



POST INCIDENT ANALYSIS FOR BLACKWOOD FIRE 11 – MILYEANNUP-SOLLYA, 23 NOVEMBER TO 5 DECEMBER 2011

Noetic Solutions Pty Limited

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INTRODUCTION

On 23 November 2011, the Milyeannup-Sollya fire, referred to as Blackwood Fire 11 escaped from a prescribed burn conducted by the Department of Environment and Conservation (DEC). After the fire's escape, it burned over 50 000 hectares before being extinguished on 5 December 2011. This is understood to be one of the largest bushfires in the south-west region of Western Australia (WA) in over 50 years. While no houses were lost, one person was injured in an indirect incident, and several properties sustained damage.

The Department of Premier and Cabinet (DPC) commissioned Noetic Solutions Pty Limited (Noetic) to conduct a Post-Incident Analysis (PIA) of the fire. PIAs are undertaken for a '*critical analysis to a complex incident or an incident that results in significant impacts or consequences*¹', and has the purpose of examining mechanisms used in responding to an incident to deliver outcomes that can improve response in the future.

AGENCY BACKGROUND

This PIA takes a tripartite approach to include the other three bodies responsible for the response to the fires, DEC, the Fire and Emergency Services Authority (FESA) and the Local Government Authority (LGA) of Augusta Margaret River Shire (AMR). An outline of their respective roles is below:

- + DEC is responsible under the *Conservation and Land Management Act 1984* to manage vested Crown land, unallocated Crown land and unmanaged reserves outside gazetted areas and town sites. One of the management tools used by DEC is fire. DEC internal policy for fire management is contained in *Policy Statement No. 19 – Fire Management Policy* and *Code of Practice for Fire Management* which provide guidance and direction on the management of prescribed burns including their initiation and containment. The Code of Practice also provides for the management of bushfires.
- + FESA is responsible for the provision of emergency management services throughout WA.
- + The local government, in this case the Shire of AMR, Under the *Emergency Management Act 2005* every is responsible for Local Emergency Management Arrangements (LEMA) and assistance with recovery as well as any other responsibilities delegated to them in the event of an emergency.

In WA, incident management during emergencies rests on the structures and principles contained in the Australasian Inter-service Incident Management System (AIIMS). Among other provisions, AIIMS defines roles that provide for the following functions:

- + Incident Control
- + Operations
- + Planning
- + Logistic Support
- + Public Information

The Incident Controller (IC) is responsible for the overall coordination and management of an incident and leads the Incident Management Team (IMT). The IMT is a standard structure which assembles the AIIMS functions into system of support for the IC. Arrangements within and between fire agencies provide for pre-

¹ DEC Fire Operations Guideline 94.

formed teams established under the AIIMS structure that can be readily deployed in the event of an emergency of a specified level, and are rostered when periods of extreme weather are forecast².

AIIMS provides for three levels of incidents and IMTs. They are numbered from 1 to 3 with Level 1 incidents being typically small, low impact and single agency; and Level 3 incidents being large, complex, high impact and multi-agency. For bushfires, the levels refer to the three phases that a bushfire may pass through, from an initial attack (Level 1), to an extended attack (Level 2) and then a Campaign fire (Level 3)³. For Level 2 and 3 incidents, when available, pre-formed teams will be deployed.⁴

THIS REPORT

This report outlines the findings from the PIA. It will provide background information and an event description which will provide context for the findings. The report will also explain the approach taken by the Noetic Team to develop the report. The findings will be presented in a series of observations and lessons structured by the terms of reference which can be found at Annex E. This will also be presented in tabular format of lesson, action and responsibility in Annex A. The report does not provide direction on responsibility for implementing the lesson. This will be determined by DPC and the relevant agencies.

MARGARET RIVER (BLACKWOOD FIRE 8) FIRE

Concurrent with the events covered in this fire, a significant fire occurred at Margaret River. The PIA for that fire is the subject of a separate report.

Aim

The aim of this report is to provide observations, lessons to be learned and recommended actions resulting from Blackwood Fire 11.

APPROACH

Methodology

Noetic's lessons learnt methodology is based around a set of principles which ensure that the most effective and useful lessons are determined. The process used to develop lessons begins with a broad information gathering stage to obtain a detail understanding of what occurred from those involved in the incident. The data is then analysed, observations developed and draft lessons are derived from these observations. The observations and draft lessons are then validated through a workshop with stakeholders, to further refine and articulate the lessons. This is then finalised, and presented in a report.

Principles

The PIA of Blackwood Fire 11 is intended to provide DPC, DEC, FESA, and the Shire of Nannup with an opportunity to reflect on what occurred and learn lessons for the future. The Noetic team used a proven lessons learnt process to conduct the PIA, with the following six principles guiding the review process:

² FESA Directive 3.5.

³ FESA Incident Level Declaration.

⁴ State Emergency Management Procedures Manual OP-23.

