert*. Since coming on-line in November 2012, *Emergency Alert* has been activated on 40 occasions for 14 incidents.
7. The importance of Command, Control and Coordination (C3) has been recognised both within and between agencies in response activities. Of note in 2013 was the national release of Australasian Inter-Service Incident Management System (AIIMS) 4, the nationally recognised system of incident management for the nation's fire and emergency service agencies, that is likely to be adopted in Western Australia. The importance of interoperability has also been emphasised particularly in regard to radio communications, coordination of response assets (such as air support) and of the usage of spatial information data. In the State, six HMAs have also reported access or pending access to a Crisis Information Management System (CIMS) that provides real time information to enhance situational awareness. Furthermore an interface is being developed which will allow different types of CIMS to communicate on a common platform.

8. In response and recovery support services an issue of focus is dealing with surge capacity either in tending to casualties or in supporting the evacuation of people from dwellings. The timely re-establishment of essential services following emergency events is also emphasised and new State Emergency Management Plans (Westplans) in relation to Electricity Supply Disruption and Disruption of Telecommunications are being considered.
9. In terms of recovery in Western Australia, local governments have a key role. Most local governments have formed Local Emergency Management Committees (LEMCs) and possess Local Emergency Management Arrangements (LEMAs) and a proportion of these contain recovery plans. However a number of the LEMCs still need to establish recovery plans. Furthermore there is also some variation in the standard of the LEMAs and their associated recovery plans across the State. There is an increasing awareness of the complexity of the recovery process and the opportunity to improve capability through shared learning and best practice examples.
10. All HMAs and Combat/Support agencies report a culture of continuous improvement and there is evidence of strong networking in the sector with sharing of knowledge both intrastate and interstate. They also report routine evaluations and post incident analysis with identification and monitoring of improvement actions.

Capability Trends

Across the highlighted capability findings, above, several trends are established. It is particularly noteworthy that agencies understand the benefits of yearly reporting and of utilising a consistent capabilities tool to robustly understand the State's readiness position on a year-to-year basis. Furthermore there is firm appreciation of the benefits of open communication, sharing of knowledge and using modern communication technologies, as well as the imperative of interoperability and interagency coordination in responding to events. Risk management is also seen as gaining momentum as a way of establishing strategic and operational priorities among agencies.

Notably most of the highlighted findings fall within one or more of the key theme areas as established in the 2012 Report. This shows the importance and relevance of these four central themes in the ongoing development of the sector. The themes are:

1. developing shared responsibility
2. promoting a risk management approach in the emergency management sector
3. improving coordination particularly in response
4. embedding a continuous improvement ethos.

Focus Areas

Based on their prevalence and/or importance to the State, key issues were identified for further detailed investigation, namely, **Tropical Cyclone and Storm**, **Bushfire Update** and the concept and application of **Risk Management**.

Tropical Cyclone and Storm

Tropical Cyclone and Storm pose a significant risk to the State. The focus chapter recognised the frequency, range, unpredictability and economic impact of storm events across Western Australia. The long history and frequency of Tropical Cyclone activity and severe storm in the State are addressed by a number of preparedness activities undertaken by a range of key EMAs. In addition, remote sensing technologies have the potential to improve our preparedness for cyclone emergencies. Also, the need for increased modelling and mapping in relation to storm surge and flash flooding from Tropical Cyclone and Storm has been identified. This follows the Warmun and Gascoyne Junction floods in Western Australia and the Queensland and Victorian floods of 2010-2011.

Bushfire

The seasonal outlook shows that the State faces a number of challenges in the 2013–2014 fire season. Up until the Cooperative Research Centre for Bushfires (Bushfire CRC) released their outlook, the South West had seen reduced rainfall, soil moisture deficit and increasing fuel loads, while high rainfall in the Mid West has resulted in high grass growth rates. Since this outlook there has been greater than average rainfall in September, despite this there is still an above normal bushfire potential forecast in the South West and the Mid West.

