Major Incident Review of the Esperance district fires

Department of Fire and Emergency Services

8 March 2016
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## Glossary of acronyms

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<tr>
<td>AFAC</td>
<td>Australasian Fire and Emergency Service Authorities Council</td>
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<tr>
<td>AIIMS</td>
<td>Australasian Inter-service Incident Management System</td>
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<tr>
<td>BFB</td>
<td>Bush Fire Brigade</td>
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<tr>
<td>BGU</td>
<td>Brigades, groups and units</td>
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<tr>
<td>CASR</td>
<td>Civil Aviation Safety Regulations</td>
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<tr>
<td>COMCEN</td>
<td>Communication Centre</td>
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<tr>
<td>DEMC</td>
<td>District Emergency Management Committee</td>
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<td>DFES</td>
<td>Department of Fire and Emergency Services</td>
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<td>DoL</td>
<td>Department of Lands</td>
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<td>FES Commissioner</td>
<td>Fire and Emergency Services Commissioner</td>
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<td>HMA</td>
<td>Hazard Management Agency</td>
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<td>IAP</td>
<td>Incident Action Plan</td>
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<td>IBMC</td>
<td>Inter-agency Bushfire Management Committee</td>
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<td>IC</td>
<td>Incident Controller</td>
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<td>IMT</td>
<td>Incident Management Team</td>
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<td>ISG</td>
<td>Incident Support Group</td>
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<td>MIR</td>
<td>Major Incident Review</td>
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<tr>
<td>MOC</td>
<td>Metropolitan Operations Centre</td>
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<tr>
<td>MoU</td>
<td>Memorandum of Understanding</td>
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<td>Mt</td>
<td>Million tonnes</td>
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<tr>
<td>OASG</td>
<td>Operational Area Support Group</td>
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<td>OBRM</td>
<td>Office of Bushfire Risk Management</td>
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<tr>
<td>P&amp;W</td>
<td>Department of Parks and Wildlife</td>
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<tr>
<td>ROC</td>
<td>Regional Operations Centre</td>
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<tr>
<td>SEMC</td>
<td>State Emergency Management Committee</td>
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<tr>
<td>SES</td>
<td>State Emergency Service</td>
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<tr>
<td>SOC</td>
<td>State Operations Centre</td>
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<tr>
<td>UCL</td>
<td>Unallocated Crown Land</td>
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<tr>
<td>UMR</td>
<td>Unmanaged Reserves</td>
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<tr>
<td>USAR</td>
<td>Urban Search and Rescue</td>
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<tr>
<td>WA</td>
<td>Western Australia</td>
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<td>WAFES</td>
<td>Western Australia Fire &amp; Emergency Services</td>
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1 Executive Summary

The Department of Fire and Emergency Services (DFES) engaged the Nous Group (Nous) to conduct an independent major incident review (MIR) of the Esperance district fires, including the Cascades, Merivale and Cape Arid complex fires, which occurred in November 2015. The response to these incidents was jointly managed by DFES, the Department of Parks and Wildlife (P&W) and Local Government. This review is designed to identify key lessons in relation to how these agencies responded to and managed these incidents, and provide recommendations to improve the response to similar incidents in the future.

The Esperance district fires had a significant impact on the local community, including the tragic loss of four lives\(^1\), as well as widespread agricultural losses, 16 property losses and damage to public infrastructure. Those involved in developing this MIR extend our condolences to the local community, in particular the family and friends of those who lost their lives in the fires.

A number of contextual factors contributed to the intensity of the Esperance district fires. Changes in farming practices in the Esperance region have resulted in more widespread and higher yield cropping areas, creating higher fuel loads across a larger area prior to harvest. Weather conditions over the preceding winter and spring had contributed to high and combustible fuel loads, including higher crop yields. Adverse weather conditions in November 2015 resulted in a high level of fire activity across the southern part of Western Australia (WA). In the Esperance region, catastrophic weather conditions on 17 November resulted in a significant escalation of the Cascades, Merivale and Cape Arid fires, including the major run of the Cascades fire. These conditions resulted in challenging fire behaviour, with the Cascades fire in particular having unusually high intensities and rates of spread for a grassland fire. It is thought to be the hottest grassland fire in WA’s recorded history, and possibly in Australia’s recorded history.

Notwithstanding the significant impact of the fires, and in particular the tragic loss of life, the response to the Esperance District fires was perceived to be broadly well managed, given the scale of the incident, unpredictable fire behaviour and extreme conditions experienced during the fire. It is unlikely that the Cascades fire could have been prevented from breaking out onto farmland, given the time and resources available and the catastrophic weather conditions. The Cascades fire is universally believed to have been unstoppable for the 4-5 hours of its major run through farmland, until weather conditions improved.

Nevertheless, the experience of the Esperance district fires provides a valuable opportunity to improve the management of future fire incidents. The MIR makes three overarching findings in relation to the management of the Esperance district fires, these are:

- **It was difficult to mobilise and maintain the initial response because the fires occurred in remote areas.** Esperance is in a remote part of WA, with limited government agency resources dedicated to fire management. This means that there are not enough government officers in place to staff an Incident Management Team (IMT) for a significant fire. The pattern of fires and predicted adverse weather conditions across the state meant that external resources were initially not available, and when they were deployed the remoteness of the fires meant it took time to get them in place. As a result, the IMT was under-resourced during the escalation of these fires, which impacted on its effectiveness. While this had a significant personal impact on those responsible for managing the initial response, the lack of resources is unlikely to have changed the overall outcomes of the fires.

\(^1\) Please note this MIR does not discuss the four fatalities. As at the date of this MIR, fatalities resulting from the Esperance district bushfires are being investigated by the coronial inquest into the same incident.
• **While regional support was strong, the ability of the State Operations Centre (SOC) to support the response was compromised by system and process failures.** The response to a major fire incident requires support at the regional and state level, particularly in coordinating resource requirements. However, some issues with sharing of information between agencies resulted in the SOC being unable to maintain a strategic overview of state-wide fire activity and resource requirements. The challenge in understanding strategic resource requirements was exacerbated by insufficient people in key management roles in the SOC and IMT. In contrast, regional agencies worked well together to support the response through the Regional Operations Centre (ROC), district emergency management arrangements and inter-agency liaison groups.

• **Despite these resourcing challenges the response was generally well managed, although there are some clear areas for improvement.** The Cascades and Merivale fires started on Unallocated Crown Land (UCL), for which responsibility for managing fire is diffused across multiple agencies. Mitigation on UCL outside of townsites is the responsibility of P&W, whereas response is the responsibility of Local Government, creating discontinuity in managing fire. Communications infrastructure was unreliable, which led to information gaps between the fireground and IMT. There were also a number of reoccurring issues with systems and processes that have been identified in previous reviews that continue to frustrate the response to fire.

The most significant findings of the MIR relate to managing resources in remote locations, in the context of increasing risk posed by bushfires. This raises questions about how government agencies must work together to most effectively use available resources to manage fire. The MIR makes three overarching recommendations, each with three specific elements:

**Figure 1: Summary of recommendations**

<table>
<thead>
<tr>
<th>Recommendation 1: A unified and integrated fire sector across the whole fire hazard</th>
<th>Recommendation 2: Resourcing models appropriate to local needs, including fire risk and remoteness</th>
<th>Recommendation 3: Resolve reoccurring issues with systems and processes</th>
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<tr>
<td>1.1 Coordinated and targeted mitigation of fire risk</td>
<td>2.1 Structures to incorporate local knowledge and situational awareness into the fire response</td>
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<td>1.3 Review of institutional arrangements in the fire sector</td>
<td>2.3 Appropriate and scalable resourcing models for remote locations</td>
<td>3.3 Live resource tracking system that can be used by all response agencies</td>
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These recommendations reflect opportunities for improvement that are known across the fire response agencies, and have been highlighted in previous major incident reviews in WA. In most of these areas, attempts have already been made to address the issues, both by individual agencies and through the Inter-agency Bushfire Management Committee (IBMC). However, the experience of the Esperance District fires indicates that there is still further work to be done. The fire response agencies, in particular DFES, P&W and Local Government, must take a collaborative and active approach to addressing opportunities for improvement. Successful implementation of the recommendations will require dedicated resources from all of the agencies with responsibilities for managing fire. Ultimately, this will improve the ability of the WA fire sector to manage future major fire incidents.
Methodological approach to the MIR of the Esperance District fires

The MIR is intended to provide a factual assessment of the management of the WA fire sector’s management of the incident, and from this to identify practical recommendations that can strengthen the WA fire sector’s capacity to manage future major fire incidents. The objective of this MIR as stated by DFES is to understand the aspects of the event that worked well and should be built on and highlight any issues that can be improved upon. In particular, the MIR will address the following:

- understand and document the context of the incident
- the effectiveness of the Incident Management Team’s decision making and timeliness to coordinate and manager operational activities
- the effectiveness of Command, Control, Coordination and Communication at Incident, Regional, State and Agency Level
- the compliance of responding agencies with relevant legislation, policies, endorsed actions and measures, agency plans and associated procedures and guides
- the effectiveness of operational horizontal and vertical communications from the incident ground through and across all operational levels
- the effectiveness and timeliness of communicating situational awareness across agencies.

The MIR used a combination of desktop review and stakeholder consultation (including single and group interviews, focus groups and workshops) to inform the findings and recommendations of the MIR of the Esperance District fires. The use of multiple data sources enabled a comprehensive understanding of the management of the fires from which to develop robust findings and recommendations. The MIR reviewed documents and materials that could usefully inform the MIR of the Esperance District fires. This included the following documents:

- Relevant state policies and legislation, including the Bush Fires Act, the State Emergency Management Plan Westplan – Fire, State Emergency Management Policies, and IBMC\(^2\) endorsed actions and measures.
- Departmental specific policies and procedures, including the DFES Western Australian Fire & Emergency Services (WAFES) Manual and Operational Directives and P&W policies
- Incident documentation, such as Incident Action Plans (IAPs) and associated documents, Regional Situation Reports, meeting minutes
- Records and attachments from the WebEOC Information Logs and Request Logs\(^3\)
- Written submissions received from agency personnel and volunteers associated with the response
- Information relating to the bush fire risk conditions, such as mitigation measures, information on land use practices, and weather conditions.

\(^2\) The IBMC includes representation from DFES, P&W, the OBRM, WALGA and WA Police.

\(^3\) WebEOC is a web-enabled system used for incident management by DFES, WA Police and the Department of Health. In 2008, SEMC endorsed the use of WebEOC as the preferred crisis information management system for emergency management agencies in WA. Currently, DFES uses the Information Log, the Request Log, the State Preparedness Board and the Incident Action Plan. WebEOC is used to facilitate vertical communication of situational awareness, operational information and resource requirements between the IMT, ROC/MOC and SOC.
The desktop review was partially completed prior to the stakeholder consultation to provide a baseline understanding of the context of the incidents and to guide stakeholder consultation. Areas of interest revealed through stakeholder consultation were then investigated through further desktop review.

Stakeholders to be consulted for the MIR were identified through DFES, P&W and Local Government representatives. Face to face consultations with stakeholders were held in Albany, Esperance and Perth, with telephone consultations held as required. The groups of stakeholders consulted included:

- **State Operations Centre (SOC)**: A focus group was held with DFES personnel involved in the SOC and further interviews were held with DFES and P&W personnel involved in the SOC and related state level DFES functions.
- **Regional Operations Centre (ROC)**: A mixture of focus groups and interviews were held with DFES and P&W personnel involved in the Great Southern and Lower South West ROCs.
- **Incident Management Team (IMT)**: A mixture of focus groups and interviews were held with DFES, P&W and Local Government personnel involved in the IMT.
- **Firefighting response**: A mixture of focus groups and interviews were held with people involved in the firefighting response, including volunteers and volunteer association representatives. Written feedback from volunteers was also provided through volunteer associations and through DFES District Officers.
- **Inter-agency coordination groups and support agencies**: A mixture of focus groups and interviews were held with members of the combined Incident Support Group (ISG) and Operational Area Support Group (OASG), and with support agencies identified through the All Hazards Liaison Group.
- **Local government**: A focus group was held with Local Government representatives.
- **Office of Bushfire Risk Management (OBRM)**: An interview was held with the OBRM.

In addition to stakeholder consultation, briefings were provided to the DFES Deputy Commissioners and to a cross-agency reference group (consisting of DFES, P&W, Local Government and State Emergency Management Committee (SEMC) representatives) at key points in the MIR to test the emerging themes and key findings.

A complete list of the agencies and organisations that provided input to the MIR is contained in Appendix C.

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4 The SOC maintains overall command, control and coordination of resources, maintains an overview of available resources and maintains a strategic overview of the resourcing requirements and incident activity across the state. (DFES, WAFES Manual Part Three: State Operations Centre)

5 The ROC coordinates operational resources at a regional level (DFES, WAFES Manual Part Five: Regional Operations Centre). The Esperance District fires were coordinated through the Great Southern ROC in Albany.

6 An IMT is a group of incident management personnel led by the incident controller, who are responsible for the overall management of an incident. (SEMC, Incident Management: State Emergency Management Policy No.4.1, 2013)
2 The Esperance district fires occurred under catastrophic weather conditions and had a significant impact on the local community

The Esperance district fires in November 2015 consisted of two fires and a fire complex: the Cascades fire (128,000 hectares), the Merivale fire (18,000 hectares), and the Cape Arid complex (164,000 hectares).\(^7\) The fires had a significant impact on life, property, the environment and the community. There were four fatalities, as well as widespread agricultural losses, 16 property losses and damage to public infrastructure. In the Cape Arid complex, significant areas of the Western Ground Parrot habitat were burnt.

A number of contextual factors contributed to the intensity of the Esperance district fires. Changes in farming practices in the Esperance region have resulted in more widespread and higher yield cropping areas, resulting in higher fuel loads across a larger area prior to harvest. Longer term climatic changes in Esperance have likely increased the risk of bushfire. In the shorter term, weather conditions over the preceding winter and spring had contributed to high and combustible fuel loads, including higher crop yields.

Adverse weather conditions in November 2015 resulted in a high level of fire activity across the southern part of WA, with over 40 fires recorded by DFES regions on 15 November. There were three fires of concern in the Esperance area: Cascades, Merivale and the Cape Arid complex. Containment efforts were undertaken by local brigades with support from DFES and P&W personnel, however catastrophic weather conditions on 17 November resulted in a significant escalation of these fires, including the major run of the Cascades fire. These conditions resulted in challenging fire behaviour, with the Cascades fire in particular having an unusually high intensity and rate of spread for a grassland fire. It is thought to be the hottest grassland fire in WA’s recorded history, and possibly in Australia’s recorded history.

This section describes the contextual factors that increased the risk of bushfire in Esperance and the chronology of the Esperance District fires from the time of ignition on 15 November to the point of transition of control on 26 November for all fires back to Local Government (for the Cascades and Merivale fires) and P&W (for the Cape Arid fires).

2.1 Changes in land use combined with weather conditions had increased the risk of bushfire in the Esperance district

There are three contextual factors that increased the risk of bushfire in the Esperance district prior to November 2015:

- changes in farming practices
- longer term climatic changes
- seasonal weather patterns.

\(^7\) Size of fires when the Esperance District incident was downgraded to Level 1 on 25 November. By this time, the Cascades and Merivale fires were contained and controlled, but the Cape Arid complex was still uncontained and uncontrolled.
Each of these contextual factors is discussed in the following section.

**Changes in farming practices in the Esperance region have contributed to the increased risk of bushfire**

The economy of the coastal part of the Goldfields-Esperance region is based on agriculture, fisheries, mining (in Ravensthorpe) and tourism. Agriculture is therefore the predominant land use by area. Between 1990 and 2000 the Esperance region experienced an increase of 50% in the total cropped area and a move away from livestock farming. For example, the number of sheep in the Esperance region has decreased over the past two decades by 45-65%.

Previously, paddocks with livestock acted as natural fire breaks due to lower fuel loads, whereas cropped areas are more combustible prior to harvest. Post-harvest, stubble is retained to reduce soil erosion which maintains a combustible ground cover and increases fuel load in pre-harvest fields.

Crop yields in the Esperance region have increased, reflecting improvements in farming practices such as a significant increase (75-100%) in water use efficiency (amount of grain produced per mm of total water used), which is amongst the highest in Australia. Collectively, these changes in land use mean greater fuel loads across a larger area. This increases the risk posed by bushfire.

The 2015 harvest was shaping up to be an above average year for crop farmers in the Esperance district. Local people reported yields of up to 5 tonnes per hectare, which was estimated to be around 40-50% harvested at the time of the fires. The Esperance port zone had received approximately 2.35 million tonnes (Mt) of grain as of January 2016 for the 2015 harvest, despite the losses from the fire and wind in November. In comparison, the average for the five previous harvests was 1.8 Mt. These changes were consistently cited by local people as contributing to increased risk of bushfire.

The Esperance region has experienced a shift towards consolidation of farms, with fewer farmers managing larger areas. This reflects a national trend, with a decrease in the number of grain farms from 40,000 to 27,000 between 1980 and 2010. Whilst this might reduce risk to life and property, it also means fewer local fire responders and potentially less mitigation work being done on private farmland.