- + **No Blame.** The lessons learnt process does not apportion blame to organisations or individuals.
- + **Identify all Lessons.** The intent of the process is to identify what was done well and what could be done better. It includes identifying the systemic issues that might not be readily apparent.
- + **The Future.** The aim of the process is to enhance the future performance of all agencies involved in the response in order to ensure that good processes are retained and mistakes are not repeated.
- + **Observations are not Necessarily Lessons.** Regardless of how passionately views are held by individuals or organisations, a single observation does not necessarily translate into a widely applicable lesson.
- + **Consult Widely.** Engaging with stakeholders and as many people involved with the incident as possible ensures a balanced outcome.
- + **Lessons are not Learnt until Something is Done.** The development of lessons must be accompanied by the allocation of responsibilities, resources and milestones to ensure lessons are in fact learnt.

Information Gathering

Noetic undertook a comprehensive review of documentation, including

- + A draft DEC review into the fire
- + FESA review into the fire
- + Legislation
- + Fire Diaries
- + Burn Prescription

A complete listing of the documentation is at Annex E.

Noetic began stakeholder engagement over the week beginning 22 April 2012. The interviews included representatives from DEC, FESA, Local Government, WA Police (WAPOL), utility providers and members of the affected communities. A full list of interviews conducted is at Annex D.

A public submissions process was also undertaken. This was facilitated by the Department of Premier and Cabinet, and extended through to 29 April 2012. Noetic received 51 submissions⁵ in total and a full list is at Annex G.

Noetic also toured the fire ground to gain further insight and appreciation of the incident and its impact.

⁵ Note that these submissions cover both the Nannup and Margaret River fires.

Analysis and Validation

Following the information gathering, Noetic was able to identify common themes and formulated observations and draft lessons. In additions to improvements, the process seeks to identify both issues for improvement and effective practice so that the latter can be replicated. Both are captured in the observations.

A workshop was conducted with representatives of the stakeholder groups (an attendance list is at Annex E) to validate the observations and lessons. This workshop offered stakeholders an opportunity to question the observations and draft lessons, develop additional lessons and suggest actions. The workshop also identified where action relating to observations is already underway.

Finalisation

Noetic produced a Draft Report based on the stages above. This report contained a series of lessons and observations, and expanded upon themes identified during the workshop. The Draft Report was provided to the agencies involved and feedback was collated. Noetic then incorporated this feedback and compiled a Final Report which was submitted.

Report Intent

The report is not a forensic analysis of the causes of the fire, the conduct of individuals or agencies during the event. The principle of no blame is applied rigorously throughout. The relatively short period of information gathering and terms of reference means that the report is focussed on improving agency performance. Consequently, the analysis in this report is aimed at developing lessons that can be implemented by agencies to improve future performance.

CONTEXT

Bushfires in the south-west of WA can be some of the most intense in Australia. As such, measures are prescribed to limit the impact bushfires have on communities, flora, fauna and other values. As mentioned earlier, prescribed burning by DEC attempts to mitigate the risk of bushfire in a given area by reducing the available fuel. As fuel ages, the risk of an uncontrollable, intense fire increases. This difficulty of suppression is often exacerbated by poor or difficult access. DEC manage this risk by removing the fuel through prescribed burning of specified areas. It is noted in the DEC *Fire Management Policy* that 'under extreme conditions, the spread of fire may only be retarded in light fuels'. By managing the fuel age in various sectors across the state, DEC mitigates the severity of bushfire incidents. Given finite resources, the existence of a strategically located area of reduced fuel will assist fire managers in resource planning and deployment⁶. DEC's prescribed burning in the south-west has an annual target endorsed by the State Government of 200,000 hectare per annum.

Prescribed burning normally requires the establishment of an 'edge' – a line of burnt area separating the area that is to be burnt from the area that is not. Fire is retarded through previously burnt areas and edging is an effective means of confining a prescribed burn. Generally, edges will be prescribed to a certain depth e.g. 100m to contain the fire.

⁶ DEC Fire Management Policy.

Effective prescribed burning can only be carried out when conditions are favourable, and in some cases a prescribed burn will take months to complete. This is quite often due to poor weather hampering efforts to establish an edge which complies with the burn prescription.

DEC is one of the designated agencies for carrying out prescribed burning in WA, and possesses a high degree of experience and expertise in undertaking this task. However, DEC understands that prescribed burning is not without risk. In particular, difficulties in forecasting weather and in the ability to predict fuel moisture and fire behaviour create uncertainty. These uncertainties are exacerbated by the difficulty of predicting the duration of a burn. Once fire is put into an area it remains a source of risk until either the fuel is substantially reduced or heavy rains extinguish the fire. Due to this uncertainty, circumstances do occur that result in a 'break out' of some prescribed burns.

Blackwood Fire 11 escaped the prescribed burn area on 23 November and was not fully contained until 5 December. Importantly for the suppression effort applied to this fire, on 23 November, another fire (Blackwood Fire 8) escaped a prescribed burn area at Ellensbrook north-west of Margaret River that presented a threat to life and property until the evening of 25 November. The available effort for both fire fighting and incident management available for Blackwood Fire 11 over the first 48 hours was constrained by the more compelling needs presented by the Margaret River fire.