A number of fundamental, long-term challenges are also highlighted. Significantly declining prescribed burning rates and the accumulation of fuel is creating potential for fires of extreme intensity for which suppression, without major damage, may not be possible.

The importance of fuel reduction as a shared responsibility is highlighted as a key measure to reduce the impact on people and property. The report outlines a number of the actions which have been undertaken to increase preparedness.

Risk Management

During 2012–2013 SEMC, through its Secretariat, commenced or continued a number of large-scale risk assessment projects in conjunction with other State agencies. A significant first phase of the project was undertaken in 2013 with analysis of five of the State's sudden onset natural hazards (storm, earthquake, bushfire, tsunami and heatwave). The data graphically presented in this report reveals, that of these five hazards, the State's highest risks stem from bushfire and storm events in the South West. Particularly vulnerable (and therefore areas for priority treatment) are the social/community, human and environmental aspects.

Following the risk assessment, bushfire is confirmed as the State's preeminent hazard. The findings of the **Bushfire Update** section of chapter 4 suggest the risk level is potentially set to worsen. Extreme storm events are also seen as yielding high risks to Western Australia and agencies and the community will need to assess the regions' preparedness and consider treatments for storms of a high magnitude. With forecast climate change and the potential for more extreme weather events in tandem with a growing and aging population, strategies to address heatwave need to be considered.

FUTURE ACTIONS

Risk Management

SEMC's intention is that over the coming three years a comprehensive risk assessment of all prescribed hazards will be undertaken in Western Australia and at multiple scales including at State, district and local level. The project is to involve all public sector HMAs, combat agencies and local governments which have responsibility for the various hazards, and will be consistent 'AS/NZS ISO 31000:2009' methodology.

As a part of the analysis of the State's sudden onset natural hazards, cyclone and flood are due for assessment in the fourth quarter of 2013 and are also expected to yield priority risks.

In response to the bushfire risk, work is underway in dealing with the complexities of multiple legislation covering fire prevention and suppression and also to reduce the risk of undertaking prescribed burning. In this regard, the OBRM has completed its first full year and aligned the prescribed burning risk management processes of DFES and DPaW to international best practice.

Over the year there has been continued and enhanced interagency cooperation between DFES, DPaW and other pertinent agencies in regards to fire prevention and suppression.

A new BRMP process is also due for piloting in 2014, designed to promote the development of bushfire risk management plans and associated treatments at the local scale.

Capability Assessment

The next incremental step for the State, in terms of building capacity, is to gain comprehensive reports from all EM stakeholders and to progress towards a more quantitative form of assessment and reporting, which requires calibrated rating scores for each capability area.

To gain calibration, a credible worst-case or credible near worst-case scenario may be generated from which EMAs test their capacity to perform. This consistent benchmark will allow year-to-year comparison of results and enhance the ability of the State to identify critical trends. Linking the risk assessment and capability processes will enable prioritisation of the most critical capabilities at the time. This will assist the State in identifying the greatest value-drivers of improvement on a year-by-year basis.

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08 APPENDICES

APPENDIX 1. EMERGENCY SITUATION DECLARATIONS

In 2012–2013, there was one Emergency Situation declared. This declaration was made by the Commissioner of the Department of Fire and Emergency Services, as the Hazard Management Agency for the hazard of cyclone. It was made on 25 February 2013, at 1700 hours, for the local government districts of Shires of Roebourne, East Pilbara, Ashburton, Port Hedland and Broome.

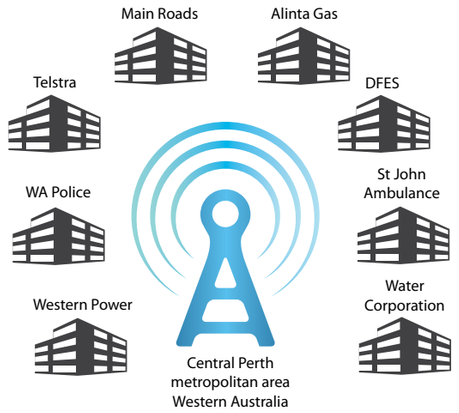
These local government districts were deemed to be directly in path of Tropical Cyclone Rusty and, as such, it was deemed that the emergency powers of Part 6 of the *Emergency Management Act 2005* were necessary to protect lives, property and the environment within these districts.