**Longer term climatic changes in Esperance have likely increased the risk of bushfire**

A hotter climate in the south west of WA has resulted in more severe, hot days and drier conditions. This has been linked to an increase in lightning strikes, some of which ignite fires, as well as greater likelihood of adverse weather conditions that contribute to escalating intensity of fires.

Consistent with the trends observed throughout Australia, temperatures in the Esperance region have risen by approximately 1 degree over the past one hundred years. However, evidence of long term changes in rainfall is mixed, with a reduction of up to 10mm per decade since 1910, but an increase at a similar rate since 1970.

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10. Australian Export Pannell, Economists’ thoughts on WA broadacre farming toward 2020, Institute of Agriculture Forum, 2009
12. Data from CBH Group, provided by Department of Agriculture and Food WA
16. Bureau of Meteorology, Meteorological Aspects of the Esperance District Fires, November 2015, 2016, p. 2, and additional information provided by Bureau of Meteorology
Seasonal weather patterns in Esperance also increased the risk of bushfire for the 2015-16

Seasonal weather patterns in the Esperance region in 2015 combined above average winter rainfall, creating optimum conditions for vegetation growth, followed by an unusually dry and warm spring. For example, Salmon Gums Research Station, around 100km north of Esperance town, reported its highest winter rainfall in 88 years; and a number of sites in the Esperance region experienced their warmest spring on record.16

The winter weather patterns resulted in greater vegetation growth with high potential fuel loads in and around the Esperance region. Subsequently, the spring weather resulted in the vegetation growth becoming very dry. The fuel curing, which is the measure of dead material in a grassland environment, was recorded at 100% in the Esperance Shire Coast and Esperance Shire Inland Fire Districts in the lead up to and during the fires17,18 indicating that the vegetation was dry and combustible. Combined with the above average anticipated harvests of 2015 (with crop yields reported to up to 5 tonnes per hectare), this created high and combustible fuel loads. High fuel loads were also observed on road verges.

The high fuel loads were compounded by significantly drier soil conditions than the last five seasons, as measured by the Keetch-Byram Drought Index and the Soil Dryness Index. This meant that a combination of significantly drier soil conditions and a high percentage of dead vegetation increased the risk of bushfires in the Esperance region and across the state. This heightened risk of bushfire was forecast in November 2015.

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18 A curing value of 0% represents totally green vegetation and 100% represents totally dry vegetation.
2.2 Adverse weather conditions resulted in numerous fires across southern WA, including the Cascades, Merivale and Cape Arid fires in the Esperance region

The movement of a weather system across the state over 14-15 November resulted in a high level of fire activity, including numerous fires in the Great Southern region and the Esperance district. By the evening of 15 November, there were two fires in the Esperance district that continued to be of concern: the Cascades and Merivale fires. The pattern of fires across the state, in the Great Southern region and in the Esperance district over 14-15 November is discussed in the following section.

**There was a high level of fire activity across the southern part of WA over 14-15 November**

Over the weekend of 14-15 November 2015, the movement of a trough system in an easterly direction over the southern part of WA brought a band of thunderstorms that ignited fires across a large area. This resulted in a high level of fire activity across the southern part of WA, with over 40 fires recorded by DFES regions on 15 November (see Figure 3).  

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19 Bushfire and Natural Hazards Cooperative Research Centre, *Hazard Note 12*, November 2015. An above normal bushfire potential indicates that resources within the region will be insufficient to fight a bushfire, and additional resources from other areas will be required.

20 DFES, *Situation Reports Per Region*, 15 November 2015
Stakeholders from DFES and P&W reported that this was an unusually high level of fire activity at this early stage of the fire season. In addition to bushfires ignited across the state, there were also over 40 prescribed burns in process. Many of these prescribed burns had been running over the prior week, leading to fatigued crews coming into the high fire activity of 14-15 November. Consequently, there was an exceptional demand on fire agencies, including volunteer brigades, and competition for resources across the state. With the majority of fires occurring in the more densely populated parts of the state, in particular the Perth metropolitan area and South West region, demand for firefighting resources was highest in these regions. Fire activity continued to be high across the state throughout the period of the Esperance District fires, including the Mt Solus fire, which was ignited on 15 November, and a fire north of Yanchep that was ignited on 22 November.

**Fire activity was also high across the Great Southern region**

On 15 November there were 29 incidents recorded by DFES across the Great Southern region. These included:

- 10 fires in the Shire of Esperance (managed by local individuals and brigades);
- four fires in the Shire of Plantagenet (managed by local brigades);
- four fires in the Shire of Boddington (managed by local brigades);
- one fire in a remote area near Mt Holland in the Shire of Kondinin (managed by DFES);

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21 Maps provided by DFES Spatial Services team and P&W Fire Management Services Branch, based on data from DFES and P&W records

22 Reported in consultation with P&W personnel
nine fires in Albany (seven of which managed by local brigades and two managed by P&W);\textsuperscript{23}

one fire in Mt Solus (managed by P&W).\textsuperscript{24}

By the end of the day on 15 November, most of the fires in the Great Southern region had been largely contained and were being mopped up. A small number of fires remained uncontained, including the fire in the remote area near Mt Holland, two fires in Albany, two fires in Esperance\textsuperscript{25} and the fire in Mt Solus, which was being managed by P&W.\textsuperscript{26} These remaining fires were dispersed across the Great Southern region, with the fires in Albany of particular concern due to their proximity to communities.

**Two of the fires in the Esperance district were still of concern by the evening of 15 November 2015**

By the evening of 15 November, eight of the fires ignited by lightning in the Esperance district had been contained by local brigades. There were two fires that continued to be of concern: the Cascades and Merivale fires.

Figure 4: Uncontained bushfires in the Great Southern region on 16 November\textsuperscript{27}

The Cascades fire, which had started on UCL in the Lake Mends area, was still active on the evening of 15 November, with weather conditions for 16 November predicted to be favourable to ongoing containment efforts. The risk posed by the Cascades fire was identified as significant, however P&W

\textsuperscript{23} DFES, Great Southern Regional Situation Report, 15 November 2015

\textsuperscript{24} DFES, Southwest Regional Situation Report, 15 November 2015

\textsuperscript{25} DFES, Great Southern Regional Situation Report, 15 November 2015

\textsuperscript{26} DFES, Southwest Regional Situation Report, 15 November 2015

\textsuperscript{27} Maps provided by DFES Spatial Services team, based on data from DFES and P&W records
considered that the Perth Hills Complex, which consisted of six fires in the Mt Solus area, posed a greater risk overall.  

The Merivale fire, near Lake Doombup, was also still active on the evening of 15 November. Protection of private properties within the Stockyard Creek area was deemed to be the priority.  

Both the Cascades and Merivale fires were categorised as a Level 1 incident at this stage and under the control of Local Government. DFES and P&W provided support from the P&W office, including support with developing containment strategies and aerial intelligence.  

There was no report yet of fires in the area of the Cape Arid National Park.

### 2.3 While response strategies were put in place, the catastrophic weather conditions of 17 November resulted in a significant escalation of these fires

Over 16 November, local brigades undertook initial response strategies for the Cascades and Merivale fires, with the support of local DFES and P&W personnel. By the end of the day, the Cascades and Merivale fires had not yet been contained. However, local agency personnel and volunteers were confident that the strategies would be successful in containing the fires, taking into account the predicted adverse weather conditions for the following day.  

However, catastrophic weather conditions on 17 November resulted in a significant escalation of the fires, including the major run of the Cascades fire. Under these adverse weather conditions, fire suppression strategies were not possible. The Cascades and Merivale fires were transitioned to DFES control under a Section 13 declaration (at 12.30pm) and the upgrading of the incident to Level 3 (at 7.20pm). At the same time, P&W were responding to fires in Cape Arid National Park, which were then brought under the management of a single multi-agency IMT on 19 November. The Esperance District fires remained active and were managed by the multi-agency IMT until transitioning back to local government and P&W control on 26 November.  

This section describes the chronology of the Cascades, Merivale and Cape Arid complex fires from 16 November to the point of transition of control on 26 November for all fires back to Local Government (for the Cascades and Merivale fires) and P&W (for the Cape Arid fires).

**Initial response strategies were put in place for the Cascades and Merivale fires on 16 November**  

Over the course of 16 November, the response to the Cascade and Merivale fires remained under the control of Local Government, and local brigades continued to undertake containment efforts with the support of an IMT consisting of four DFES and P&W personnel based in Esperance. Both fires were considered to pose a risk, as they were both in difficult to access terrain. It was thought that the Merivale fires constituted the highest risk due to a greater potential to impact life and property on the east and west sides of the fire. Consequently, a member of the local brigade visited seven properties which were identified as being at risk in the Merivale area, and the residents of all properties bar one agreed to leave.

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28 DFES, DFES PaW Liaison Officer Situation Report 2, 17 November 2015  
29 A Level 1 incident is characterised by being able to be responded to and managed by local resources, having a low level of complexity and having a relatively minor impact on the community. See Appendix A for a full description of incident levels.
The Cascades fire was burning in a complex lake system, close to Lake Mends. Local brigades, supported by DFES and P&W, applied three containment strategies\(^3\) to the Cascades fire:

1. secure the fire edge with mineral earth breaks using two private machines
2. re-treat existing fuel modifications on the UCL / private property interface
3. landowners on the private property interface to harvest crop and construct mineral earth breaks

For the Merivale fire, the strategy was to strengthen existing containment lines using a strategic boundary to the east of the fire.

Fires were reported in the Cape Arid region on the afternoon of 16 November. These fires quickly escalated through long unburnt fuels (age predates record-keeping in area) in a north-east direction. P&W crews were deployed to investigate the situation.

The incident response on 16 November was predominantly undertaken by local volunteer brigades and various private appliances, including machinery sourced from farmers. P&W also supported the fireground response with around six personnel and one appliance, initially at the Merivale fire but later in the afternoon redeployed to investigate the Cape Arid fires.

Local agency personnel and volunteers had been confident that the strategies would be successful in containing the fires, taking into account predicted adverse weather conditions for the following day. By the afternoon of 16 November, however, the Cascades and Merivale fires had not yet been contained. The remoteness of the Cascades fire meant that it took time for machinery to arrive at the fireground. A machine also got caught in the boggy terrain of the lakes system. The terrain of the Merivale fire also presented challenges, with razorback sand dunes systems making it difficult for crews to consolidate a strategic boundary. As a result of the delays in completing the containment strategies, DFES issued bushfire alerts for both fires. A Bushfire Advice\(^3\) alert was issued for the Stockyard Creek and Mullet Lake areas in Merivale at 4.05pm; and a Bushfire Advice alert was issued for North Cascade at 4.15pm.

Alongside the local response to fires on 16 November, preparations were being undertaken at the regional level by the ROC. Adverse weather conditions were predicted for the following day, with a catastrophic fire danger forecast\(^3\) initially for the Roe sub-district, and later shifting to the Esperance Shire Inland district.\(^3\) A total fire ban for the entire Great Southern Region was declared, to be implemented from midnight, and communicated to all Shires in the region. The Great Southern Region also assembled a Level 2 IMT in Narrogin on 16 November.

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\(^3\) Documented in partial IAPs completed by DFES on 15 November.

\(^3\) A Bushfire Advice alert indicates that “a fire has started but there is no immediate danger” (DFES website – warning systems)

\(^3\) ‘Catastrophic’ fire conditions are considered the worst conditions for a bush or grass fire. A fire that starts in ‘catastrophic’ fire conditions is extremely hard to control and takes significant firefighting resources and cooler conditions to manage.

\(^3\) The routine Emergency Services Weather Briefing issued on 16 November at 10.50am forecast catastrophic fire danger for the Roe sub-district, and isolated catastrophic conditions possible throughout the Great Southern and Central Wheat Belt districts for 17 November. An additional non-routine Emergency Services Weather Briefing was issued later that day at 5.05pm, forecasting catastrophic fire danger for the Esperance Shire Inland district. This is consistent with the Fire Weather Warning issued by the Bureau of Meteorology at 3.05pm on 16 November, which forecast catastrophic fire danger for Esperance Shire Inland.

\(^3\) A Level 2 incident is characterised by requiring a multi-agency response, and being more complex in terms of size, resources, risk and/or community impact than a Level 1 incident. See Appendix A for a full description of incident levels.
Catastrophic weather conditions on 17 November resulted in a significant escalation of the fires, including the major run of the Cascades fire

Figure 5: Esperance district bushfires on 17 November

Cascades fire shape is as of 17 November 5.07pm; Merivale and Cape Arid fire shapes not available for 17 November.

As anticipated, the Esperance region experienced catastrophic weather conditions on the afternoon of 17 November. This resulted in a significant escalation of the fires, including the major run of the Cascades fire. Under these adverse weather conditions, fire suppression strategies were not possible. In response to the expected weather conditions, Local Government implemented harvest and vehicle movement bans for the west zone of the Shire of Esperance at 8.00am, extending to the whole Shire by 11.30am. Local farmers were notified of the bans by SMS. This restricted vehicles from moving through crop and reduced the risk that the operation of machinery would spark further fires.

The management of the Cascades and Merivale fires transitioned to DFES after a Section 13 declaration was made at 12.30pm, which appointed a DFES officer as Incident Controller (IC). The Cape Arid fires remained under the control of P&W, with personnel working on plans for managing the fire, but with no suppression activity taking place given the weather conditions.

Catastrophic weather conditions

Catastrophic weather conditions were anticipated for 17 November in the Esperance district, with high temperatures, high wind speeds and low humidity.

A spot fire weather forecast was issued for Lake Mends (in the vicinity of the Cascades fire) early on 17 November, forecasting conditions to peak at 3pm with temperatures of 42 degrees, relative humidity of 6% and winds of 40km/h gusting to 60km/h. In the event, however, winds were measured to be

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35 Maps provided by Department of Fire and Emergency Services Spatial Services team, based on data from DFES and P&W records
36 DFES, Great Southern Regional Situation Report, 17 November 1600hr
37 Bureau of Meteorology, Spot Fire Weather Forecast for Lake Mends, issued at 05:26am Tuesday 17 November 2015
consistently 50-60 km/h during the afternoon, with wind gusts up to 70-80 km/h.\textsuperscript{38} As predicted, temperatures reached above 40 degrees by the afternoon.

Challenging weather conditions were also experienced for the Merivale fire over 17 November. By 1.00pm, the temperature in the Merivale area was 38 degrees, relative humidity was between 15% and 20%, and winds were from the north-west of around 30 km/h gusting to 40 km/h. The NW winds increased through the afternoon to around 45 km/h.

In the Shire of Esperance, the following weather conditions were observed at various points during the day (see Figure 6).

**Figure 6: Weather conditions in Esperance on 17 November\textsuperscript{29}**

<table>
<thead>
<tr>
<th>Location</th>
<th>Time</th>
<th>Temperature (degrees)</th>
<th>Wind speed (km/h)</th>
<th>Gust speed (km/h)</th>
<th>Grassland fire danger index</th>
<th>Forest fire danger index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esperance town</td>
<td>3.30pm</td>
<td>40.7</td>
<td>46</td>
<td>70</td>
<td>180</td>
<td>116</td>
</tr>
<tr>
<td>Cascades</td>
<td>12.50pm</td>
<td>41.3</td>
<td>42</td>
<td>53</td>
<td>181</td>
<td>143</td>
</tr>
<tr>
<td>Scaddan</td>
<td>1.00pm</td>
<td>41.2</td>
<td>34</td>
<td>52</td>
<td>175</td>
<td>140</td>
</tr>
</tbody>
</table>

Based on the observed weather conditions on 17 November, the fire danger rating was considered to be well beyond the threshold for classification as ‘catastrophic’. The threshold for a catastrophic classification is a fire danger index of 100 or higher, however the McArthur Grassland Fire Danger Index for the fires peaked at 222 at around 3pm. This indicates that the conditions were among the most severe ever experienced in southern Australia.\textsuperscript{40}

**Cascades fire behaviour**

**Cascades fire: sequence of events on 17 November**

*Prior to ~11.00am: Fire burns SE in UCL under relatively benign weather conditions*

~11.00am: Fire moves rapidly SE under strong NW winds

11.30am: Bushfire Advice alert re-issued

~11.45am: Fire crosses from UCL to private property on Ned’s Corner Road

12.30pm: Management of the fire transferred to DFES under Section 13

1.10pm: Bushfire alert upgraded to Watch and Act

3.30pm: Cascades fire upgraded to Level 2 incident

~3.50pm: Fire crosses Griggs Road, leading to four fatalities

~5.00pm: Fire crosses the Coolgardie Esperance Highway at Scaddan

5.50pm: Bushfire alert upgraded to Emergency Warning

~5.00pm-7.00pm: Wind shifts to SW alongside easing weather conditions

7.20pm: Incident declared Level 3

\textsuperscript{38} N Burrows, Fuels, Weather and Behaviour of the Cascade Fire (Esperance Fire #6) 15-17 November 2015, 2015, p. 8

\textsuperscript{39} DFES, Bush Fire Investigation Report - Cascades, 2015, p. 0

\textsuperscript{40} N Burrows, Fuels, Weather and Behaviour of the Cascade Fire (Esperance Fire #6) 15-17 November 2015, 2015, p. 9
Over the morning of 17 November, the Cascades fire continued burning in the bushland on UCL resulting in an estimated 5km long fire front. There were strong winds from the north-west by around 11am, resulting in multiple flare ups of the fire as it moved in a south-east direction towards private property. Crews reported seeing the fire jump across a lake that would represent a distance of 200m-400m. A Bushfire Advice alert for North Cascade was re-issued by DFES at 11.30am. Under the extreme fire conditions, at around 11.45am the Cascades fire jumped across fuel modification breaks on the interface of UCL and private property, which consisted of substantial pre-existing scrub rolling and other fuel treatment. The fire moved rapidly once it had entered private property, further encouraged by the relative dryness of the fuel in the area, as well as the high fuel loads on farmland. The bushfire alert for North Cascade was upgraded to a Watch and Act alert\(^{43}\) at 1.10pm. The Cascades fire was upgraded to a Level 2 incident at 3.30pm.