EVENT DESCRIPTION

This section provides a description of the fire event from its inception as a prescribed burn, its break out and subsequent development up until it was contained. The information for this section was obtained from a variety of sources including those involved with the fire, log books and reports on the fire. A map of the impacted area is at figure 1.

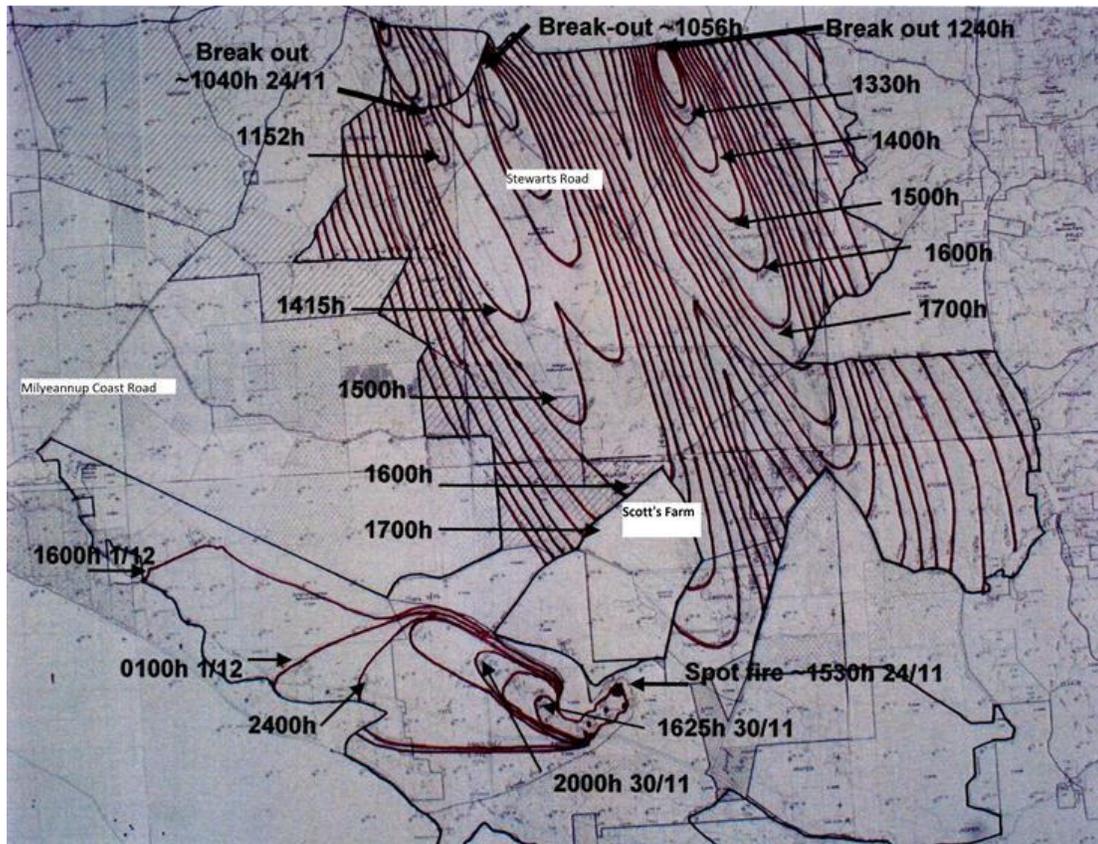


Figure 1 - Map of the fire from break out

The fire that escaped the prescribed Milyeannup-Sollya Burn (also known as BB125) resulted in Blackwood Fire 11, one of the biggest bushfires in the south west region (approximately 270km south east of Perth) for over 50 years. Edging of the prescribed burn (BB125) began in autumn 2011. The prescription for the burn contained an edging plan which specifies the acceptable limits for weather, fuel and Soil Dryness Index⁷ (SDI) for implementation. Edging appears to have been carried out within these limits. At the time it was noted that around the south west corner of the prescribed burn fuels were too wet to establish an acceptable edge. At the end of the 2011 autumn edging effort, it is likely that only 26km from a total of 44km was effectively edged and that the edge was of variable quality⁸.

⁷ SDI is an index of dryness of soil profile, deep forest fuels and coarse woody debris. It ranges from 0 (saturated) to 2000 ('bone' dry).

⁸ Burrows, ND, Milyeannup Bushfire: causal factors and fire behavior April 2012.

As BB125 contained high fuels loads and was surrounded by areas that had not been subjected to prescribed burns for a number of years, it was recognised as a 'potentially risky and difficult burn'⁹ and thus identified as a 'red flag' burn by DEC.