The Declaration remained in place for three days.

APPENDIX 2. COMMUNICATION PROJECTS CURRENTLY IN PROGRESS

PROJECT	DETAIL
NATIONAL PUBLIC SAFETY MOBILE BROADBAND	This project will develop a new nationally-interoperable mobile broadband capability for Australia's public safety agencies through a new high-speed mobile broadband capability. It will facilitate responses to emergency situations by providing access to real time video, data and maps. The Steering Committee is working with the Australian Communications and Media Authority (ACMA) as part of its review of the 805 to 890 MHz frequency band.
NATIONAL FRAMEWORK TO IMPROVE GOVERNMENT RADIO-COMMUNICATIONS INTEROPERABILITY	The National Coordinating Committee for Government Radio-communications (NCCGR) is coordinating the implementation of this project that was endorsed by CoAG on 7 December 2009. The framework provides a set of guiding principles and key areas of work to enhance government radio communications interoperability over the next 10 years.
WESTERN AUSTRALIAN REGIONAL MOBILE COMMUNICATIONS PROJECT	The Department of Commerce is responsible for the rollout of the $39.2 million Royalties for Regions program Regional Mobile Communications Project (RMCP). It will expand terrestrial mobile, voice and high speed wireless broadband services in regional, rural and remote areas of Western Australia. The RMCP infrastructure build commenced in January 2012 and the State Government is working closely with Telstra to fulfil contractual arrangements. Seventy-two sites have been commissioned, with a further 41 sites by mid–2014. WA Police has been appointed as the joint Emergency Services Organisation representative to liaise with Telstra to ensure maximum benefits are derived across agencies and projects.
WA COMMUNITY SAFETY NETWORK	This is a digital trunked radio network managed by WA Police on behalf of the State Government. It currently provides coverage throughout the Perth metropolitan area, extending north to Lancelin, east to Northam and south to Dunsborough. Coverage is now being extended by WA Police to cover Albany, Kalgoorlie, Geraldton and key towns in the Pilbara. The Community Safety Network (CSN) has many benefits including a robust and secure communication systems, improved network resilience, enhanced voice communication, and seamless interoperability with other agencies on the CSN. The CSN is currently used by WA Police and the Department of Corrective Services. The integration of DFES into this network is planned prior to commencement of the 2014–15 bushfire season. CSN will provide a secure control network radio capability within DFES to support incident operations. The WA Emergency Radio Network (WAERN) capability will be retained as it will form the command radio network for operational use. It will be the primary radio communications network for areas outside of CSN.

PROJECT	DETAIL
WA EMERGENCY RADIO NETWORK	This urban and rural based, interoperable radio network is used by DFES (all incident responders) and DPaW for incident dispatch, incident management and other daily tasks. The radio equipment used to access the network is also capable of direct radio communication (radio to radio) for interoperability between internal and external entities, including WA Police, DPaW, Volunteer Marine Rescue Services (VMRS) and RAC rescue helicopter. Radio communications capability is present in all DFES brigades, units and stations. WAERN is managed by DFES and interoperability will be enhanced with the addition of the digital CSN.
WA POLICE DIGITAL RADIO NETWORK ROLLOUT	The State–wide conventional digital radio network continues to be rolled out and will replace the current analogue police radio network.
WA LIFELINES RADIO NETWORK	Managed and supported by WA Police since 2002, this LifeLines Communications Back Up System provides basic communications to emergency services operation centres in the event of a major failure of communication networks. LifeLines, illustrated below, is designed to improve communication in emergencies when the traditional communication media are severely disrupted.