During its major run over the afternoon of 17 November, the Cascades fire is estimated to have moved at a rapid rate of spread of up to at 15 km/h, and estimated to have travelled approximately 70 km over a five hour period, crossing the Coolgardie Esperance Highway at around 5.00pm.\(^{44}\) An Emergency Warning\(^{45}\) was issued at 5.50pm for North Cascade, and the fire was upgraded to a Level 3\(^{46}\) incident at 7.20pm. By late afternoon the wind shifted from north-west to south-west, and by 8.00pm had eased to around 20 to 30km/h. The wind shift resulted in multiple fingers emerging on the northern flank of the fire, but the easing weather conditions prevented this from becoming a wide head fire. By the end of 17 November, the Cascades fire had burned an area of around 118,000 hectares.

Over the afternoon of its major run south-east on 17 November, the Cascades fire is estimated to have reached an intensity of around 45,000 kW/m.\(^{47}\) It is thought to be the hottest grassland fire in WA’s recorded history, and possibly in Australia’s recorded history.\(^{48}\) This intensity of fire behaviour far exceeds the threshold for effective suppression, with direct attack unlikely to succeed for grassland fires above 5,000 kW/m and indirect attack likely to fail for grassland fires above 8,000 kW/m.\(^{49}\) Given that direct and indirect attack strategies were no longer possible, the response strategies were focused on protection of life, such as warning properties of the danger.

During the afternoon period of the major run of the Cascades fire, four fatalities occurred on Griggs Road in Scaddan.\(^{48}\) There were multiple residential, commercial and storage property losses, damage to infrastructure, and agricultural losses to infrastructure, crops and stock. The fire also impacted on the Coolgardie Esperance Highway. Sections of the Coolgardie Esperance Highway, West Kalgoorlie Esperance rail line, Mount Burdette and Salmon Gums Repeaters, Worley Parsons Gas Pipeline and three public schools were deemed to be at risk and roads were closed. Two assisted evacuations were

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\(^{43}\) A Bushfire Watch and Act alert indicates that “A fire is approaching and conditions are changing, you need to leave or prepare to actively defend to protect you and your family” (DFES website – warning systems)


\(^{45}\) A Bushfire Emergency Warning indicates that “you are in danger and you need to take immediate action to survive as you will be impacted by fire” (DFES website – warning systems)

\(^{46}\) A Level 3 incident is characterised by being protracted, large and resource intensive. They typically require significant coordination of multi-agency resources, and have high levels of complexity and community impact. See Appendix A for a full description of incident levels.

\(^{47}\) DFES, *Bush Fire Investigation Report - Cascades*, 2015, p. 9. Based on assumptions of 6 t/ha and 15.3 km/h rate of spread in natural grass, which equates to 45,900 kW/m.

\(^{48}\) Discussed in stakeholder consultations with P&W personnel. While this is extreme fire intensity for a grassland fire, it is less extreme than major forest fires. Severe forest fires can burn at intensities of over 100,000 kW/m.

\(^{49}\) Based on Muller, *Report on a Bush Fire Threat Analysis for Western Australia*, 2008, as presented in the *Guide and Tables for Bushfire Management in Western Australia*, 2011.

\(^{49}\) Please note this MIR does not discuss the four fatalities. As at the date of this MIR, fatalities resulting from the Esperance district bushfires are being investigated by the coronial inquest into the same incident.
undertaken from Salmon Gums and Grass Patch: one on the evening of 17 November north to Norseman, and a second later that night south to Esperance.

**Merivale fire behaviour**

Under strong north-west winds, high temperatures and low humidity, the Merivale fire moved rapidly in a south-east direction. A Bushfire Advice alert for the Merivale Fire was re-issued at 11.25am and upgraded to a Watch and Act at 11.55am. At 3.30pm, the Merivale fire was upgraded to a Level 2 incident. The forecast wind change from the north-west to the south-west was expected to put residential properties at risk. Once the wind had shifted at around 6.00pm, the fire moved rapidly in a north-east direction. An Emergency Warning was issued at 9.04pm, after the fire had crossed Cape Le Grand Road. The fire burned through Stockyard Creek, resulting in two residential property losses. P&W relocated campers from Cape Le Grand National Park. By the end of 17 November, the Merivale fire had burned through 15,000 hectares.

The Esperance District fires remained active and were managed by a single multi-agency IMT until transitioning back to local government and P&W control on 26 November

**18 November**

On 18 November, the IMT started to receive external resources to supplement and relieve existing members who were on the ground in Esperance, while Emergency warnings remained in place. The IMT continued to implement strategies for the Cascades and Merivale fires. The Cascades fire was largely stationary, with crews concentrating on controlling and containing the fire. The Merivale fire travelled slowly in an east-north-east direction, with intermittent erratic fire behaviour. Four single-engine air tankers were operated by crews to control this fire. The Cape Arid fire complex was still under the

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49 Maps provided by DFES Spatial Services team, based on data from DFES and P&W records
control of P&W on 18 November. Crews undertook work on containment of the Grewar Road fire, one of three fires in the Cape Arid area. The Mt Ragged and Gypsum Lake fires were monitored only.

**19 November**

On 19 November, DFES and P&W transitioned the control of the Cape Arid fires to a multi-agency IMT covering all the active fires in the Esperance district, with divisions for each of the Cascades, Merivale and the Cape Arid complex fires. This resulted in the management and co-ordination efforts for all three fires being controlled centrally. Crews continued to focus on controlling and containing the Cascade and Merivale fires. In addition, the DFES Urban Search and Rescue (USAR) team commenced assessments for damage resulting from the Cascades fire, and work started to progressively reopen sections of the Coolgardie Esperance Highway.

In the Cape Arid division, the focus of the firefighting effort was to protect private property on the western boundary of the Cape Arid National Park and limit the extent of the fire near Grewar Road to protect the Western Ground Parrot habitat. This was done by consolidating pre-existing containment lines and establishing new containment lines on the western side of the fire, including burning operations. Direct attack of the fires was expected to have a low probability of success given the difficulty and time required to access the fires, and the resources available to crews. On the morning of 20 November, the fires on Mt Ragged and Grewar Road in Cape Arid National Park converged. That larger fire continued to run unchecked, although aerial intelligence confirmed that there was little fire activity on the northern and western flanks.

**20-24 November**

Over 20-24 November, the fire containment effort continued. For the Cascades fire, progress with containment resulted in the bushfire alert being downgraded to Watch and Act on 19 November at 3.15pm, and then to Advice level on 20 November at 10.20am. The remainder of the Coolgardie Esperance Highway was reopened on this morning, as well as local roads in the area. The Cascades fire was considered fully contained (but not controlled) on 24 November.

Containment efforts also continued for the Merivale fire over 20-24 November, but the fire experienced a few flare ups, with action taken to burn out pockets. Most notably, a fire run on the western boundary in the Myrup area resulted in an Emergency Warning being put in place on 21 November at 9.50am. The ability of crews to fight the fires and accurately track their progress was hampered by the nature of the vegetation and the varying terrain in this area, which included swamps, lakes and dune systems coupled with blue gum plantations. This became the focus of fire suppression activities, with the fire eventually being downgraded back to a Watch and Act on 22 November at 5.40pm. By 24 November, the western edge of the fire had been contained and there were favourable weather conditions, resulting in the alert level being downgraded to Advice.

As the advance of the Cascades and Merivale fires slowed with the easing conditions over this period, the communities affected shifted to a phase of recovery. A Shire recovery coordinator was appointed on 20 November and a Lord Mayor’s Distress Relief Fund was established, supporting non-commercial need. On 23 November, a formal recovery coordination group meeting was held and a community briefing was scheduled.\(^5\) The IMT planned the resourcing and support for the recovery stage and the incident was downgraded to Level 2 on 24 November. IMT priorities for the Cascade and Merivale fires shifted to recovery facilitation and demobilisation. Key steps included treatment of remaining hazards, opening of all roads and rehabilitation of containment lines.

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\(^5\) DFES, Great Southern Regional Situation Report, 23 November 2015
Containment work continued for the Cape Arid complex of fires over 20-24 November, with the focus being on containing their spread westward to maintain the fires to the east of private property boundaries. Preparatory action was undertaken to modify fuels on the western boundary of Cape Arid national park. However, progress was slower than hoped, and the Cape Arid complex remained uncontained and controlled on handover back to P&W on 26 November.

**25-26 November**

An All Clear was issued for both the Cascades and Merivale fires on the afternoon of 25 November, and the Esperance District complex of fires was downgraded to Level 1. DFES transitioned control for the recovery effort for all fires back to Local Government (for the Cascades and Merivale fires) and P&W (for the Cape Arid fires) on 26 November. Shire staff continued with recovery with DFES support, working with state recovery personnel and drawing on SEMC planning resources and counterparts in other shires who had experience managing bushfire recovery.

![Figure 8: Esperance district bushfires on 26 November](image)

The Cascades, Merivale and Cape Arid fires had a significant impact on life, property, the environment and the community. There were four fatalities. There were 19 property losses, of which three were residential houses. In total, 30,000 hectares of crop and 4,500 heads of stock were destroyed. In addition, 500,000 tonnes of grain are estimated to have been lost due to head loss and lodging as a result of the accompanying winds.\(^{51}\) There was also significant damage to public infrastructure in the area, including damage and losses of power poles in the area. Significant areas of the Western Ground Parrot habitat were burnt.

Notwithstanding the significant impact of the fires, in particular the tragic loss of life, the response to the Esperance District fires was perceived to be broadly well managed, given the scale of the incidents,

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\(^{51}\) Maps provided by DFES Spatial Services team, based on data from DFES and P&W records

\(^{52}\) Written submission from the Department of Agriculture and Food.
unpredictable fire behaviour and extreme conditions experienced during the fire. The experience of the fires provides an opportunity to improve the management of future fire incidents.
3 It was difficult to mobilise and maintain the initial response because the fires occurred in remote areas

Esperance is in a remote part of WA, with limited government agency resources dedicated to fire management. This means that there are not enough government officers in place to staff an IMT for a significant fire. The pattern of fires and predicted adverse weather conditions across the state meant that external resources were initially not available, and when they were deployed the remoteness of the fires meant it took time to get them in place. As a result, the IMT was under-resourced during the escalation of these fires, which impacted on its effectiveness. While this had a significant personal impact on those responsible for the managing the initial response, the lack of resources is unlikely to have changed the overall outcomes of the fires.

3.1 There are not enough government officers based in Esperance to staff an IMT for a significant fire

Under state emergency policy, the response to fires is the responsibility of DFES, P&W and Local Government, depending on land tenure. In practice, agencies in Esperance support each other in the response to bushfire. The response to a bushfire is managed by an IMT under the principles of the Australasian Inter-service Incident Management System (AIIMS), which ensures that all necessary functions are carried out as an incident escalates. In the Great Southern region, and Esperance in particular, there is a low level of government agency resourcing for fire management. This means that across the Great Southern region there is only sufficient government capacity to form one IMT for a significant fire. In Esperance, there are not enough government officers to staff an IMT for a significant fire.

Each government agency has different responsibilities in the management of fires

Westplan – Fire is the State Emergency Management Plan that details the responsibilities of agencies for prevention, preparation, response and recovery for fire emergency incidents. DFES, P&W and Local Government are responsible for day to day management of bushfire within their respective jurisdictions, with responsibilities for the response to bushfire split across the agencies accordingly (see Figure 9 below).
Thus in the Esperance region, which includes the Esperance Fire District, national parks, private property and large areas of UCL, the response to fires is the responsibility of DFES, P&W and Local Government, depending on the tenure. In practice, given the remoteness of the region and relatively low population, agencies support each other in the response to bushfire.

**The response to fire incidents is managed by an IMT under the principles of AIIMS**

Incidents in WA are managed under the principles of AIIMS. AIIMS provides a scalable framework to ensure all necessary functions are carried out as an incident escalates. AIIMS is underpinned by five key principles:

1. **Flexibility:** the application of all AIIMS principles has to be flexible to ensure an effective multi-agency response to all hazards
2. **Management by objectives:** the IC, in consultation with the IMT, determines the desired outcome of the incident
3. **Functional management:** responsibility for various functions can be delegated by the IC to other IMT members, where the incident is too complex for one person to manage
4. **Unity of command:** there is one IC for any incident with responsibility for directing and coordinating actions, and the setting of incident objectives
5. **Span of control:** the number of groups to individuals that can effectively be supervised by one person. A ratio of 1:5 is desirable, however a ratio of 1:7 is acceptable.54

There are also specified functions under AIIMS that must be performed to manage an incident, which include:

- control
- planning
- intelligence
- operations
- investigations
- logistics

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The response to emergency incidents, including bushfire, is managed by an IMT that is led by an IC. The IC is designated by the Controlling Agency to be responsible for the overall management and control of an incident. IMTs apply AIIMS to effectively and efficiently control incidents. As AIIMS is designed to be scalable, the size of the IMT will depend on the requirement of the incident. For example, a very small incident may be managed by a single IC who fulfils all the required functions under AIIMS.

Pre-formed IMTs are required to be formed and deployed on a regional basis when periods of extreme fire weather are forecast. The purpose of a pre-formed IMT is to minimise the impact of level 2 and 3 bushfires on the community through providing the following functions: incident control, planning, logistics support, public information. The minimum structure of a DFES Operations deployable pre-formed IMT is based upon 9-11 members in roles shown below.

There is a low level of resourcing in the Great Southern region and Esperance in particular, which impacts on the size of IMT that can be assembled

The Great Southern region has a low level of resourcing of dedicated fire personnel, relative to its size and number of brigades, groups and units (BGUs). The region has the highest number of BGUs (239), which is almost double the number of BGUs in the next highest region, Goldfields Midlands (which has 133 BGUs). However, there are only 18 DFES operational staff in the Great Southern to manage these BGUs (including State Emergency Service (SES) managers), which is not much more than in other country regions (see Figure 11 below).

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57 Brigades, groups and units includes: Fire and Rescue Service (FRS), Volunteer Fire and Rescue Service (VFRS), Volunteer Fire and Emergency Services (VFES), State Emergency Service (SES) and Bush Fire Brigades (BFBs).
As a result of the relatively low level of resourcing in relation to number of BGUs, the Great Southern region has the highest ratio of BGUs in relation to DFES operational staff (1:13.3) compared to all other country DFES operations regions (average 1:8.5). When an appropriate span of control is exceeded, it may put the effectiveness of the operation at risk. This relatively low level of resourcing places considerable pressure on DFES operational staff to work with BGUs to manage bushfire risk, build relationships with local volunteers and coordinate BGUs during the escalation of fires. In addition to its large geographical area, the Great Southern region contains a variety of different landscapes and likely fire behaviour, including forests, coastal dunes and broadacre farming. Reflecting the large size and diversity of this region, DFES is currently undertaking a review of its regional boundaries.

DFES and P&W, AIIMS Awareness Learners manual, 2013
Esperance in particular has a low level of resourcing of dedicated government agency fire personnel across agencies. The DFES Esperance office consists of one Area Officer who has responsibility for BGUs as far as Ravensthorpe (187 km) and Hopetoun (194 km), as well as BGUs in and around Esperance. The majority of BGUs in the Great Southern region are located to the west, and the BGUs that are located around the Esperance region are geographically dispersed, which makes it difficult for the sole DFES officer based in the Esperance office to coordinate. The P&W Esperance office has 1.5 officers dedicated to day-to-day fire-related work.

This low level of resourcing in Esperance results in there being insufficient resources to staff a Level 2 IMT locally. Prior to the escalation of the fires, DFES, P&W and Local Government pre-formed a four person IMT in Esperance. While this number of resources may be sufficient for a Level 1 IMT, where an IC may perform all of the functions, it is lower than the number of resources considered a minimum for a Level 2 IMT (see Figure 10 on the previous page). Additional required roles in planning (situation officer), public information (information officer), logistics (supply coordinator) and management support cannot therefore not be fulfilled locally.