On 19 November, edging and core ignition were carried out simultaneously. In the morning edging was concentrated along the north western boundary due to the likelihood of winds pressuring that border following core ignition. In the early afternoon, core ignition¹⁰ commenced by air, with ignition lines running parallel to the north-west border. At 1730hrs core ignition had finished and the prescribed burn was burning.

On the morning of 20 November, edging continued on the south-west boundary. The fire behaviour was mild at this time. By the afternoon, the edging on the south boundary was completed to the extent possible. The fuel along the southern boundary was described as moist and 'duffy'¹¹. On 21 November, the focus shifted to consolidating the edging, along the eastern, south-west and southern borders. DEC documentation of the prescription recorded that one crew member noted that edging was 'poor on the eastern side of the creek' (presumed to be Milyeannup Creek).

On 22 November crews began to mop up around the perimeter and during this time there was a noticeable change in the weather. The wind, which was forecast for east-north-east was recorded by around 1500hrs to be west-south-west.

On 23 November, the perimeter was being patrolled by a crew consisting of two trucks and a light unit. A DEC spotter aircraft noticed a hop over, which was investigated by the crew. By this stage, the winds had shifted to a north-westerly direction, and shortly after midday, the fire had broken out from the prescribed burn area over the south-west boundary.

Initially, the DEC District Duty officer at Kirup was leading an IMT that was still assembling and which was responsible for both the Ellensbrook and Milyeannup fires. At 1140hrs, the roles of District Duty Officer and IC were separated and allocated to different people both based in Kirup. The attention demanded by the Ellensbrook fire inevitably, and correctly, limited the incident management effort available for the Milyeannup fire. Although the IC (and IMT) remained responsible for operations at both Ellensbrook and Milyeannup, the Duty Officer effectively controlled responses to the Milyeannup fire on behalf of the IC. As far as incident control was concerned, the Milyeannup fire was risk managed until the afternoon of 24 November.

Early in the afternoon of 23 November the IC and the District Duty Officer (DDO) considered the strategic situation and potential of the fire from a worst-case scenario perspective. This information was again reviewed later in the day and DEC state fire management were advised of the potential of the fire being large, affecting the Scott River agricultural area with weather influenced by a west coast trough movement on 24 and 25 November. This potential was discussed several times with senior staff during Shift 1 and at handover to Shift 2 on 24 November. The IMT and DDO also discussed and identified that direct attack would most likely fail due to inaccessible terrain (boggy ground) and severe fire behaviour under strong winds and long unburnt fuels. This scenario was factored in to the strategic thinking.

⁹ *ibid.*

¹⁰ Ignition of the core of the block, in this case by air using incendiary.

¹¹ 'Duffy' is used to describe the partially decomposed layer on a forest floor – also known as the *humus* layer.

During the early afternoon on 23 November an Operations Officer, six fire units and a bulldozer arrived at the fire ground and the crews began to focus on suppression using the resources on hand. This included some aerial support for reconnaissance. By the early hours of 24 November a measure of re-containment had been achieved but there was concern about the likelihood of another escape from the containment line and its potential impact.

At approximately 0900hrs on 24 November a Level 2 Incident Management Team (IMT) dedicated to this fire was established in Kirup, and began to draw resources from surrounding areas. Because of the drain created by Blackwood Fire 8, the IMT was initially staffed only by the District Duty Officer and two or three staff members with active management of the response being delegated, in practice, to the Operations Officer on the fire ground.

At about 1030hrs the fire, fanned by strong north-easterly winds, escaped containment with multiple 'hop overs' both north and south along Stewarts Road. Around 1040hrs a decision was made to withdraw crews from the fire ground as the multiple breakouts had created an unacceptable risk to their safety. The behaviour of the fire precluded direct attack, and the focus subsequently shifted to containment. At around this time it was observed that the fire was moving at 1-1.5 km per hour with flame heights of 30 – 40 metres. The IMT directed that further roadblocks be positioned along key roads to reduce danger to the public.

At around 1300hrs on 24 November, the incident was formally upgraded to a Level 3 and a Level 3 IMT began to form at Kirup under a FESA IC. Initially this IMT was restricted to the IC and the handful of DEC staff remaining at Kirup. At this time, the fire was running south towards the coast, which placed property along the Four Acres Road under direct threat. Efforts to protect the properties were ultimately successful, the fire was diverted and only minor property damage was sustained. However, one resident was severely injured as a result of a motor vehicle accident which occurred in thick smoke.

By mid-afternoon, additional fire fighting resources deployed into the area and the IMT was fully established. As a result, the effectiveness of the suppression effort rapidly improved. Over the following days effort was directed to contain the fire. Suppression activity focused on the construction of containment lines, edging / burning out unburnt pockets, mopping up and suppressing the numerous, mainly small, hop-overs.

At approximately 2300hrs on 24 November, a wind shift occurred which moved the fire towards the Vasse Highway. This slowed the fire to a degree but caused it to spread in a different direction. On the following day (25 November) the primary effort was focussed on containment, as the fire had the potential to run into areas of old fuel. There was a large spot fire in the Lake Quitjup area, and containing it proved difficult because the boggy terrain made access for land based units problematic. With the exception of the active spot fire east of Lake Quitjup, the remainder of the fire was contained and controlled over the next 4 days.