APPENDIX 3. SEMC CAPABILITY FRAMEWORK

CAPABILITY AREAS	30 CORE OBJECTIVES	
1. LEGISLATION, POLICY AND GOVERNANCE STRUCTURES	1.1	Legislation, Policy and Governance Structures
2. RISK ASSESSMENT AND RISK TREATMENT	2.1	Risk, Vulnerability and Hazard Identification and Assessment
	2.2	Risk Treatment Activities
3. RESOURCES	3.1	People
	3.2	Equipment and Infrastructure
	3.3	Finance and Administration
4. SHARED OWNERSHIP	4.1	Volunteering
	4.2	Public Education
	4.3	Community Involvement
	4.4	Resilience
5. OPERATIONAL PLANS AND PROCEDURES	5.1	Operational Response and Recovery Plans
	5.2	Training and Exercising of Plans
6. PUBLIC INFORMATION AND COMMUNITY WARNINGS	6.1	Public Information and Community Warnings
7. A MOBILE, CAPABLE AND COORDINATED RESPONSE	7.1	Command, Control and Coordination
	7.2	Effective and Interoperable Communication Systems
	7.3	Mobilisation
	7.4	Situational Assessment and Acquisition of Critical Resources and Services

CAPABILITY AREAS	30 CORE OBJECTIVES
8. RESPONSE AND RECOVERY SUPPORT SERVICES	8.1 Evacuation and Public Protection Measures
	8.2 Fatality Management Services
	8.3 Health and Medical Services
	8.4 Welfare and Social Services
	8.5 Essential Services and Critical Supplies
9. RECOVERY	9.1 Restoration of Local Services and Consumer Goods
	9.2 Infrastructure Recovery
	9.3 Psychosocial Recovery
	9.4 Economic Recovery
	9.5 Environmental Recovery
10. EVALUATION, KNOWLEDGE AND CONTINUOUS IMPROVEMENT	10.1 Evaluation
	10.2 Knowledge Management
	10.3 Continuous Improvement

APPENDIX 4. AGENCY CAPABILITY ASSESSMENT TOOL RESPONSES

The following agencies provided a response to SEMC Capability Framework Assessment Tool:

Hazard Management Agencies

Brookfield Rail Pty Ltd

Department of Agriculture and Food Western Australia

Department of Finance, Public Utilities Office

Department of Fire and Emergency Services

Department of Health

Department of Transport, Marine Safety

Public Transport Authority

WA Police

Combat/Support Organisations

Department of Child Protection

Department of Environment and Conservation

Department of Environment Regulation

St John Ambulance Australia, Western Australia

Other

Bureau of Meteorology

Department of Defence

Department of Education

Department of the Premier and Cabinet

Forest Products Commission

Horizon Power

Landgate

Main Roads

Water Corporation

Western Australian Local Government Association

Western Power

Local Governments

City of Albany

City of Armadale

City of Belmont

City of Fremantle

City of Joondalup

City of Kwinana

City of Rockingham

City of South Perth

City of Stirling

City of Wanneroo

Shire of Denmark

Shire of Katanning

Shire of Moora

Shire of Murray

Shire of Northampton

Shire of Roebourne

Shire of Wagin

Shire of West Arthur

Town of East Fremantle

APPENDIX 5. THE EMERGENCY MANAGEMENT FRAMEWORK

To manage the hazard potential, the State possesses an integrated emergency management framework developed under the *Emergency Management Act 2005* (the Act), which includes the establishment of committees, groups and councils, such as SEMC and the State Emergency Coordination Group as well as the State Disaster Council.

The Act prescribes that SEMC will develop policies to provide a strategic framework for emergency management in Western Australia and prepare emergency management plans. Hazards are defined both in the Act and the *Emergency Management Regulations 2006* (the Regulations) to include specific events. To date 26 hazards of natural and man-made origin have been included, as shown in Table 8.1.