The Great Southern region established a pre-formed IMT of eight personnel, which was initially deployed to Narrogin and was later relocated to Esperance to assist with the response. The region only has capacity to pre-form one Level 2 IMT and, even across the whole region, DFES and P&W do not have sufficient resources to immediately establish a Level 3 IMT. Furthermore, due to the significant distances involved in the Great Southern region, regional IMT members will not normally position themselves in

59 The Area Officer is supported by a Community Emergency Service Coordinator from the Shire of Esperance.
3.2 A remote region such as Esperance must draw in external resources, but these are difficult to mobilise quickly

Adverse fire conditions were anticipated in the Great Southern region. In preparation, a regional pre-formed Level 2 IMT was formed and deployed to Narrogin, which was the area of perceived greatest risk given current fire activity relative to population centres and the forecast catastrophic fire danger. The Esperance district requested additional resources prior to the escalation of fires on 17 November, including additional IMT personnel and aerial support. However, the pattern of fires and predicted adverse fire conditions across the state meant that there were competing demands for resources, and limited external resourcing was made available. Even once resources were available for deployment to Esperance, the remoteness meant that it took time to mobilise and embed additional external resources.

Preparation for the anticipated fire conditions was undertaken across the state, including the mobilisation of a regional pre-formed IMT to the area of perceived greatest risk

Preparation was undertaken across all regions in the state in light of anticipated fire conditions, including in the Great Southern Region. At a state level, the SOC put several strategies in place on 13 November in preparation for adverse weather conditions, with high to severe fire danger ratings and dry thunderstorms expected. The strategies included preforming two Level 2 IMTs in Perth on standby for deployment state-wide and three strike teams for potential deployment.

A Heightened Risk Action plan was developed by the Great Southern region on 12 November. One manager for an IC role and one administrative staff member were on call in Albany for 14 November, which was the date of the Royal visit to Albany. Two fixed wing water bombers and crews in and around the Albany region were also on standby.

After the ignition of multiple fires across the Great Southern region over the weekend of 14-15 November, and in anticipation of the forecast severe, extreme and catastrophic fire danger conditions on 17 November, a Level 2 IMT was formed. The Great Southern Level 2 IMT was deployed to Narrogin on 16 November, as it was perceived to be the area of greatest risk given current fire activity relative to population centres and the forecast catastrophic fire danger for the Roe sub-district.61

While preparation for the anticipated fire conditions was undertaken, given the size of the Great Southern region it was difficult to adequately plan for all possible scenarios. The pre-formed Level 2 IMT was deployed to the area of perceived greatest risk. However, fire and weather conditions can be unpredictable. The location of the forecast fire danger changed slightly on the afternoon of 16 November, with the predicted catastrophic fire danger shifting to the Esperance Shire Inland district.62

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60 DFES and P&W, Western Australian Regional – Inter Agency Bushfire Command and Control Arrangements between P&W South Coast Region and DFES Great Southern Region, 2014, p. 8

61 The routine Emergency Services Weather Briefing issued on 16 November at 10:50 forecast catastrophic fire danger for the Roe sub-district, and isolated catastrophic conditions possible throughout the Great Southern and Central Wheat Belt districts for 17 November.

62 An additional non-routine Emergency Services Weather Briefing was issued later on 16 November at 17:05, forecasting catastrophic fire danger for the Esperance Shire Inland district. This is consistent with the Fire Weather Warning issued by the Bureau of Meteorology at 15:05 on 16 November, which forecast catastrophic fire danger for Esperance Shire Inland.
The Level 2 IMT in Narrogin was then relocated to Esperance on 17 November, in line with the change in relative risk posed by the fires across the region.

While the Esperance district did request additional resources, the pattern of fires and predicted adverse fire conditions across the state meant that limited external resourcing was made available.

Numerous fires across the state and the geographical scale of the predicted adverse weather conditions led to competition for scarce resources and challenging decisions regarding resource deployment. Additional resources were requested by DFES staff based in Esperance verbally prior to the Section 13 being invoked, however due to the pattern of fires and anticipated fire conditions across the whole of the southern part of the state, external resources were stretched and not available for early deployment to Esperance.

On 16 November, a DFES Area Officer based in Albany was deployed to the Esperance district office to assist the local IMT. On the morning of 17 November, the ROC requested additional resources from Perth. Initially, the SOC did not action the request due to a determination that there were adequate IMT resources already in Esperance and Narrogin. However, later on 17 November as conditions worsened, the SOC deployed eight additional resources to support the IMT in Esperance to arrive that evening and the following morning. P&W also offered additional resources to support the response in Esperance, however they were stretched fighting fires across the region, in particular two fires near Albany that posed significant threat to life and property.

The IMT and local brigades in Esperance determined that aerial support for intelligence and suppression would assist the response. Aerial suppression can slow the spread of a fire but requires ground support to be fully effective, which would have been a challenge at both the Cascades and Merivale fires given the access difficulties of the terrain. Requests for aerial resources were made verbally by DFES to the ROC, but these resources were not available. Metropolitan based resources were said to be on standby for the metropolitan area (if required) and Mt Solus complex fires, and the aerial resources in Albany were committed to fires in that area, in particular to the Torndirrup fire which was uncontained and posed significant risk to three communities. A request was made through WebEOC for aerial intelligence and suppression resources occurred in the evening of 17 November. A formal request for aerial resources was also made to the P&W Regional Duty Officer in Albany on the morning of 18 November. Four fixed wing bombers and an air observer were then deployed to assist with the response that morning.

There were two local fixed wing agricultural aircraft operated by private contractors in the Esperance area and offered for aerial fire suppression tasking. However, regulatory constraints and, the time available and contract management capacity prohibited their employment. Civil Aviation Safety Regulations (CASR) provide the primary regulatory framework for aerial firefighting. Under CASR regulations, a compliant operator can perform aerial fire suppression until the hazard management agency, i.e. DFES, takes control of the fire, after which suppression operations require DFES approval. In addition to CASR, aerial firefighting service delivery is also governed by a combination of contractual conditions, state emergency management doctrine and National standards. These mechanisms ensure that all aircraft satisfy an array of prerequisites, including training, experience, safety audits,

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63 WebEOC request log 6214, Adverse Weather incident.
64 WebEOC request log 6214, Adverse Weather incident.
65 WebEOC request log 6791, Adverse Weather incident.
66 WebEOC request log 6261, Esperance Complex Fires incident.
67 Aerial fire suppression operations are governed by CASR Part 137 “Aerial Application Operations – Other than Rotorcraft”. Sub-regulation CASR 137.175 covers the specifics of aerial firefighting operations with 137.165 “Close Proximity Operations” also relevant.
indemnification, radio fits and equipment. DFES and P&W maintain contracts for both fixed and rotary wing aerial fire suppression, with tasking and deployment managed through the joint State Operations Air Desk. With no contracts or agreements in place, DFES would not have been able to take responsibility for assuring private operators’ compliance with CASR and other standards and conditions.68

The response in Esperance was therefore reliant on aerial resources from outside of the region. Had aerial suppression resources been available prior to the escalation of fires on 17 November, they would most likely have been deployed to the Merivale fire. This was considered to pose the greatest risk to life and property, and the effective use of aerial suppression at the Cascades fire would have been constrained by its distance from the nearest air strip in Esperance. Regardless, aerial suppression would have been ineffective once the Cascades fire took its major run, due to the high intensity of the fire.

**Once resources were available for deployment to Esperance, the remoteness meant that it took time to mobilise and embed additional external resources**

The remoteness of Esperance meant that it took time to mobilise and embed additional resources. For example:

- The relocation of IMT personnel from Narrogin to Esperance was requested on the morning of 17 November, but due to the distance they did not arrive until the evening.
- The request for IMT resources in Esperance made to the SOC on the afternoon of 17 November resulted in some personnel arriving that evening and others arriving the following morning.
- Taskforces that were deployed from Perth for three days were required to drive for two days (at the start and end of the deployment), which was not taken into account in the forward planning. Some taskforces chose to stay an additional day at the incident.

The remoteness led to the use of air travel for deployment of some personnel, which also presented challenges. These incoming personnel would not be travelling with a vehicle, and would be reliant on locally hired vehicles that are unlikely to be appropriately equipped. The airport was also compromised by smoke in the most active phase of the Cascades fire, leading to one occasion of a scheduled flight being cancelled.

Esperance’s remoteness therefore placed significant challenges on the expedient mobilisation of additional external resources.

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68 Information provided by DFES Aviation Services
The reliance on external resources was a challenge given the level of fire activity across the state, and consequently competing demands for resources across multiple incidents. As a result, incoming personnel to Esperance were not always prepared for their roles and it took time to embed them in the IMT. For example, IMT members were deployed from Perth without knowing what their IMT roles would be. This meant that IMT members were sometimes taking on roles in which they did not have significant skills or operational experience. It took additional time to establish individual responsibilities of incoming IMT members. This put individual personnel under greater pressure and required other IMT members to provide additional support to IMT functions.

3.3 As a result, the IMT was under-resourced during the major run of these fires, with implications for its effectiveness

As a result of limited resourcing in place in Esperance, there was an under-resourced IMT during the escalation of the fires. On 17 November, when the fires escalated, there were only four government officers on the IMT, in addition to the volunteer response on the fireground. This meant that resources were stretched and there was a lack of structure in the early phases of the fire. The lack of additional resources placed considerable pressure on the local IMT personnel, which is reflected in the lack of record keeping, planning and information to pass up the line in the early phases of the fire. Under-resourcing and a lack of structure in the early part of the response ultimately impacted on core IMT functions, in particular planning. However, the extreme fire behaviour and weather conditions on 17 November means that, ultimately, the lack of IMT resources during the initial response is unlikely to have changed the overall outcomes of the fires.
As a result of limited resourcing in place in Esperance, there was an under-resourced IMT during the escalation of the fires

On Sunday 15 November, the IMT in Esperance consisted of three personnel, comprised of one from DFES, one from Local Government and one from P&W, working out of the P&W office. In addition, the Cascades and Merivale fires were each being controlled by the Chief Bush Fire Control Officer and local senior volunteers. The IMT met to review information received from volunteer brigades active at the fire sites, to consider the likely impacts of the coming weather, and to support volunteers with the development of response strategies. At this stage, the incident response was under the control of Local Government, with the DFES and P&W IMT providing support in the early phases.

On 16 November, the IMT acquired one additional DFES officer, however P&W support was withdrawn by evening to investigate the reported fires in the Cape Arid area. When the Section 13 was issued at midday on 17 November, agency staff in Esperance requested a full pre-formed Level 2 IMT from the SOC. External IMT resourcing put in place the first night shift on 17 November, and enabled the day shift IMT to grow to 9 people on 18 November and, together with P&W personnel managing the Cape Arid fires, 36 people on 19 November.

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69 DFES, Great Southern Regional Situation Report, 17 November 2015
Figure 14: Level of IMT resourcing for the Esperance District fires from ignition until transition of control back to Local Government and P&W

IMT resources

<table>
<thead>
<tr>
<th>Day shift</th>
<th>Night shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 Nov</td>
<td>3 4 4 9 36 44 44 41 32 33 27</td>
</tr>
<tr>
<td>16 Nov</td>
<td>0 0 4 5 5 6 6 6 4 4 0</td>
</tr>
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<tr>
<td>25 Nov</td>
<td>0 0 4 5 5 6 6 6 4 4 0</td>
</tr>
</tbody>
</table>

For the period prior to the first Section 13 being declared (15-16 November) the IMT numbers shown above do not include the volunteer response undertaken on the ground. P&W resources responding to the Cape Arid fires are not included as part of the IMT numbers shown until the multi-agency IMT was formed on 19 November.

This meant that resources were stretched and there was a lack of structure in the early phases of the fire

The under-resourced IMT over 16-17 November meant that it was difficult to maintain the IMT functional structure, as each person was trying to fulfil multiple coordination and response roles. The development of the Cape Arid fires, and subsequent deployment of P&W personnel to respond, put further pressure on the structure of the IMT as it fractured into two separate responses: one led by DFES for the Cascades and Merivale fires and one led by P&W for the Cape Arid fires. The level of under-resourcing and lack of structure was reported by stakeholders to have contributed to a chaotic environment in the early days of the response. Reflecting this, the initial IMT members reported being

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IMT resource numbers for 15 – 16 November are based on verbal submissions from IMT members, as there was limited record keeping in the early phases of the fire.
exhausted by the evening of 17 November, as they were unable to maintain plans, records or support for the Local Government response.

IMT and Local Government stakeholders reported that there was a lack of clarity in the process for invoking a Section 13 declaration and its implications for control, which caused confusion and added to the lack of structure in the early part of the response. Local Government contacted DFES on the evening of 16 November to communicate a request for a Section 13 declaration to be made. Different interpretations of this communication resulted in DFES understanding this as a request to prepare for, rather than implement, a Section 13 declaration. The Section 13 declaration was then made the following day after further discussion between DFES and Local Government, and a formal request from the Shire CEO.

Under Section 13 Under Westplan – Fire, when P&W or Local Government invoke a Section 13 it may be agreed that they maintain control of the incident as the requesting agency. In this situation, the requesting agency remains the controlling agency, and undertakes the coordination of firefighting resources.71 Once a fire is Level 3, it automatically falls under the control of the FES Commissioner, but DFES does not necessarily assume the IC role. Thus it was not necessarily clear whether Local Government or DFES was in control of the Esperance District fires after the initial Section 13 declaration was made, but prior to the level of the fires being upgraded to Level 3. The ambiguity of the implications of the Section 13 declaration meant that there was uncertainty around what each agency’s responsibilities were after the Section 13 was invoked, with reports that members of the IMT were unsure which agency was officially in control of the incident. In comparison, under Section 45A of the Bush Fires Act 1954 when Local Government hands over control of an incident to P&W, it is much clearer, as P&W assumes “control of all operations in relation to the fire”.72

IMT stakeholders reported that the move of the IMT to a dedicated co-location centre on 18 November helped to resolve the lack of structure in the IMT. The co-location centre had not been used before, but DFES, P&W and the Shire had met earlier in November to discuss how an incident would be run through the centre. There were some initial technical difficulties and uncertainties reported, such as setting up printers, plotters, radios and phones. Once these were resolved, the co-location centre was reported to have worked well. The use of a centralised Incident Control Centre aided the response, creating structure and order to support the IMT. This was especially crucial given that the incident spanned three areas and involved three separate agencies.

The split of the IMT on 16 November, with a Local Government and DFES IMT managing the Cascades and Merivale fires and P&W managing the Cape Arid fires, contributed to a lack of structure in the early part of the response. A decision was later made by the DFES and P&W regional command in Albany to incorporate management of the Cape Arid fires into the Esperance fire complex. This brought the management of the Cascades, Merivale and Cape Arid fires into a single multi-agency IMT, which was in place by 19 November. However, the primary response agencies continued to operate separately to some extent. Once the management of the Cape Arid fires had been brought into the IMT, with the Cape Arid fires as a division of the Esperance District complex, standalone IAPs were initially produced for the Cape Arid division that were separate to the combined IAP produced for the Merivale and Cascades divisions, even though the IMT was to cover all three fires. Production of separate IAPs persisted until 22 November. This meant that stakeholders could not refer to one authoritative IAP across all three fires in the Esperance District complex, presenting a risk of a less coordinated response. Developing two separate IAPs is likely to have been more time consuming relative to producing a single combined IAP, representing a less efficient use of IMT resources.

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72 Bush Fires Act 1954, s45A
Under-resourcing and a lack of structure in the early part of the response ultimately impacted on core IMT functions

The under-resourced IMT also impacted on the forward planning of resources, with only one person in a planning role on shifts prior to 18 November. This meant that the planning function did not have sufficient capacity to identify current resources and plan future requirements, and so it took time for the IMT to communicate to the ROC what resources were on the ground and would be needed. On 17 November, an entry in the WebEOC request log indicates that the SOC did not have a clear view of the resources committed to the Esperance fires.73

There was also considerable difficulty getting maps produced in the early phases of the fire, as there was no dedicated intelligence available in the IMT to give an indication of the fire shape. Under AIIMS, the intelligence function would be part of the planning function, and the minimum Level 2 IMT specified by DFES includes a Situations officer, which is part of the intelligence function, under the Planning Officer. However, with only one person in the planning function, this role was not fulfilled, impacting on the ability to produce and use intelligence.

The continued lack of structure after the integration of the Cape Arid fires into the IMT resulted in less understanding of the strategies being undertaken in the respective divisions of the Esperance District fire complex. Fire suppression was generally not undertaken on the Cape Arid fires at night, as unfavourable conditions meant that it would be ineffective. As the Cape Arid division was predominantly managed by P&W personnel, this generally meant that there was not a P&W presence on the IMT night shifts. If there were not detailed handovers between the day and night shift, this could result in less knowledge in the night shift IMT of the operations of the Cape Arid division. This had the potential for IAPs developed for the day shift not being appropriate or comprehensive for the Cape Arid division. One particular example of this was disagreement amongst night shift IMT members about how a particular fall-back line on private property in the Cape Arid incident area should be handled. Without P&W presence on the night shift or a sufficient handover, the IMT faced a gap in knowledge and a member referred the issue up to the SOC. This situation could have been avoided if there had been a more structured approach to integrate the agencies and divisions, either in composition of the night shift IMT or through handovers between shifts.