The fire was downgraded to a Level 2 incident and responsibility for incident control reverted to DEC.

Despite substantial and repeated efforts at aerial suppression and efforts on the ground on 30 November, a south-easterly wind caused this fire to run toward Milyeannup Coast Road. The third run of the fire between 30 November and 2 December had the potential to impact the settlements of East Augusta, Molloy Island and Augusta town site. Several lines of containment were established ahead of the fire. One of these was Milyeannup Road. When a hop-over crossed the trigger point on Milyeannup Road the settlement of Molloy Island was evacuated.

The fire was held on 2 December once it reached the containment line established at Milyeannup Coast Road, and it was finally extinguished on 5 December. It had made three runs, through largely old and unburnt fuel, burning over 50 000 hectares. The fire was later determined to have run at an estimated 4-5 kilometres per hour at some points. During the course of the fire no lives were lost; there was one injury and only minor property damage sustained. A map of the impacted area is included in Annex B.

OBSERVATIONS AND LESSONS LEARNT

The following section details the lessons to be learnt from incident. It provides some explanation and commentary on the issue. The issues covered reflect the Terms of Reference.

Planning and Implementation

Prescribed burning is about managing risk. As the rate of burning gradually decreases the average age of fuels increases. Over time this means that the risk attendant on any prescribed burn also increases. Consequently, it would appear reasonable that prescribed burns should only be ignited when conditions are, or close to, ideal. However, to do so would reduce the amount of fuel reduction and increase the overall threat faced by communities and eco-systems. The challenge is therefore not to seek to avoid risk completely but to put in place measures that recognise and manage it to the extent possible.

The Keelty Review of the Margaret River Fire *'Appreciating the Risk: Report of the Special Inquiry into the November 2011 Margaret River Bushfire'* (Keelty Review) makes a number of recommendations about improvements to the risk management process and supporting procedures for prescribed burns. Although Keelty's review was focused specifically on the fires at Margaret River, his recommendations surrounding improved risk management are applicable across all prescribed burns. The Noetic PIA supports the implementation of these recommendations and the following observations and lessons reinforce the importance of the Keelty Review findings.

Although the procedures for planning and managing prescribed burns are formal and documented, the processes for risk management within them is informal and distributed across a number of decision makers. Although it is reasonable to include a variety of perspectives in decision making it is important that decisions to ignite prescribed burns are fully informed by recognition of the risks being accepted and the measures in place to manage them. In the case of BB 125 the existing procedures led to the acceptance of accumulating risks resulting from high fuel loads, limited suppression resources, patchy edging and adverse weather forecasts. In isolation each decision was reasonable but, in sum, they presented a high degree of risk that was not fully appreciated or planned for.

The prescribed burn, BB125, was assessed as a 'red flag' burn¹² as it contained areas of old fuels and was surrounded by areas of old fuels. Despite attempts in autumn 2011 to edge the area, by spring 2011 a large portion of BB125 remained un-edged. When edging restarted on 19 November, fuel moisture was still relatively high, particularly along the south west boundary of the burn. As a result it is likely that the edging did not meet the prescribed standards a depth of 100 metres particularly in the south west. Here there were areas where the fuel was 'duffy', moist, and the edging was patchy and weak. On 19 and 20 November edging and core ignition were progressed simultaneously.

¹² A 'potentially risky and difficult burn' - Burrows, ND, Milyeannup Bushfire: causal factors and fire behaviour April 2012.

Despite the recognised 'red flag' character of the burn and an incomplete edge, core ignition was conducted beginning 19 November. DEC advised that this is standard practice on a burn of this type as it is not always possible to complete all edges separately and still retain the block unburnt. As a result it is normal for edging on one or two edges to follow core ignition. By the time of ignition weather forecasters were anticipating the development of a west-coast trough by 23 November but that was outside the four day forecast relied on by DEC. In any event, a decision to proceed with a burn of recognised high risk with an incomplete edge and in the midst of old fuels should include measures to mitigate the risks being accepted, including an increased preparedness for the eventuality of a breakout

The lack of comprehensive procedures to clearly recognise and retire risk in preparing for a high risk burn ('red flag' events) meant that DEC was not as prepared as it might have been for the escape. Desirable preparations might include actions such as rolling contingency planning to provide a draft Incident Action Plan (IAP) for an incoming IC, the concentration of a reserve of fire-fighting capacity, the pre-emptive deployment of additional fire-fighting assets or the establishment of a skeleton IMT. Ignition of 'red flag' burns needs to be more comprehensively managed than ignition of low risk burns.

Even though BB125 was assessed as a 'red flag' burn, there appears to have been insufficient pre-planning by DEC in the event that the fire escaped. The lack of detailed contingency planning had consequences for the initial response to the breakout of the fire which is explored later in this report. While there is no guarantee that detailed contingency planning would have prevented the breakout, it may have assisted in a more cohesive initial response.