Table 8.1 – Hazards

1. COLLAPSE	14. ROAD CRASH
2. CYCLONE	15. LAND SEARCH AND RESCUE
3. FLOOD	16. MARINE SEARCH AND RESCUE
4. EARTHQUAKE	17. RADIATION ESCAPE FROM A NUCLEAR POWERED WARSHIP
5. TSUNAMI	18. SPACE DEBRIS RE-ENTRY
6. FIRE	19. TERRORIST ACT
7. STORM	20. RAIL CRASH (PASSENGER NETWORK)
8. HAZARDOUS MATERIAL – CHEMICAL	21. RAIL CRASH – (FREIGHT NETWORK)
9. HAZARDOUS MATERIAL – RADIOLOGICAL	22. MARINE TRANSPORT EMERGENCY
10. HAZARDOUS MATERIAL – BIOLOGICAL	23. MARINE OIL POLLUTION
11. HUMAN EPIDEMIC	24. ENERGY SUPPLY DISRUPTION (GAS)
12. ANIMAL AND PLANT BIOSECURITY	25. ENERGY SUPPLY DISRUPTION (LIQUID)
13. AIR CRASH	26. HEATWAVE

The hazards are managed by the following designated HMAs:

- Commissioner of Police
- Fire and Emergency Services Commissioner
- State Human Epidemic Controller
- Agriculture Director General
- Public Transport Authority
- Brookfield Rail Pty Limited
- State Health Coordinator
- Marine Safety, General Manager
- Coordinator of Energy

For each of the prescribed hazards there is a State emergency management plan (or Westplan) which contains detailed arrangements, responsibilities and procedures for the various agencies or support groups involved in preparation and response. There are also eight Support Westplans, which although not hazard specific, provide for essential functions during an emergency event such as welfare and health services. For further effectiveness of emergency management, the State is divided into district and local areas. There are 14 emergency management districts State-wide (each with an emergency management committee) and 102 local emergency management committees largely aligned with their respective local government authority.

APPENDIX 6. ACRONYMS LIST

Acronym	Term in full
Act (also 'EM Act')	*Emergency Management Act 2005*
AIIMS	Australasian Inter-Service Incident Management System
ANZEMC	Australia New Zealand Emergency Management Committee
AWARE	All West Australians Reducing Emergencies program
BOM	Bureau of Meteorology
BRIG	Bushfire Review Implementation Group
BRMP	Bushfire Risk Management Planning
Bushfire CRC	Cooperative Research Centre for Bushfires
C3	Command, Control and Coordination
CaLD	Culturally and Linguistically Diverse
CEMO	Community Emergency Management Officer
CIMS	Crisis Information Management System
COAG	Council of Australian Governments
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DCPFS	Department for Child Protection and Family Services
DEC	Department of Environment and Conservation
DEMC	District Emergency Management Committee
DER	Department of Environment Regulation
DFES	Department of Fire and Emergency Services
DoT	Department of Transport
DPaW	Department of Parks and Wildlife
EM	Emergency Management
EMA	Emergency Management Agency
EM Act	*Emergency Management Act 2005*
FPC	Forests Products Commission
HMA	Hazard Management Agency
IMT	Incident Management Team
LEMA(s)	Local Emergency Management Arrangement
LEMC(s)	Local Emergency Management Committee
MIR	Major Incident Review
MoU	Memoranda of Understanding
NDRP	Natural Disaster Resilience Program

Acronym	Term in full
NDRRA	Natural Disaster Relief and Recovery Arrangements
NERAG	National Emergency Risk Assessment Guidelines
OBRM	Office of Bushfire Risk Management
PTA	Public Transport Authority
RFDS	Royal Flying Doctor Service
SEMC	State Emergency Management Committee
SEMP	State Emergency Management Policy
SES	State Emergency Service
SJA	St John Ambulance Australia
SOC	State Operations Centre
WALGA	Western Australian Local Government Association
WANDRRA	Western Australia Natural Disaster Relief and Recovery Arrangements
Westplan	State Emergency Management Plan

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