73 WebEOC request log 6264, Esperance Complex Fires incident.
4 While regional support was strong, the ability of the SOC to support the response was compromised by system and process failures

The response to a major fire incident requires support at the regional and state level, particularly in coordinating resource requirements. However, some issues with sharing of information between agencies resulted in the SOC being unable to maintain a strategic overview of state-wide fire activity and resource requirements. The challenge in understanding strategic resource requirements was exacerbated by insufficient people in key management roles in the SOC and IMT. In contrast, regional agencies worked well together to support the response through the ROC, district emergency management arrangements and inter-agency liaison groups.

4.1 Insufficient integration of key information processes made it hard to get a state-wide perspective on resources

Major fire incidents tend to require additional resources from outside of the immediate region. The SOC is responsible for maintaining an overview of resource requirements for incidents across the state, and coordinating resources from relevant state-based and national agencies to support incidents as required. To fulfil this role, there must be a common strategic overview of incident activity and resourcing requirements across fire response agencies at the state level. However, there is limited guidance for agencies on how to integrate processes for sharing information during major fire incidents. This meant that there were some issues with sharing of strategic information between agencies during the period of the Esperance district fires. As a result, there was not a common state-wide perspective of fire activity and resource availability and needs, which made it difficult for the state to make effective resourcing decisions.

There is limited guidance for agencies on how to integrate information sharing during major fire incidents

As noted in Section 3.1, DFES, P&W and Local Government each have particular responsibilities in the response to bushfire. *Westplan – Fire* also requires that the agencies collaborate in their responses to major bushfires. DFES and P&W are responsible for the development of state-level inter-agency arrangements for bushfire, while DFES, P&W and the relevant Local Governments are responsible for the development of regional level inter-agency arrangements.

While there are some shared operational polices and doctrine, there is currently no shared, published guidance on inter-agency arrangements between DFES and P&W at the state level. DFES and P&W have been working to establish comprehensive state-level inter-agency arrangements through the IBMC since 2012. A draft agreement prepared in 2013 is yet to be finalised, with outstanding issues in June 2015 including inter-agency arrangements for interstate deployment.

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74 IBMC, Minutes of 1 February 2013 meeting, 2013
75 IBMC, Minutes of 12 June 2015 meeting, 2015
Internally, DFES and P&W have detailed operational guidance on how their own agencies respond to major fire incidents, but each has only limited internal guidance on inter-agency arrangements at a state or regional level:

- The WAFES manual outlines the operational management structure and systems that DFES uses for emergency preparedness and response. The only guidance on inter-agency cooperation is that, at a state level, the SOC Duty Chief Superintendent must review situational awareness in consultation with P&W as required.76

- The P&W Bushfire Preparedness and Response Manual makes a brief reference to inter-agency coordination arrangements, stating that, where required, a P&W Commander will represent their agency’s interests in the SOC.77

This extends to limited guidance across agencies that determines what information should be shared, at which levels, and how, to enable a common operating picture at state level. Under Westplan – Fire, all fires are to be reported to DFES COMCEN. Local Government and P&W are also responsible for keeping DFES informed of bushfires which have the potential to escalate to Level 3 or have potential for multi-agency involvement.78 This is reflected in P&W’s bushfire preparedness and response manual, which directs that all fires occurring within P&W regions will be directly reported to the DFES Communication Centre (COMCEN). Beyond this, however, there are currently no detailed procedural documents that outline how Local Government, P&W and DFES should work together to share information to best ensure that DFES has a strategic overview of fire activity across the state. Recognising this, DFES and P&W are currently working together to develop agreed processes and operating procedures for sharing information relating to fire activity.

As a result, there were some issues with sharing of strategic information between agencies, which prevented a common state-wide perspective of fire activity and resource availability and needs

The SOC is required to maintain visibility of all emergencies state-wide for which DFES has legislative responsibility. This visibility supports the SOC in its role to maintain a strategic overview of resourcing requirements and to coordinate resources as required to support operations.79 Relevant information about incidents is gathered from the Metropolitan and Regional Operations Centres, Incident Browser, social media, Agency Liaison Officers and the WebEOC information boards.80 Within P&W, information relating to active bushfires is recorded on the online Fire Support System, and information relating to prescribed burns is recorded on the electronic Prescribed Fire Planning system.81

There are some areas in which sharing information between agencies at the state level works effectively, such as centralised predictive modelling in the SOC. However, reflecting a lack of clarity over broader inter-agency arrangements, there was insufficient sharing of information between agencies during the fire activity of November 2015, particularly in relation to fire activity and resource availability and needs. This resulted in the absence of a common strategic overview of fire activity over this period and, consequently, the absence of a strategic perspective on resource requirements.

The agencies recognised that there was insufficient sharing of information during this period. To maintain communication between DFES and P&W, a DFES liaison officer was then appointed to the P&W

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77 P&W, Bushfire Preparedness and Response Manual, Chapter 4, 2015
79 DFES, WAFES Manual Part Three: State Operations Centre, Section 1, 2014
80 DFES, WAFES Manual Part Three: State Operations Centre, Section 4.2.1, 2014
81 P&W, Bushfire Preparedness and Response Manual, Chapter 9, 2015
state headquarters over the period 17-18 November. The DFES liaison officer acted as the conduit for information flow between the agencies at state level, providing reports back to the SOC of situational and operational information relating to P&W managed fires and the implications for regional and state planning. This ensured that communication between DFES and P&W was maintained while P&W were not present in the SOC.

Despite this, however, the SOC reported that in mid-November 2015 it did not have a state-wide overview of all fire activity across both agencies, including both active bushfires and ongoing prescribed burns. This made it more difficult for the SOC to take a strategic approach to anticipating and managing potential resource requirements across all fire incidents in the state.

This made it difficult for the state to make effective resourcing decisions

The vertical communications procedures between the IMT, ROC and SOC allow for requests to be made by the IMT to the ROC for resources if they are not available locally. The ROC then coordinates and prioritises all regional resource requests to support each incident. Where resources are unable to be sourced from the region, the ROC may request the SOC’s assistance with the supply of resources. The SOC will coordinate and prioritise all resources across the state, and, if required, interstate and internationally, to ensure all regions and incidents have sufficient resources.

Similarly, within P&W resources are managed at a local, regional and state level as required. For example, District Duty Officers are authorised to commit District resources to external resource requests in their District in consultation with the Regional Duty Officer. Regional Duty Officers are authorised to commit resources from Districts in their Region in consultation with the State Duty Officer. The State Duty Officer can commit resources from other Regions to external resource requests. 83

For these vertical resource request procedures to work, officers at all levels need access to relevant information across all response agencies about the availability of resources in DFES, P&W, Local Government and among volunteer units. During the Esperance District fires, agencies had limited visibility of the range of resources available. The lack of clarity existed between state, regional and incident levels. The limited visibility of all resources meant that resource management was not integrated or optimal, either within agencies (for example, neither DFES nor P&W have an automated resource allocation monitoring system) or across them (for example, there is no clear, shared guidance on how resources needs should be addressed collaboratively).

These weaknesses were put under further strain by the insufficiency of resources available to respond in Esperance: all agencies were engaged in multiple, simultaneous bushfire responses across the state. As recorded in DFES Commissioner’s Briefing Notes, this required the SOC to make choices about how to assess relative and changing risks, how to mobilise physical resources (such as water bombers) and human resources (such as Level 2 and Level 3 IMTs) as weather conditions worsened, and where to deploy them to. In turn, IMT and ROC members were frustrated at not receiving all additional resources requested, such as access to air intelligence. In the context of these competing demands for firefighting resources across the state, the lack of visibility of resources made it harder to determine the optimal resourcing decisions to support all incidents. When there is limited visibility of what resources are available, there is also a limited ability to identify and deploy the personnel who have the right skills, experience and training for particular roles.

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4.2 Insufficient numbers of people in key management roles at all levels contributed to challenges in understanding resource requirements

Effective management and coordination of resources is dependent on both the required information being available and the responding agencies having sufficient capacity to use this information to plan and coordinate resources. At the state level, coordination of resources between agencies is managed through the SOC. However, differences in the operating models of DFES and P&W means that there are relatively few P&W personnel operating at state level. This resulted in the SOC reporting that there was insufficient P&W presence to facilitate sharing of information to support strategic resourcing decisions. At the incident level, the IMT is responsible for planning resource requirements and requesting additional resources if needed. However, there were insufficient people in the IMT to plan resource requirements, which made it challenging for the ROC to support with resource requests. The use of WebEOC for vertical communication of information and requests did not overcome the challenges in understanding resource requirements.

Differences in the operating models of DFES and P&W means there were insufficient people to support strategic resourcing decisions in the SOC

The fire combat agencies’ different operating models also constrain the integration of bushfire operations, contributing to challenges in making strategic resourcing decisions at state level. DFES have a centralised operating model, with a large team based in the SOC in Perth. There are 15-20 personnel on call in the SOC during the high threat period of December to April, and 8 personnel on call during the rest of the year.\(^3\) This centralised model is consistent with DFES’ core business as emergency manager across multiple hazards. It is intended to allow for the efficient management of multiple concurrent incidents.

Under this centralised model, the SOC (and ROC) undertake some aspects of the AIIMS functions. In contrast, P&W has a more decentralised operating model, with all AIIMS functions fulfilled at the local incident level and the Regional Duty Officer responsible for strategic oversight of incidents, such as ensuring effective resourcing levels and coordinating intelligence gathering, as well as maintaining communication with the State Duty Officer. Under this decentralised model, P&W tend to have a smaller number of people operating at state level during major fire incidents compared to DFES.

These different operating models together with limited clear guidance on inter-agency arrangements results in a lack of clarity between agencies on how best to share information and make strategic cross-agency resourcing decisions during major fire incidents. The SOC layout is designed with a dedicated office available for P&W personnel, to facilitate P&W participation in the SOC. Reflecting limited guidance on state level inter-agency arrangements, P&W provided personnel to the SOC as considered appropriate, but the SOC reported that there was insufficient P&W presence in the SOC to facilitate the required sharing of information. In line with P&W policy and consistent with the intent of Westplan – Fire, a P&W officer was present in the SOC for a number of days from 14 November and would participate in the daily All Hazards Liaison Groups conference calls. However, there were insufficient resources available in P&W at state level to maintain this presence in the SOC, which resulted in a DFES Liaison Officer being stationed at the P&W office on 17-18 November.

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There were insufficient people in the IMT to plan resource requirements, which made it challenging for the ROC to support with resource requests

The challenges for managing and planning resourcing requirements for the Esperance incident were exacerbated by insufficient people in the IMT, particularly in the early part of the response. The IMT is responsible for managing and coordinating resources at the incident level, but if resources are not available locally a request is made to the ROC. The ROC then coordinates and prioritises all regional resource requests to support the resourcing of each incident in the region. Where resources are unable to be sourced from the region, the ROC may request the SOC to assist with the supply of resources. ROC members considered that their resource requests were met by the SOC, but that it was difficult for the ROC to access adequate information from the IMT to perform its regional coordination role, particularly on 17 November and 18 November as the fire worsened and during the transition of agency responsibilities. Conversely, some IMT members felt that ROC and SOC personnel did not understand the impact of the limited resources in the IMT, particularly when the fires were fast moving on 17 November and it was hard to access up-to-date information from the fire ground.

To support the IMT with planning resource requirements, the ROC developed a resource management system in Excel to help the IMT track and plan resourcing. Given the level of resourcing in the IMT, however, the Planning personnel did not have the capacity to use and maintain this system adequately.

Systems and processes for vertical communication of information and requests did not overcome the challenges in understanding resource requirements

Resource coordination between the ROC and SOC appeared to work well on the whole. The SOC reported receiving good, forward-looking Regional Situation Reports. The WebEOC system was seen as a useful mechanism for reporting from the ROC up the line to SOC, but not as a channel for regular communication between the IMT and the ROC. Users appeared to record information in differing ways in the system and not in a way that ensured all relevant users would see it. Furthermore, not all IMT and ROC members have access to WebEOC, particularly non-DFES personnel such as the P&W Liaison Officer in the ROC. The system did not therefore provide a single point of oversight to understand resource requirements. It was hard for users to assess whether issues, including resource requests, recorded in the system were being acted on. The weaknesses of how the system was used were partly related to personnel’s lack of familiarity with the technology (and ongoing simulation exercises were seen as important preparation opportunities), but also to the capacity of the technology. In its current form, WebEOC does not provide the functionality required for response agencies to use it as a comprehensive resource management tool. ROC members noted that conversations between people were more important, with WebEOC best used as a system to record decisions rather than to facilitate flow of information and requests.

4.3 In contrast, regional agencies worked well together to support the response

While there were some challenges experienced at state level, the agencies worked well at the regional level to support the response to the Esperance District fires. Within the DFES command structure for emergency incidents, the ROC is the regional coordination body. DFES and P&W worked well together through the ROC to support the response, which was facilitated by the presence of a P&W liaison officer in the ROC and open communication between the agencies. The district emergency management arrangements enabled a broader set of agencies to plan for the response. There was also effective coordination among liaison agencies through a combined ISG/OASG based in Esperance.
DFES and P&W worked well together through the ROC to support the response at the regional level

Inter-agency arrangements for bushfire operations at a regional level are more clearly developed than those for the state level. DFES and P&W have established regional inter-agency agreements in some regions, including in the Great Southern region. The Great Southern agreement outlines arrangements for a number of inter-agency operations related to bushfire preparation and suppression, such as the process for establishing and deploying inter-agency Level 2 IMTs, inter-agency communication protocols, and identified IMT resources and control centres. These agreements, which are renewed for each bushfire season, provide guidance on inter-agency arrangements that are specific to the region.

At the regional level, agencies reported generally effective sharing of information to enable a coordinated response. There were two mechanisms through which DFES and P&W coordinated at a regional level: regular communication between the DFES Regional Superintendent and P&W Regional Manager; and the presence of a P&W liaison officer in the ROC. Through these communication channels, information was shared between the agencies on the situation of fires in the regions, including sharing of IAPs, and resources committed and required.

These open communication lines resulted in the jointly made decision to combine the DFES IMT (for the Cascades and Merivale fires) and the P&W IMT (for the complex of Cape Arid fires) into a single multi-agency IMT. There was a P&W liaison officer in the ROC from 19 November to 24 November, the period over which the multi-agency IMT was in place. The main role of the P&W liaison officer was to ensure a coordinated approach to managing resourcing and information. For example, the liaison officer ensured that the cross-agency view of the fire situation at a regional level was shared with P&W at the state level.

There were some challenges noted by ROC members in coordinating a cross-agency response the regional level. In particular, ROC stakeholders noted the use of WebEOC by DFES, but not P&W, for recording and reporting information, differences in how information is passed through their respective hierarchies, and different approaches to resource management. For example, information was reported upwards from the region to the state through both agencies, through separate regional situation reports. A coordinated approach at the regional level was maintained despite these differences, primarily due to both DFES and P&W ROC personnel having an understanding of the differences between agencies, having prior experience and familiarity with their ROC roles, and having existing relationships with the other members of the ROC.

The district emergency management arrangements enabled a broader set of agencies to plan for the response, although differences in agency boundaries constrained this to some extent

The regional level was also able to share knowledge across the broader set of agencies with a stake in emergency management through the District Emergency Management Committee (DEMC). A DEMC meeting was first held in Albany on 16 November to brief agencies on the predicted adverse weather conditions, in particular the catastrophic fire danger rating, and the actions being taken in response. A further DEMC meeting was held on 17 November, in which all agencies provided an update on response actions taken. Agencies represented at the DEMC reported that this forum worked well for sharing information and coordinating the inter-agency response. District emergency management arrangements are well established, so agencies have spent time working together, are familiar with their roles in emergency management and have built relationships with each other.

However, one breakdown in this broader level of regional inter-agency coordination was identified. There are differences in the boundaries of emergency management response and support agencies, which are different again from the emergency management district boundaries. Esperance is in the
Goldfields-Esperance emergency management district. The Esperance DEMC agencies were not included in the DEMC briefings that took place in Albany on 16 and 17 November, although all affected Shire CEOs in the DFES Great Southern region were briefed by the regional office. This may have resulted in a less coordinated response across the whole of the region, with Esperance disconnected from the actions being taken at a regional level by the DEMC.

Effective coordination among liaison agencies through a combined ISG/OASG supported the fire response

While inter-agency coordination was a challenge at state level during the response, the cooperation between expert support agencies at the regional level, through the ISG and OASG structures, worked well. The multi-agency coordination structure required under state emergency management policy allows sectoral agencies, local government and community organisations to support operational agencies with information, expert advice, support and resources that will assist fire response and recovery. The IMT is encouraged to engage agencies early on to ensure that local expertise and knowledge is used. This involves establishing an ISG at the incident level and an OASG at the regional level.

The ISG allows the IC to draw together information about resources, response activities, impacts and issues from groups who have on-the-ground knowledge. It is convened when an incident requires inter-agency coordination and/or when a Level 2 incident or above is declared. The OASG provides strategic-level support and advice for the overall operational area and is convened when multiple incidents occur within an operational area. Members of the two groups include a Chair appointed by the Controlling Agency, the Local or District Emergency Coordinator and liaison officers from agencies and community organisations involved in response and recovery.