Given the risks surrounding prescribed burning, importance is placed on risk management. Current risk management procedures in the burn prescription process appear to be focused on a single 'point-in-time' – the decision to ignite. This becomes an issue when the prescribed burn is conducted over an extended period and circumstances evolve.

Core ignition began on 19 November when the seven day forecast¹³ was anticipating the development of a west coast trough¹⁴ with northerly winds and higher temperatures, beginning 23 November. Clearly the degree of uncertainty associated with a seven day forecast is greater than that of a four day forecast. But a degree of uncertainty is preferable to decision making without all available information. Given the other burns being considered or conducted, consideration of the seven day forecast may have led to a decision to delay ignition of BB 125 or to apply more resources to edging or the containment effort. Tightening the connection between weather forecasting and decision making would offer opportunities for improved risk management. There is also potential benefit early in a suppression effort if experienced forecasters and fire behaviour experts are collaborating to anticipate likely fire behaviours. Modern forecasting models offer the prospects of more informed decisions but need to be interpreted by experienced meteorologists.

¹³ DEC does not receive seven day forecasts from the Bureau of Meteorology, however, they are available.

¹⁴ A west coast trough is one of the major weather developments for WA, a semi-permanent development creating very high temperatures – source Bureau of Meteorology.

Lessons:

- 1. There should be clearly established criteria for burns which are specially challenging, and these criteria need to extend beyond the intended boundaries of the prescribed burn. The criteria should be clarified and adopted as agency SOPs.**
- 2. A risk management approach is needed which considers risks both inside the prescribed burn and the risks that will need to be managed if the fire escapes. This risk assessment should be dynamic in line with the four day and seven day weather forecast.**
- 3. Prescriptions should mandate consideration of measures to retire risk.**

Once the burn was ignited on 19 November, the threat presented by deteriorating weather conditions should also have triggered more focussed risk assessment and mitigation efforts. The environment that a burn is conducted in is invariably dynamic. In this case, the development of a west coast trough would make the fire fighting environment more complex and difficult. Appropriate inputs (such as updated forecasts) to a dynamic risk assessment will assist in developing mitigation strategies that can help to pre-empt and address the developing situation.

Lessons:

- 4. Once a burn is ignited, it needs to be the subject of continuing risk assessment and appropriate mitigation.**
- 5. Contingency plans for escaping burns should be prepared in advance.**

The prescribed burning of BB125 was within limits set by DEC policy and was within the limits specified in the burn prescription. However, burning guides and prescriptions are designed for five to seven year old fuels and for normal patterns of seasonal drying. The situation in BB125 was unusual in that fuels were long unburnt (17 years old) and the Soil Dryness Index (SDI) was very low for the time of year. Correction factors exist in DEC documents to provide for some of these variables in the decision making process but they ultimately rest on the application of good judgement.

Complex burns and/or high risk burns require a higher degree of detail in planning. A uniform approach that draws on the best available experience to assess a high risk burn would assist in capturing risk factors outside of those regularly assessed. Robust and articulate documentation would assist less experienced personnel to understand these factors, and should be incorporated as part of the process.

Lessons:

- 6. Prescriptions need to be interpreted by experienced and knowledgeable personnel to ensure risk is fully understood. It is important that the background and justification for these decisions are captured at each stage and are visible to all levels in WA fire management hierarchy.**
- 7. The burn prescription should capture the fuel characteristics and potential rate of spread for those areas outside the burn that will likely be critical during the initial attack on any escaping fire.**

- 8. Core ignition, particularly of red flag burns, should be informed by the four and seven day forecasts (including a longer term perspective over three to four months).**
- 9. DEC embed an experienced forecaster in the state operations centre.**

The Escape and Response

The prescribed burn BB125 was planned to cover nearly 8000 hectares with some 44 kilometres of boundary. On the day of the escape, 14 kilometres of the southern boundary were downwind of the forecast wind. This included the boundary that was identified as the weakest edge of the burn. There were in attendance two fire tankers and a light unit. Patrolling and monitoring of this section of the boundary was possibly beyond the capacity of these assets. The fire at Margaret River meant that as the fire escaped there were no readily available assets that could be committed to contain the fire. As noted previously, resourcing to meet likely contingencies is important. When burns are assessed as high risk, it is also important that information be shared so that the implications can be assessed across districts and the state.

Lessons:

- 12. A rolling risk assessment is required which captures the risks of the burn escaping and provides adequate resources.**
- 13. Decisions taken on the basis of this risk assessment need to be recorded and distributed across district and state.**

From the fire's escape at 1209hrs on 23 November, the incident was managed by the Duty Officer at Kirup under the oversight of the Incident Controller (IC) who had to give greatest attention to the Margaret River fires¹⁵. By 0900hrs on 24 November, it was identified as meeting the criteria for a Level 2 incident. The fire was declared a Level 3 at approximately 1300hrs on 24 November and establishment of the IMT occurring shortly thereafter. The IMT initially consisted only of the FESA IC and a handful of DEC staff. Until then, the Operations Officer at the fire ground largely managed the incident with the support of the Duty Officer at Kirup. This was a particularly challenging task.