The Esperance ISG and OASG were first and jointly convened on 18 November and combined ISG/OASG meetings were held twice daily at the request of the Incident Controller. The members were staff from DFES, the Shire of Esperance, WA Police, WA Country Health Service, St John Ambulance, Department for Child Protection and Family Support, Department of Agriculture and Food, Water Corporation, Main Roads, Brookfield and Aurizon Rail companies and the Australian Defence Force. The OASG was disbanded on 22 November, while the ISG was stood down on 23 November as part of the handover in control from the IMT to the Shire of Esperance. That handover went with an overall shift in focus from response to recovery, as the incident was downgraded to Level 2.

Stakeholders reported consistently that the combined ISG/OASG worked effectively. It enabled fire response agencies and stakeholders with long-term knowledge, contacts and interests in the region (related, for example, to infrastructure, agriculture and community welfare) to share information. This supported the immediate response as well as recovery planning. Strengths of the ISG/OASG were:

- **An agreed point of contact.** The group provided a dedicated point of contact for inter-agency cooperation that informed individual agencies’ priorities. Representatives discussed issues and made joint decisions during meetings, as well as between meetings via phone. Agencies could also track and follow-up on issues thanks to the timely distribution of meeting minutes.

- **Good representation from agencies.** While participation varied across meetings, overall the meetings were well-attended by representatives who understood their roles and made

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84 SEMC, District Emergency Management Arrangements: State Emergency Management Policy No.2.4, 2009
85 SEMC, Incident Management: State Emergency Management Policy No.4.1, 2013, p4
87 DFES, Great Southern Regional Situation Report, 22 November 2015
88 DFES, Great Southern Regional Situation Report, 23 November 2015
decisions that supported the incident response. An important dimension of this was that agency representatives had the authority to make operational decisions on behalf of their agency.

- **Access to incident and operational area information.** Having simultaneous access to information at both levels helped agencies understand the broader changing conditions, for example where roads were open or closed and where water supplies or communications were down. This helped agencies plan their operations as well as identify information to be shared at community meetings.

- **Relevance to important operational decisions.** Stakeholders shared information that improved their decisions. For example, roads and electricity representatives shared information about the conditions under which they could arrange the reconnection of power services, while telecommunications representatives could share information about resources available for deployment to communities.
5 Despite these resourcing challenges the response was generally well managed, although there are some clear areas for improvement

Once there was a sufficient level of resourcing, the response to the Esperance District fires was generally well managed. Beyond the issues relating to resourcing, there were still some clear areas for improvement. The Cascades and Merivale fires started on UCL, for which responsibility for managing fire is diffused across multiple agencies. Mitigation on UCL outside of townsites is the responsibility of P&W, whereas response is the responsibility of Local Government, creating discontinuity in managing fire. Communications infrastructure was unreliable, which led to information gaps between the fireground and IMT. There were also a number of reoccurring issues with systems and processes that have been identified in previous reviews that continue to frustrate the response to fire, including the role of Local Government, integrating local knowledge into the response, and incident planning forms and systems.

5.1 These fires started on UCL, where multiple agencies are responsible for managing the fire risk

Responsibilities for managing fires on UCL, where the Cascades and Merivale fires started, are diffused and complex. Mitigating bushfire risk is undertaken by DFES for UCL in townsites, and P&W for UCL outside of townsites. Response to fires on UCL is the responsibility of Local Government, creating discontinuity in managing the fire hazard. P&W receives funding to mitigate fire risk on UCL, but it is a substantial task. It is not practical within funding and resource constraints to mitigate the whole area of UCL and private property interface. There was some fire mitigation work undertaken on UCL in the Esperance region in the vicinity of the Cascades, Merivale and Cape Arid complex fires. However, it has not been possible to maintain all mitigation to the desired level.

**Responsibility for managing the fire hazard on UCL is diffused across DFES, P&W and Local Government, while the Department of Lands maintains administrative responsibility**

While the Department of Lands (DoL) has administrative responsibility for UCL and Unmanaged Reserves (UMR), P&W and DFES have responsibility for mitigating bushfire risk depending on the location through separate Memoranda of Understandings (MoUs) with DoL. In the Perth metropolitan area and regional centres and townsites, DFES manages mitigation of bushfire risk[^5] while P&W manages mitigation of bushfire risk on all other UCL[^6]. Furthermore, Local Government, through bushfire brigades, has

[^5]: Memorandum of Understanding between the Department of Conservation and Land Management and the Department for Planning and Infrastructure in relation to the Administration and Management of Unallocated Crown Land and Unmanaged Reserves Outside the Metropolitan Area, Regional Centres and Townsites, 2004

[^6]: Memorandum of Understanding between the Department for Planning and Infrastructure and the Fire and Emergency Services Authority in relation to Fire Risk Management on Unallocated Crown Land and Unmanaged Reserves in the Metropolitan Area, Regional Centres and Townsites, 2004
responsibility for response when fires break out on UCL, further adding to the complexity of managing the fire hazard on UCL.

Due to the complex arrangements around managing the fire hazard on UCL, there is not a coordinated approach to managing the risk across the state. While bushfire mitigation work on UCL outside of the Esperance town site is the responsibility of P&W, Local Government has overall planning responsibility through the requirement to develop a Bush Fire Risk Management Plan for the whole Local Government Area. This requires input from other agencies. However, the diffusion of responsibilities has the potential to cause confusion and does not necessarily translate to a coordinated approach to managing and mitigating bushfire risk on the ground. To address this issue the OBRM plans to adopt a ‘tenure blind’ approach to the assessment of bushfire risk across WA, which would take a more holistic approach to the planning of bushfire mitigation by ignoring ownership demarcations of land. However, such an approach would still require cooperation across multiple agencies and private landowners to implement coordinated mitigation measures. Furthermore, prioritising risk for each Local Government Area on an individualised basis could lead to competition for mitigation expertise and funding between Local Governments.

Mitigating the risk of fire on UCL outside of the metropolitan region and regional centres is a substantial task, for which DoL provides funding to P&W to undertake

The UCL and UMR area for which P&W undertakes fire mitigation for DoL is vast, estimated to be 89 million hectares. It is difficult to ascertain the length of the UCL/UMR interface across WA. However, in the south west of WA alone the interface of P&W estate to cleared agricultural area is estimated to be at least 7,700km, of which over half is UCL and UMR interface. In the Esperance area, the interface is estimated to be at least 2,350km.

Under the MoU, DoL provides some limited funding to P&W to undertake fire mitigation, weed and feral animal control, and harvesting of flora and forest produce. In 2014-15, state-wide funding under the MoU was around $1.5m, of which around $1m was for fire-related activities and the rest for non-fire matters (principal control of weeds and feral animals).

Thus, mitigating the risk of fire on UCL is a substantial task, with a large area to cover within the constraints of the available funding. As is the case across the state, in the Esperance region there is limited funding to mitigate fire on the UCL and UMR interface. Given the limited resourcing, P&W takes a targeted risk-based approach to prioritise mitigation work, but it is not practical within the constraints to mitigate the whole area.

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91 DFES, Westplan – Fire, 2013, p. 49
92 DFES, Westplan – Fire, 2013, p. 49
93 Memorandum of Understanding between the Department of Conservation and Land Management and the Department for Planning and Infrastructure in relation to The Administration and Management of Unallocated Crown Land and Unmanaged Reserves Outside the Metropolitan Area, Regional Centres and Townsites, Attachment 4, 2004
There was some fire mitigation work undertaken on UCL in the Esperance region, but it has not been possible to maintain all mitigation to the desired level.

There has been fire mitigation work undertaken on UCL and P&W tenured land in the locations of all of the Esperance District fires. In the immediate vicinity of the ignition point of the Merivale fire, there was limited mitigation due to the inaccessibility of terrain and proximity to private land. However, construction of firebreaks and prescribed burns had been undertaken close to Cape Le Grand National Park, which provided a strategic boundary to the south of the fire (see Figure 15 below). Fuel age was estimated to be around seven years\(^94\), following a previous bushfire in Stockyard Creek.

Figure 15: Fire mitigation in the vicinity of Cape Le Grand National Park\(^95\)

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\(^94\) Data sourced from fuel age map prepared by DFES Spatial Services
\(^95\) Map provided by P&W, Fire Management Services Branch
In and around Cape Arid National Park, mitigation work had been carried out in the past two years in the form of firebreaks and prescribed burns (see Figure 16 below).

Figure 16: Fire mitigation in the vicinity of Cape Arid National Park

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96 Map provided by P&W, Fire Management Services Branch
In the area where the Cascades fire started, excluding the reactive mitigation work done on 16 November, P&W had carried out bushfire mitigation work five to six years ago, which consisted of scrub rolling (2009) and burning (2010) pre-existing fuel buffers. The mitigation of the UCL interface in the area of the Cascades fire, including the additional mitigation undertaken by brigades on 16 November, is shown in Figure 17 below. Research and operational experience of P&W indicates that these 100m buffers should contain all but the most extreme fires for 8-10 years before requiring re-treatment.\textsuperscript{97} In areas where, on 16 November, brigades had widened pre-existing buffers that had been scrub rolled in 2009 and burnt in 2010, the buffers were effective at stopping the spread of the Cascades fire. However, limited time and resources meant that this additional treatment could only be undertaken on about 5km of the interface, of which about 1km ended up being in the path of the Cascades fire.

Figure 17: Fire mitigation on the UCL / private property interface of the Cascades fire\textsuperscript{98}

The consensus amongst P&W stakeholders was that there are not currently sufficient resources available to widen and maintain buffers across the whole of the UCL interface. Thus a risk-based approach must be used to prioritise mitigation works, as is currently used.

\textsuperscript{97} N Burrows, Fuels, Weather and Behaviour of the Cascade Fire (Esperance Fire #6) 15-17 November 2015, 2015, p. 7
\textsuperscript{98} Map provided by P&W, developed in November 2015
5.2 Communications infrastructure was unreliable, which led to information gaps between the fireground and IMT

The response to the Esperance District fires was hindered by unreliable communications infrastructure, in particular challenges with radio communications. There were also issues with how communications infrastructure was used, including inadequate discipline over communication channels and the lack of a communications plan in IAPs for several days. Unreliable communications contributed to limited intelligence from the fireground and limited visibility of resources. This highlights the importance of protecting critical infrastructure during major incidents.

Constraints in infrastructure to support communication between the IMT and the fireground led to gaps in information

It was a significant challenge to maintain communications during the Esperance District fires, in part due to infrastructure constraints. Outside of the metropolitan area, the state has to date been relatively poorly served in terms of mobile communications infrastructure, although state government plans are in place to address mobile black spots. In the Esperance region, this includes an additional two mobile base stations that will be completed by June 2016, and a further nine by June 2018 (see Appendix B for locations).99 Gaps in regular mobile coverage were compounded by the necessary compromise of power during the fire incidents: central power was switched off for safety reasons and there was limited battery back-up available, particularly at smaller sub-towers. This meant that mobile communications were unreliable and congested.

Local agency personnel and volunteers reported that local people are aware that mobile telephone communication is ‘nice to have’ but likely to be constrained during a major fire incident. Radio communication systems are, by contrast, essential to the fire response, particularly in remote areas. Communication through the Cascades repeater failed early in the response to the fires, and as a result it could not support reliable radio communications during the incident. There was no redundancy in the radio infrastructure system in the Esperance area, such as portable or back-up repeaters, which meant that there were no workarounds available in the event of radio infrastructure not being functional. As a result, there was sometimes limited radio communication between the Cascades fireground and the IMT.

Radio traffic also became congested due to radio infrastructure failures. The Shire had two channel systems intended for use during incidents: the Bush Fire Brigade (BFB) network and the DFES command network.100 The intent of the two networks was to allow for separation in communications in the event of more than one fire. However, the DFES command network was not able to be used during the initial days of the incident. A workaround had been put in place to address an issue with a faulty antenna101, but this had not been communicated to relevant local DFES personnel. This left one frequency, the BFB network, available for all communication related to the Cascades and Merivale fires. These constraints were felt particularly on 18 November, at the same time as the fire conditions had worsened and the

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99 In February 2015, the state government announced the $45m Regional Telecommunications Project, which would provide greater connectivity for regional communities and improve safety and emergency service capabilities. This identified 85 priority sites and 22 for initial roll out, which included Salmon Gums and Grass Patch. In June 2015, the funding was increased to $118m with co-funding from the Commonwealth and telcos carriers, which will enable 153 new or upgraded towers.

100 The DFES command network is a linked repeater network that spans from Esperance to Albany. It has two channels: Channel 186 which is a Command Network Repeater and Channel 187 which is the local area wide Communications network.

101 In July 2015, the DFES contractor for maintaining radio infrastructure identified that the antenna on the Channel 187 repeater was not operating to specifications. A workaround was put in place to move the Channel 186 antenna to Channel 187. The issue was considered high risk, and permanent resolution of the issue was scheduled for completion as part of planned maintenance work in November.
IMT was being set up. There was no communication of these issues from the IMT back to the Perth-based Radio Communications team, which meant it took more time for these issues to be resolved.

Even with the support infrastructure in place, different agencies, including DFES, P&W, Local Government and the WA Police, use different communications systems. Where private vehicles are used, this becomes more of a problem. For example, local farmer response units generally do not have the same level and type of communications systems installed in their vehicles. Some personnel that were deployed from other regions had to use hire cars, which were also not fitted with compatible communications systems.

**Issues in how communication infrastructure was used also hindered communication between the IMT and the fireground**

While the BFB radio channel functioned satisfactorily, a lack of clear protocols, discipline and thoughtfulness in how the radio was used compounded the infrastructure constraints and affected the operational response. Personnel had to book air time or break in over the top of others’ communications. Some interviewees reported that idle radio chatter among some teams clogged the system at times. These behavioural issues made it hard for the IMT to discern major issues, while it was difficult for fire crews to hear and relay information as required.

Stakeholders involved in the response said it would have been helpful to have had a centralised incident level communications plan. This would have helped with communication between the IMT and the fireground. The plan would be devised to ensure that everyone on the fireground could send and receive necessary information, while there would be contingencies in place to deal with risks and issues. The IAP forms have provision for including communications plans, which are specified as being mandatory for Level 2-3 incidents. However, communications plans were not included in IAPs until 20 November.

**Unreliable communications contributed to limited intelligence from the fireground and limited visibility of resources**

Constraints in communications infrastructure also manifested in limited information from the fireground in the IMT. This is reflected in the absence of intelligence on the fire behaviour and movement during the early phase of the response, and consequently the lack of maps that could be produced by the IMT at this time. Unreliable communications is also linked to limited visibility of resources on the fireground. Currently, there are no systems in place to automatically track resources. Instead, the IMT uses the physical system of T cards and an Incident Management Board. Resources should be recorded on a T card prior to tasking. The organised placement of T cards on the Incident Management Board at the control point then tracks the location of the resources.\(^\text{102}\) Movements of crews on the fireground should be communicated back to the control point to enable the placement of T cards to be updated. However, with the breakdowns in communications infrastructure, it was not possible to maintain this system. Thus, the IMT reported not having visibility of resources on the fireground. This has the potential to put crews and operations at risk, particularly given the fast rate of spread experienced by the Cascades fire on 17 November.

\(^\text{102}\) DFES, *Standard Operating Procedure 3.2.6 – T Cards and Incident Management Boards*, 2015
5.3 Issues with systems and processes identified in previous reviews continue to frustrate the response

There are a number of other issues with systems and processes that have been identified in previous reviews but continue to frustrate the response to major incidents. The integration of local knowledge into the management and operations of the response is one of these key processes, and was crucial for the Esperance District fires given the reliance on external resources. Local Government played a valuable role to provide local knowledge to the management of the response. However, there were opportunities where this could have been strengthened through greater clarity of roles and direct involvement in the IMT. At the operational level, there was variable integration and use of local knowledge on the fireground. While there were some reports of external division and sector commanders valuing and using knowledge provided by local brigades, there were other reports of this not being the case. The use of incident planning forms and systems to provide direction to the fireground response was another area of reoccurring frustration during the Esperance District fires.

These reoccurring issues with systems and processes are discussed in the following section.

**Local Government played a valuable role to provide local knowledge to the management of the response, but there were opportunities where this could have been strengthened**

It is recognised that integration of local knowledge is crucial to an effective firefighting response. Numerous reviews into major bushfires in Australia indicate that the effective use of local knowledge in a firefighting response is crucial.\(^{103,104}\) Furthermore, the Margaret River Bushfire Special Inquiry cited the lack of engagement of local knowledge had a detrimental effect on the firefighting response.\(^{105}\) It is also a requirement that IMTs include personnel with local knowledge where practicable.\(^{106}\) Local Government have an important role in ensuring that the response to a major incident draws on local knowledge. This was even more important than usual in the Esperance district fires, given the reliance on external resources both in the IMT and on the ground.

The Shire of Esperance continued to be closely involved in the response to the Esperance District fires after control was transferred to DFES. For example, the Shire CEO was present with the IMT from 16 November onwards, and subsequently there were several Shire staff supporting the IMT every day. Shire staff and councillors played an essential role communicating with community members through local meetings, social media posts and media outlets. The Shire also contributed local expertise in ISG meetings. This incident was the first time that the Shire of Esperance and a full-agency IMT had worked together, with positive feedback on inter-agency coordination between Local Government and the IMT reported on both sides.

While Shire staff generally felt well-informed by the IMT and able to fulfil their communication role, they reported some challenges. It was difficult at times to maintain the accuracy and consistency of information in the public domain. This was due to the flow of information on social media, the way in which some non-local journalists operated, unclear delegation of media responsibilities among councillors and interruption to mobile phone services. Shire staff were also placed in a difficult position when they were unable to comment on critical issues such as fatalities while these were being reported in the media.

\(^{103}\) SEMC, Parkerville Stoneville Mt Helena Bushfire Review Report, 2015, p. 35
\(^{104}\) 2009 Victorian Bushfires Royal Commission, Fire Preparation, Response and Recovery, 2009, p. 90
\(^{105}\) M Keelty, Margaret River Bushfire Special Inquiry, 2012, p. 9
\(^{106}\) DFE5, Westplan – Fire, 2013, p. 23
Shire staff noted the importance of establishing a single source of information on which all agencies and media could draw, similar to the ‘one source: one message’ system the Keelty review into the Perth Hills Bushfire recommended.\(^7\) This would have helped communities stay calm and prevented, for example, some mixed messages to the Salmon Gums community about when to evacuate. However, the evacuation of people in Salmon Gums to Esperance on the evening of 17 November is a good example of the valuable role played by Local Government. The evacuation was carried out effectively with the support of Shire staff. They were able to draw on their knowledge of available resources in the procurement of vehicles and supplies, and were able to inform the community of the evacuation through established phone trees. Shire staff were then part of the evacuation convoy itself, which meant that there was a locally known community member to provide a reassuring presence for evacuees.

Despite the overall positive role of Local Government in the response, there were some issues identified relating to clarify of roles. There was an initial lack of clarity on the role senior Shire staff could play in the Level 3 response once DFES assumed control. The Shire did place staff in the Incident Control Centre, enabling them to support the IMT and feed information back to Shire councillors. Shire staff were not, however, included as full members in the IMT. Conversely, IMT members commented that Shire staff members provided valuable support but could have been strengthened if there were personnel with experience and training in AIIMS or key IMT roles.

**Local knowledge was crucial given the reliance on external resources, but there were reports that local knowledge was not always sufficiently well integrated into the response**

In addition to the role played by Local Government in providing local knowledge into the management of the response, there is a crucial need to integrate local knowledge into the firefighting response on the ground. There was variable integration and use of local knowledge on the ground in the Esperance district fires. While there were some reports of external division and sector commanders valuing and using knowledge provided by local brigades, there were other reports of this not being the case.

Local volunteers and Shire of Esperance staff continued to provide substantial support to the fire response after overall control was transferred to DFES. Local brigades continued their work to contain and control fires, while other local volunteers such as St John Ambulance and State Emergency Services personnel provided essential support. In some cases, volunteers reported that there was limited continuity of these local volunteers following shift changes, which meant that when external crews were brought in to relieve local crews, they did not have local knowledge available to them. Thus, local volunteers believed it was a poor decision to stand down local crews as external resources arrived. From the perspective of the IMT, however, the fatigue of all firefighters must be adequately managed to ensure their safety. This is a reoccurring challenge across all incidents spanning more than a few days as, in practice, local volunteers will often choose not to step away from protecting their own communities.

Local agency personnel and volunteers emphasised the importance of external people deployed to the response being willing to listen to local people, who are likely to have a good knowledge of the terrain, typical local fire behaviour, and local roads and infrastructure. While there were some reports of local knowledge being listened to by external commanders, there were also reports of local knowledge not being used, including:

- **Understanding of the terrain**: A situation was reported where a machine got bogged, which would have benefited from local insight of the terrain.
- **Understanding of typical fire behaviour**: A situation was reported where local knowledge of how to manage firebreaks in particular vegetation was not used, impacting on its effectiveness.

• **Understanding of local roads and infrastructure:** Inappropriate placement of vehicle control points was consistently noted by volunteers, including instances of vehicle control points positioned without consideration for managing the flow of road trains in that particular area, resulting in road trains being unable to turn around.

Clearly, both external agency personnel and local volunteers have valuable knowledge and experience that must be adequately utilised in the response to a major fire incident. External agency personnel bring experience in responding to large and complex incidents, whereas volunteers bring valuable local knowledge such as understanding of the local terrain, typical fire behaviour, and local roads and infrastructure. Effective use of external and local expertise requires both sides to have an understanding of the value and process to integrate such knowledge. The variable integration of local knowledge in the Esperance fires indicates that there is variable understanding of this.

**Issues relating to incident planning forms and systems sometimes hindered effective communication between the IMT and the fireground**

The IAP is the key planning document at the incident level. It is intended to capture activities and support the response for a defined period of time. It covers incident objectives and strategies, key risks, instructions for operational activities and communication and support arrangements. A common comment made in consultations was that the IAP is being developed as a single product to be relevant to multiple audiences, but in practice it cannot meet all of their different needs. For example, IMT and ROC members felt that IAP preparation was geared to the needs of the ROC and SOC, and as a consequence the IAP did not always provide clear operational direction to fire crews on the ground.

There was also some confusion about how the WebEOC system should be used to develop and record IAPs. DFES’ WebEOC business rules require the IAP to be developed in that platform for Level 2 and 3 incidents, but IMT personnel found it difficult to use the web-based version. They believed a paper-based version would have been easier to use and update at the incident level, and in practice paper-based IAPs were generally used by the IMT. WebEOC has an option to upload a paper-based version, but IMT personnel were not aware of this, and it would appear to be inconsistent with the WebEOC business rules. Furthermore, the WebEOC and paper based IAPs were used differently, with IAPs in WebEOC being developed as an initial Form 1 IAP.

Issues in the use of the IAP for meeting the needs of crews on the ground is reflected in observations of a gap in tasking and communication to fireground responders, particularly during the establishment of the full IMT on the morning of 18 November. Without tasking from the IMT, local brigades identified their own priorities. One brigade volunteer reported that, in the absence of any direction, they self-deployed to support farmers on the eastern side of the Cascades fire. While this is likely to have provided useful support to this part of the fire response, self-deployment of crews poses a safety and operational risk, as the IMT does not have full knowledge of the location of resources on the fireground and strategies being undertaken. Later that day, the crew changed their location in response to IMT instructions, but felt that the overall response was weakened because there were no crews to replace them in their original position.

6 Recommendations

The MIR has reviewed the effectiveness of the management of the Esperance district fires. In the context of the challenging conditions, intensity of the fires and competing resource demands across the state, the Esperance district fires were generally well managed. However, the review confirms where areas of focus for future improvement need to be. The MIR makes three overarching recommendations, each with three specific elements:

Figure 18: Summary of recommendations

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<th>Recommendation 2: Resourcing models appropriate to local needs, including fire risk and remoteness</th>
<th>Recommendation 3: Resolve reoccurring issues with systems and processes</th>
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<td>1.1 Coordinated and targeted mitigation of fire risk</td>
<td>2.1 Structures to incorporate local knowledge and situational awareness into the fire response</td>
<td>3.1 IAP formats and processes appropriate to the nature of the emergency response</td>
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<td>1.2 Co-designed arrangements that support a unified response to fire</td>
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<td>1.3 Review of institutional arrangements in the fire sector</td>
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Managing the fire hazard requires a collaborative effort from multiple agencies, in particular between DFES, P&W and Local Government. These agencies must therefore take a collaborative and active approach to addressing opportunities for improvement. The recommendations reflect opportunities for improvement that are known across the fire response agencies, and have been highlighted in previous major incident reviews in WA. In most of these areas, attempts have already been made to address the issues, both by individual agencies and through the IBMC. However, the experience of the Esperance district fires indicates that despite good progress in many areas, there is still further work to be done. The IBMC is a forum for discussion between agencies chaired by the SEMC and it does not have the capacity to implement recommendations, relying on the agencies to address issues as part of business as usual operations. This approach has had some successes, but ultimately is constrained by its limited capacity. Successful implementation of the recommendations will require dedicated resources from all of the agencies with responsibilities for managing fire.

Recommendation 1: A unified and integrated fire sector across the whole fire hazard

Management of the fire hazard is diffused across multiple agencies, depending on the land tenure and phase of the hazard. DFES, P&W and Local Government all have significant responsibilities in mitigating and responding to fire. DFES has ultimate accountability, reflecting the designation of the FES Commissioner as the Hazard Management Agency (HMA) for fire. The fire agencies have been taking steps towards greater coordination, but the management of the Esperance district fires demonstrates that there are still opportunities for improvement.

There are three elements of the recommendation for a unified and integrated fire sector across the whole fire hazard:
• Coordinated and targeted mitigation of fire risk
• Co-designed arrangements that support a unified response
• Review of institutional arrangements in the fire sector

Each of these is discussed below.

Recommendation 1.1: Coordinated and targeted mitigation of fire risk

Rationale
The risk posed by bushfires is increasing in the southern part of WA. This is due to a number of factors, including changes in climate, rising populations in the rural-urban interface, and changes in land use and management such as reductions in prescribed burns and more intensive farming practices. The changing nature of risk is unlikely to be the same across all parts of the state, as there are locally specific factors that need to be understood. For example, the changes in farming practices in the Esperance region led to a higher level of risk prior to harvest, but this may not be replicated in other parts of the state.

At the same time, resourcing available for responding to bushfire has remained largely unchanged. Furthermore, if there are challenging weather and terrain conditions and high fuel loads, the ability of response agencies to quickly contain and control a bushfire can be limited. Direct attack of bushfire is unsuccessful beyond a certain level of intensity. Therefore, there needs to be a focus on mitigating the risk posed by fire. This has been a key theme in previous reviews of major bushfires in WA and other jurisdictions.

Currently, the responsibility for mitigating fire risk is diffused across multiple agencies and private landholders. In recognition of the importance of managing risk and the diffused responsibilities, the OBRM was set up in 2012 to “enhance the efficient and effective management of bushfire related risk in WA”. The OBRM is taking a tenure-blind approach to assessing and planning for the risk of bushfire. In its current form, the OBRM encourages coordination between agencies but does not actively coordinate implementation of fire risk mitigation.

Key components:

The WA fire sector is taking steps towards a proactive and coordinated approach to managing fire risk through the OBRM, but this needs to be taken further. There needs to be a coordinated and targeted approach to implementing mitigation strategies to address risks identified and assessed by OBRM. The approach to implementing fire mitigation strategies needs to be coordinated between agencies, coordinated across the state, and targeted to local risk factors:

• **Coordinated between agencies:** The OBRM has recently released guidelines for Local Governments to develop an integrated bushfire risk management plan, which promotes a coordinated approach to planning for mitigating bushfire risk. To support OBRM in its role to encourage coordination between agencies, there needs to be arrangements in place to actively facilitate coordination of implementation of mitigation strategies. This could be through regular forums for communication, and joint approaches to resourcing mitigation strategies.

• **Coordinated across the state:** To make most effective use of available resourcing, funding and expertise for bushfire mitigation, there needs to be a state-wide coordinated approach to

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implementing mitigation strategies. Without a centrally coordinated approach there is a risk of inconsistent and sub-optimal application of mitigation.

- **Targeted to local risk factors:** Implementation of mitigation strategies must be targeted to local risk factors, requiring local assessment of the risks posed by bushfire. The framework for local governments to develop a bushfire risk management plan requires local assessment of the risk. As part of this, local governments and landowners should consider local factors that impact on the ability to effectively respond to bushfire. This coordinated local assessment approach can also identify opportunities to draw on the resources of all local organisations for solutions to identified risks. For example in Esperance, an opportunity was identified for Brookfield Rail to collaborate with the fire agencies to help address local emergency communications issues.

A coordinated approach to mitigating fire risk requires a detailed understanding and assessment of the changing nature of risk. In particular, the change in risk associated with changes in farming practices was highlighted in the MIR for the Esperance district fires, but is not currently well researched and understood. These changes may have implications for bushfire risk across other parts of WA and Australia. Further research is needed at a state or potentially national level to understand the drivers and implications of these changes. This needs to draw on the knowledge and insights of relevant government and non-government agencies, such as the Department of Agriculture and Food and the Farmers’ Federation.

Agencies cited limited resourcing as a factor that constrains fire mitigation operations. Limited resourcing is one reason for the reduction in prescribed burning that has been undertaken by P&W over recent decades, in particular since the 1990s. Resourcing constraints are also a factor in the amount of mitigation that can be undertaken on UCL. In light of increased risk posed by high intensity fires in some areas of the state, the appropriate level of investment in mitigation of fire risk should be reviewed.

**Recommendation 1.2: Co-designed arrangements that support a unified response to fire**

**Rationale:**

There are three agencies with responsibilities for responding to fire under state policy: DFES, P&W and Local Government. Reflecting this, *Westplan – Fire* requires DFES and P&W to develop state inter-agency arrangements for bushfire operations. While there are some areas where agencies use joint doctrine, most notably through State Emergency Management Policies, there are a number of areas in which limited clarity of arrangements for a unified response impacts on responding to fire. Most significantly, there is limited detailed guidance on how agencies should integrate their procedures and operations and information through state, regional and local operational levels. This leads to gaps in information, preventing a common strategic overview of fire activity and response.

Personnel from DFES and P&W consistently cite this as a critical issue to be addressed. A unified response to fire would support more efficient and effective management of incidents, particularly where there are multiple concurrent incidents across the state. Despite the policy direction and clear benefits, however, clear inter-agency arrangements for response at the state level are not in place. A number of barriers have been cited, including different organisational objectives, different cultures and insufficient resourcing to develop inter-agency arrangements.

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111 Other factors include climate variability, land use changes and population growth.
**Key components:**
A unified response to fire must be underpinned by detailed guidance on the roles and responsibilities of all agencies at different operational levels in the response to fire. DFES coordinates the response to emergency incidents through the structures of the SOC at state level and MOCs/ROCs at regional level. The WAFES manual has role descriptions of the SOC, MOC and ROC, but it does not provide guidance on how other agencies should integrate into these structures. Greater clarity is needed of the expectations of each agency for participating in SOC/MOC/ROC functions, particularly in the context of multiple concurrent incidents. There must also be a common and agreed understanding of how the SOC, MOC/ROC and IMT interface with each other.

A unified response is also dependent on a common picture of fire activity and response appropriate to the operational level. This requires clarity of the information required at each level as well as agreed systems and approaches to communicate this information. For example, agencies that participate in the SOC must agree what information is required from each agency to enable the SOC to maintain a state-wide strategic overview of emergency incidents and how this information is shared. There are initiatives being undertaken to address this in specific areas, such as through the project to establish a joint intelligence desk in the SOC. Agencies need to extend this to clarify and address all information requirements of each operational level.

The Esperance district fires highlighted insufficient clarity between DFES and Local Government of the process and implications for Section 13 declarations. DFES, Local Government and P&W need to jointly clarify the triggers and process for requesting a Section 13 declaration, and define the implications for transfer of control.

Ultimately, inter-agency arrangements for a unified response to fire must be co-designed by all agencies with a key role in the response (primarily DFES, P&W and Local Government). This requires resources from the agencies dedicated to developing the arrangements. A co-designed approach will ensure that the arrangements are appropriate, practical and accepted by all agencies. While there are specific opportunities for a unified response currently being pursued, a comprehensive approach that starts by defining current agency and inter-agency procedures and desired future state procedures would be preferable.

Once the arrangements for a unified response are agreed and clearly defined, they need to be communicated and understood by personnel in the relevant agencies. The continuation of multi-agency exercises is a useful channel for embedding unified response arrangements.

**Recommendation 1.3: Review of institutional arrangements in the fire sector**

**Rationale:**
As noted in Recommendations 1.1 and 1.2, there is currently a disjointed approach across agencies to managing the fire hazard. These issues are well known by the agencies, and as a result effort has been made to address them, primarily through the IBMC. A unified and integrated approach to fire management may be achieved under the current institutional arrangements through implementing the opportunities identified in Recommendations 1.1 and 1.2. However, recommendations of this nature have been made in previous reviews. Given the difficulties that have been experienced under current institutional arrangements to develop an integrated fire sector, more radical reform could be considered.
Key components:
The first step would be to review the current institutional arrangements and investigate alternative options. This would cover the responsibilities of the three agencies with significant responsibility for managing fire under Westplan – Fire: DFES, P&W and Local Government. Options that could be considered would likely be on a spectrum of institutional integration, as shown below. A greater level of institutional integration would require a greater level of change, and therefore would likely be more difficult and time-consuming to achieve.

Figure 19: Spectrum of institutional integration

There would be various permutations between the two options shown above, each with their own advantages and disadvantages. For example, options could include:

- responsibility for response is held by a single agency
- responsibility for prevention through to response is held by a single agency, but recovery remains the responsibility of Local Government
- responsibility for response on non-P&W land is held by a single agency, integrating the responsibilities of DFES and Local Government for response

It is important to note that any change to institutional arrangements would be significant. The starting point should be consideration of Recommendations 1.1 and 1.2 to develop a unified fire sector under current arrangements. An in-depth review of institutional arrangements should be undertaken before any change is proposed.
Recommendation 2: Resourcing models appropriate to local needs, including fire risk and remoteness

The ability to mobilise and deploy appropriate and sufficient numbers of resources to incidents is a challenge for the fire agencies when transitioning from business as usual to emergency response. This was particularly important for the Esperance district fires given the context of competing demands for resources across the state, the relatively low level of resourcing in place in Esperance and its remoteness.