At 0630hrs on 24 November the Operations Officer was advised that there would be a handover and shift change at 0715. No resources arrived at the fire ground to facilitate the changeover so the resources then active on the fire ground remained. From 0750hrs on 24 November, volunteer fire fighting resources began arriving at the fire ground. No sector commander or division commander was attached to these volunteer resources, so this meant that the Operations Officer made a conscious decision not to deploy fire fighting resources on to the fire ground because it was unsafe to do so for a number of reasons. The Operations Officer was not able to physically meet up with the units to provide a briefing and outline safety issues. The Operations Officer was also unable to determine the experience of these volunteers, and therefore was unable to safely employ them around the head fire. Eventually, some volunteer assets were employed in mopping up, but generally the volunteer resource remained under-utilised. No prior notification was given to the Operations Officer about what resources were arriving and when.

¹⁵The Margaret River Complex is referring to the multiple fires burning in the Margaret River District.

The first three brigade units that arrived were briefed and despatched onto the safer western boundary to mop up. The next four brigade units that arrived (around 0900hrs) were directed to stay at Brockman Highway and Stewart Road until the Operations Officer could meet with them. Note that at this time the fire was placing pressure on the containment lines and multiple hop overs were occurring on the southern boundary. The Operations Officer, as part of his role, took responsibility for all fire fighters and their safety on the fire ground, including the incoming resources. This was the main reason the incoming volunteer resources were not engaged and deployed as soon as they arrived, as it was not safe to do so. The fire had escaped and there was no approved strategies in place or approved IAP to deploy resources safely.

As a result of the extreme fire behaviour and limited access, fire fighting assets were withdrawn from the direct fire suppression effort at around 1040hrs on 24 November. At 1140hrs on the same day the Operations Officer was re-tasked and undertook an assessment of the situation at Brockman Highway. During the remainder of the day management of the fire and activity of the fire fighters was focussed on community and asset protection to the south.

Notwithstanding the previous observations of the environmental difficulties, closer relationships between DEC and the Volunteer Bush Fire Brigade (VBFB) would have helped to ensure a stronger response effort. Developing stronger relationships cannot be done on the fire ground and requires effort to build understanding and trust outside of the fire danger season.

Lesson

14. On a regional basis there would be value in closer working relationships between DEC crews and VBFBs to build mutual trust and confidence. This could be done by opportunity engagement of VBFBs in DEC fire management or through exercises.

Given the weather conditions and understanding of the fuel loads in the path of the fire, there should have been sufficient information to anticipate that there was a high likelihood of a major fire developing once it had escaped from its initial containment. When the fire was declared a Level 2 incident on the morning of 24 November there was probably sufficient information to trigger a declaration of a Level 3 incident. Early declaration of a Level 3 incident, possibly with a Section 13 declaration, would probably have facilitated the earlier establishment of an effective IMT. Although this may not have altered the course of the fire, it may have reduced later impacts on property and people.

Lessons

15. The State Duty Officer from DEC and the State Duty Director, FESA need to confer whenever a Level 2 or 3 incident is declared to satisfy themselves that they have appropriate incident management structures and resources across the state at an appropriate level of preparedness.

At 1300hrs on 24 November, a level 3 Incident Controller was appointed and an IMT was progressively established. Due to the rate of spread, farms in the path of the fire were under threat and impacted at around 1530hrs. Prior to the new IMT functioning some farms had already been impacted by the fire some farms had been impacted by the fire. One person was seriously injured as a result of a motor vehicle accident in heavy smoke. Infrastructure damage occurred on some properties. Given the nature of the fire behaviour it is doubtful whether additional fire fighting resources would have made a difference to the final shape of the fire

because of floatation (bogging) issues affecting the capacity to track the fire and lack of access through the required areas.

It was not until late in the afternoon of 24 November (at approximately 1700hrs) some 28 hours after the fire broke containment that the IMT was fully established and functional. From this time, the conduct of fire suppression became more organised and coordinated. By the fire's third run on 29 November, it appears that incident management was of a high standard.

There were communication issues between Vehicle Control Points (VCPs) established by WAPOL and the Incident Controller on 24 November. The people manning these VCPs were unable to refer to the Incident Controller for guidance and as a result a number of decisions were taken which unnecessarily impacted on the community. In some cases, VCPs are the primary means through which the community interacts with emergency managers. If VCPs are well informed and helpful, community understanding is increased and co-operation will be enhanced.