There are three elements of the recommendation for resourcing models that are appropriate to local needs, including fire risk and remoteness:

- Structures to incorporate local knowledge and situational awareness
- Flexible pre-formed multi-agency IMTs
- Appropriate and scalable resourcing models for remote locations

Each of these is discussed below.

Recommendation 2.1: Structures to incorporate local knowledge and situational awareness into the fire response

Rationale:
Outside of the metropolitan area, the response to a major fire is likely to require the support of external personnel. This was the case in the Esperance district fires, which required external personnel in IMT roles and external firefighting crews. Previous reviews have highlighted that incorporating local knowledge is vital for the response. This is recognised and understood by the fire agencies. For example, DFES has made efforts in the past to identify local people to take on roles as volunteer liaison officers, but it has been difficult to implement. Thus there is a need to ensure that there are structures that incorporate local knowledge and enable incoming personnel to quickly be able to develop situational awareness by drawing on local knowledge.

Key components:
A major fire incident puts local communities under a great deal of stress. Different people within the community, including volunteers, will respond in different ways, which will affect their attitudes, behaviours and interactions towards external fire response personnel. Structures to incorporate local knowledge must therefore be grounded in an understanding of the ways in which the local community respond to being in the situation of a major incident that draws on both local and external resources. This is a commonly occurring scenario across Australia. There would be benefit in state or national level research to investigate this further, and the implications for responding to major fires.

Structures to incorporate local knowledge must define the role of local volunteers, local government agencies, and external response personnel in a fire that falls outside the control of Local Government. This could include fires where control is transferred away from Local Government (under Section 13 or Section 45 of the Bushfires Act) and situations where local volunteers are supporting a DFES or P&W controlled fire from the start.

- **Defining the role of local volunteers:** The role of volunteers is clear in a Local Government controlled fire, and local brigades will be familiar with, and well-practised in, their roles. The role of local volunteers in major fires is less well defined, particularly in how best to draw on
their knowledge. Defining the role of local volunteers in major fires will inform the structures and processes used to incorporate their knowledge. This could include mechanisms through which local brigades nominate a volunteer to work with external sector/division commanders and to accompany external crews. It may also include identifying local personnel who would fulfil specified IMT roles for different incident levels.

- **Defining the role of local government agencies**: There is likely to be varying familiarity of local government agencies (including, but not limited to, Local Government) in their role in a major fire incident. This will be dependent on the extent to which agencies have participated in joint exercises or have been involved in major incidents locally. Defining the role of local agencies could include clarifying the role of Local Government CEOs, Councillors and staff, and the role of Local Government in public communications. There is also an opportunity to define the agency-specific role of ISG members, which will vary depending on the local context. Defining the role of local government agencies could also extend to identifying agency personnel who could fulfil specified IMT roles for different incident levels.

- **Defining the role of external personnel**: While agency personnel recognise the importance of drawing on local knowledge, there is not currently clear guidance on how best to engage local people for this purpose. Both local responders and external personnel need to have clear expectations on how to interact and ensure sharing of knowledge during a major incident.

Defining roles and putting in place structures to incorporate local knowledge should be undertaken at a local level. This will ensure it is appropriate to the local circumstances. For example, roles and expectations of local volunteers and external personnel may be considered by the local Community Emergency Management Officers, local DFES and P&W personnel, and local brigades and fire control officers. Roles and expectations of local government agencies may be considered through Local Emergency Management Committee arrangements.

The fire agencies will need to ensure that there is sufficient support for structures to incorporate local knowledge. This should include the availability, and potentially funding, of training for local volunteers and government agency staff to enable them to participate in IMT roles.

**Recommendation 2.2: Flexible pre-formed multi-agency IMTs**

**Rationale:**
Outside of the metropolitan area, the response to major fire incidents generally requires IMT personnel from beyond the immediate region, as there is a lower level of resourcing in place for business as usual operations. This makes it challenging to rapidly mobilise and deploy IMT members in sufficient numbers and who are familiar with and prepared for their IMT role. Where response to fire requires resources from outside of the immediate area, the fire is often at a scale and complexity that requires multi-agency involvement. The need to draw on multiple agencies for IMT personnel compounds the challenge of deploying sufficient and appropriate IMT members.

Establishing multi-agency pre-formed IMTs would make it easier to deploy adequate IMT resourcing to major incidents. The benefits of pre-formed IMTs have been identified by agencies and in research, primarily relating to the development of strong working relationships between IMT members.\[12\]

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\[12\] Bushfire CRC and AFAC, Fire Note Issue 106, *The Influence of Familiarity on Teamwork and Decision Making*, 2013. This research indicates that IMTs where working relationships have previously been formed demonstrate higher performance, such as attending to more fireground events more effectively, producing higher quality reports, making timelier decisions, developing greater situation awareness and showing greater teamwork.
Key components:
The intent and arrangements for establishing multi-agency IMTs are in place in some regions through MoUs. Regions put together multi-agency level 2 IMTs as the need arises based on anticipated adverse fire conditions. In practice, however, agency priorities tend to supersede the arrangements to form multi-agency regional IMTs. At the state level, there remain significant barriers to overcome in order to establish multi-agency pre-formed IMTs. For this recommendation to be successful, agencies need to be committed to the concept and work together to co-design the requirements and arrangements. For example, participating agencies must agree the numbers and roles of resources appropriate for initial deployment to Level 2 incidents, and requirements for Level 3 incidents. Coming to an agreement on this will also require a common understanding of the roles of the SOC, ROC and IMT in relation to an incident, as discussed in Recommendation 1.2.

One of the challenges of establishing and deploying pre-formed IMTs is that the number of resources required may vary between incidents and over the duration of an incident, and there may be multiple incidents across the state that require additional IMT resources. An incident requiring additional management resources generally does not need a fully-formed IMT as there will already be a number of personnel from local fire agencies and volunteer brigades in place. Pre-formed IMTs must therefore be flexible, to enable scaling up of resources as appropriate and to take into account the realities of competing demands for resources. One option for creating this flexibility could be to have a pre-formed ‘pool’ of IMT personnel from multiple agencies. Each pool could be an equivalent size to, for example, four minimum sized Level 2 IMTs. The people in the pool would have defined roles and would train together, thus getting the benefits of familiarity of role and working relationships. However they would not necessarily be deployed as a single pre-formed team, depending on the requirements of the incident and other resourcing demands across the state.

As part of establishing multi-agency pre-formed IMTs (or pre-formed ‘pools’ of IMT personnel), participating agencies must jointly define the current state and desired future state number of people trained in each core IMT role. This will identify any gaps in expertise that must be addressed through further training. Agencies must also have common approaches to IMT accreditation and endorsement. Through the IBMC, agencies have agreed to recognise the accreditation of personnel from other agencies. Work is also being undertaken by the Australasian Fire and Emergency Service Authorities Council (AFAC) towards establishing a national certification process.

Recommendation 2.3: Appropriate and scalable resourcing models for remote locations

Rationale:
In areas of the state with a relatively low population, there is generally a low level of resourcing of fire agency personnel. This reflects the lower risk posed to life and property on a day to day basis. In the event of a major incident, fire agencies will mobilise personnel from other regions to support the local response. Remote locations, such as Esperance, face an additional challenge of requiring more time to mobilise and embed external resources to support a major incident. The resourcing model for remote locations must be appropriate to their needs, based on the fire risk, and allow for effective scaling up of resourcing as required.

Key components:
Each fire agency must consider the minimum level of resourcing required for remote locations. This minimum level of resourcing must be appropriate to the local fire risk and conditions. In the case of the Esperance region, for example, it should take into account local factors that impact the risk, such as the
changes in farming practices. Local conditions that could be considered include the remoteness of the location, and therefore time needed to deploy additional resources, and likely workload to manage and coordinate local volunteer brigades. To ensure that there is an ongoing level of local resilience, it is unlikely that one person in any office is sufficient.

The resourcing model for remote locations must also be scalable to ensure efficient use of resourcing relative to the level of risk through the year. This would allow for sufficient resourcing in high risk times of year. For example in Esperance, it may be sensible to have a higher level of resourcing in the early part of the fire season before harvest. A scalable model of resourcing could have the benefit of enabling non-local personnel to become familiar with the regions. This could be on a rotational basis, where identified fire agency personnel rotate through regions during the high threat season. As well as supplementing permanent local resourcing during high threat periods, these external personnel can build relationships with local people (both volunteers and agencies) and gain experience and understanding of the local area, terrain and fire behaviour. In the event of a major fire, there will be a larger pool of personnel that have developed local knowledge and can be deployed to the incident.

**Recommendation 3: Resolve reoccurring issues with systems and processes**

There are a number of issues with systems and processes that frustrate the response and are regularly identified by agencies and external reviews as issues that need to be addressed. These reoccurring issues should be resolved. As with other recommendations, resolving reoccurring issues with systems and processes will be most effective if implemented jointly by all fire agencies.

There are three elements of the recommendation for resolving reoccurring issues with systems and processes:

- IAP formats and processes appropriate to the nature of the emergency response
- Cross agency resource management system
- Live resource tracking system that can be used by all response agencies.

Each of these is discussed below.

**Recommendation 3.1: IAP formats and processes appropriate to the nature of the emergency response**

**Rationale:**

The current IAP format is geared towards informing multiple audiences, including crews on the ground, the IMT and coordination bodies above the IMT. This results in a lengthy document that is time consuming to produce and is not relevant in its entirety to responders on the fireground. The IAP is therefore sometimes of limited use in providing operational direction and tasking to the fire response. There are practical difficulties involved in providing sufficient copies of a lengthy IAP to all response crews, which can lead to delays in tasking of crews.

During the period in which a fire is escalating, the level of detail required in the current IAP format results in time being spent producing a document that can quickly become out of date. In the case of the Cascades fire, for example, its rate of spread on the afternoon of 17 November meant that any specific
operational objectives, beyond protecting life, property, infrastructure and environment, would have been irrelevant.

Key components:
IAP formats and processes need to take into account the phase of the response, and must ensure fire responders receive appropriate information. Fire agencies may consider different levels of complexity of IAPs depending on the phase of the response. During the escalation of a fire, there may be shorter more focused IAPs that communicate the key safety and operational information that is needed by crews on the ground.

Beyond the escalation phase, fire agencies should review the IAP in its current format to identify which parts are for which audiences. The IAP can be divided into the information that needs to go down from the IMT to the fireground, that needs to inform the activities of the IMT, and that needs to be reported upwards. The information given to crews on the ground should only be what they require, to ensure they receive a practical document that is usable and can be quickly disseminated to them. Similarly, the ROC may only receive the information that it needs to conduct its regional oversight and coordination role.

In addition, to ensure that IAPs provide timeline and useful guidance to the fire responders, expectations must be clearly set for the process of getting IAPs to the fireground. This includes clear expectations on the IAP components that are given to crews, the process for getting them to crews, and the role of the central IMT Operations personnel and division and sector commanders in disseminating IAPs to the fireground.

The issues to be addressed through this recommendation have been identified and are being acted on by the fire agencies through the IBMC. DFES proposed to IBMC a review of the timeframes and contents of the IAP. A working group is undertaking the review. For this to be successful, any changes to the IAP format and processes must be agreed and implemented jointly by DFES and P&W in consultation with operational fire responders, including volunteers.

Recommendation 3.2: Cross-agency resource management system

Rationale:
There is currently not a high level of visibility across agencies of resources that are committed to incidents and resources that are available for deployment. It is difficult, even within agencies, to immediately identify potential resources for deployment. This becomes even more challenging when trying to identify potential resources across multiple agencies. As a result, it is difficult for agencies at the regional and state level to plan, manage and coordinate resource deployments effectively. The ROC and SOC are not able to balance competing demands for resources effectively. Resource deployments may not be optimal, taking into account availability, fatigue management, skills and experience.

WebEOC is currently used to manage resource requests from the ROC to the SOC. However, in its current form it does not provide the functionality needed for a resource management system.

Key components:
Given the role of multiple agencies in responding to fire in WA, it is critical that any resource management system includes all key response agencies, including local government and volunteer units. It must be able to account for different industrial arrangements, including fatigue management rules, for

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different agencies. To ensure it is an effective tool for coordinating resources for fire response, the specification and requirements of the resource management system must be undertaken jointly by all of the fire response agencies.

The cross-agency resource management system must include both human and physical resources, and identify the relevant certifications, skills and experience of resources. For physical resources, this may include compliance with relevant standards. For human resources, this may include AIIMS accreditations, but also other relevant skills and experience, such as experience in particular types and levels of bushfire and familiarity with different regions. It should include a local dimension, to ensure that local resources, such as contractors for machinery and appliances, are recorded in a central location that is accessible to all agencies. This will enable regions to appraise the availability of local resources to improve self-sufficiency, including identifying opportunities to increase local capacity.

As well as giving visibility to resources, the cross-agency resource management system must support agencies to track and manage deployments. It must contain information on current and planned deployments to enable forward planning of resourcing, taking into account fatigue management arrangements. This will support agencies to better manage the logistics for catering and accommodation for deployed personnel and to more easily anticipate operational resource requirements at the incident, regional and state level.

**Recommendation 3.3: Live resource tracking system that can be used by all response agencies**

**Rationale:**
It is currently difficult to track resources on the fireground. The physical T card system can be effective in a small incident, but is difficult to maintain accurately in a larger incident with multiple sectors, and is reliant on communication of any changes to the IMT. Any unplanned movements in fireground resources are unaccounted for, unless communicated to the IMT. This poses a safety and operational risk in larger incidents, as the IMT may not have a complete and accurate picture of the location of resources on the fireground.

Agencies recognise the benefits of implementing a live resource tracking system. P&W has vehicle location technology available, and DFES is currently implementing Automatic Vehicle Location technology.

**Key components:**
The response to any major incident is generally comprised of resources from multiple agencies, including volunteer units. Therefore a resource tracking system must be used and compatible across all response agencies, to ensure a common operational picture of resources on the fireground. Taking into account the practical realities of fire response, the system is likely to require options for mobile or portable locators to be used. This will enable any response units that are not fire agency vehicles to be included as needed.

As with the cross-agency resource management system, the specifications and requirements of a common resource tracking system must be jointly defined by the key fire response agencies that would be using the system. This will ensure it is appropriate to the needs of all agencies involved in the response.
Appendix A   Criteria for declaration of emergency incident levels

For reference, the criteria for the declaration of each incident level are set out in Figure 20 below.

**Figure 20: Criteria for incident levels**

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
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| A Level 1 incident is broadly defined by meeting one or more of the following typical conditions:  
• there are no significant issues  
• there is a single or limited multi agency response (day to day business)  
• there is minimal impact on the community  
• the incident can be managed by a Controlling Agency IMT only  
• there is a low level of complexity. | A Level 2 incident is broadly defined by meeting one or more of the following typical conditions:  
• requires a multi-agency response  
• has a protracted duration  
• requires coordination of multi-agency resources  
• there is some impact on critical infrastructure  
• there is a medium level of complexity  
• there is a medium impact on the community (health, safety, economic, technological or other)  
• there is potential for the incident to be declared an ‘Emergency Situation’  
• the incident involves multiple hazards. |

<table>
<thead>
<tr>
<th>Level 3</th>
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| A Level 3 incident is broadly defined by meeting one or more of the following typical conditions:  
• requires significant multi agency response  
• there is a protracted response duration  
• there is significant impact on critical infrastructure  
• there is significant coordination of multi-agency resources  
• there is a high level of complexity  
• there is significant impact on the community (health, safety, economic, technological or other)  
• there are multiple incident areas  
• evacuation and/or relocation of community is required  
• there is actual or potential loss of life or multiple, serious injuries  
• a declaration of an ‘Emergency Situation’ or ‘State of Emergency’ is required |

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Appendix B  Proposed mobile based stations in Esperance

Figure 21: Map of proposed mobile base stations in the Esperance region\textsuperscript{115}

\textsuperscript{115} Provided by Department of Commerce
Appendix C  Agencies and organisations that have provided input into the MIR

The following are the agencies and organisations that have provided input into the MIR, either through stakeholder consultations or through the provision of a written submission. The MIR acknowledges and thanks the contributions of all stakeholders that have provided input into the MIR.

- Association of Volunteer Bush Fire Brigades
- Aurizon Rail
- Brookfield Rail
- Bureau of Meteorology
- Bush Fire Service
- Bushfire Front
- Department for Child Protection and Family Support
- Department of Agriculture and Food
- Department of Commerce
- Department of Fire and Emergency Services
- Department of Human Services
- Department of Lands
- Department of Parks and Wildlife
- Department of The Premier and Cabinet
- Farmers’ Federation
- Main Roads WA
- Office of Bushfire Risk Management
- Shire of Esperance
- State Emergency Management Committee
- State Emergency Service
- Volunteer Fire and Rescue Service
- WA Local Government Association
- WA Police
- WaterCorp