Lessons

- 16. There needs to be a better appreciation of the role of VCPs and how they are managed in bushfire emergencies by all key agencies and the community.**
- 17. VCPs are one of the instruments by which the Incident Controller manages the emergency. VCPs without communications cannot be fully effective in their role.**
- 18. Local knowledge should be accessed to inform the placement and operation of VCPs.**
- 19. There is a need for community education on how road-blocks and VCPs operate in the event of an emergency.**

Lessons from a range of fires across Australia (such as the Toodyay fire and Wangary fire) highlight the importance of local knowledge to an effective response. The objective of good emergency management is to support community resilience. Combat agencies are culturally and organisationally focused on countering the specific hazards for which they are accountable and, during an emergency, relationships with the community are customarily seen through this lens rather than through that of resilience. Suppressing a fire in a way that contributes to community resilience rests to some extent on detailed local knowledge which is most likely to be resident in local government and local organisations. The Incident Support Group (ISG) is one mechanism to access this knowledge but it is, in most cases, it does not continuously interact with the IC or IMT. Developing mechanisms to identify and place knowledgeable local people into IMTs would be beneficial. Local government officials are a good source of knowledge and opportunities to embed them in IMTs should be investigated.

Lessons

- 20. Suitably experienced personnel with local knowledge should be connected to the Operations and Planning sections in all Level 3 incidents in the vicinity of substantial settlements.**
- 21. Opportunities should be sought to embed other local government representatives in other areas of the IMT particularly in public information.**

The Effectiveness of Suppression Strategies and Tactics during the Fire

From the time at which the fire initially escaped from the prescribed burn on 22 November, until the end of its first run to the south-east the following day there was not a fully staffed and functioning IMT. As a result, there was also no formal IAP and most decisions were made tactically by the Operations Officer on the fire ground. Nevertheless, extreme fire behaviour during the fire's first run limited the options for direct attack.

As the IMT was established late on 24 November, and resources were released from the Margaret River fires, the strategic direction of the response improved. By 25 November effective strategies had been developed and were being implemented. During the fire's second and third runs, to the south-east and subsequently to the west, the strategy for establishing control of the fire was well conceived, well executed, and ultimately successful.

The Effectiveness of Aerial Suppression

From 0500hrs on 24 November, water bombers were available to fight the fire. Two aircraft were forward based at Nannup and the first air attack sorties were flown at 1150hrs. At this stage the fire was moving at 1 – 1.5km per hour with 30m – 40m flame heights. An aerial spotter on site at 1415hrs was unable to determine the head fire or flanks due to smoke. Although useful, the effectiveness of aviation suppression was limited by the weather and fire behaviour particularly in the early stages of the fire.

It was reported to the Noetic Team that there was an issue with communications to aircraft. Communications were on a high band, and crews on the fire ground were on a mid band and, at least on 24 November. Consequently, no direct communication could be established between air and ground.

After the fire's initial run aviation was the primary and most effective method for initial containment in the hotspot that arose in difficult terrain around Lake Quitjup. Conditions from 25 November onwards enabled effective use of aviation, but long turnaround times to the airhead limited rates of effort. Despite numerous sorties over five days, aircraft were unable to fully extinguish this hotspot. A ground crew operated on the site, but due to swampy terrain they were unable to be fully effective.

Aviation remains an important capability to support fire suppression and despite the challenges presented by weather, smoke, long turnaround times and incompatible communications, it was used effectively in this fire. It is most effective when operating in coordination with ground crews.

The Effectiveness of Emergency Management Procedures

The cluster of emergencies at Margaret River and at Nannup highlights some weaknesses in emergency management procedures. While these arrangements are generally sound, enhancements to them are possible.

- + The impact of different agency geographic boundaries and different agency headquarters (HQ) locations increased the challenges faced by emergency management. There would be benefit in progressively realigning agencies boundaries and locations. Specifically, the liaison between agencies in the event of emergencies and the ability to collectively surge at short notice may have accelerated the response to these fires.

- + Under existing arrangements, district and local emergency management committees are focussed on deliberate planning – that is the Preparedness component of the PPRR continuum. The objective of good emergency management is to support community resilience. Combat agencies are culturally and organisationally focused on countering the specific hazards for which they are accountable and relationships with the community are customarily seen through this lens rather than through that of resilience. The ISG that forms part of the WA emergency management arrangements, and in particular its relationship to the IMT, subordinates the perspectives of the community to those of incident management. In the case of these fires, the needs of fire suppression at times took precedence over the needs and perspectives of the community. An expanded role for District and Local emergency management committees to extend their role into hazard management across a precinct, and into the response and recovery phases, would expand the role of the community in managing emergencies that impact on it. It could also offer a useful mechanism to encourage the community to accept its share of the responsibility to manage emergencies. Mechanisms to actively engage district and local emergency management committees across the PPRR emergency management continuum would be beneficial.
- + FESA has limited call on local government fire fighting assets. There are traditional reasons for this arrangement but there would also be advantage in establishing a legislative framework to enable FESA to determine the appropriate distribution of fire fighting assets in the event of a Level 3 incident and in particular to direct local government to release however many fire fighting assets FESA believes to be appropriate.

Lessons

22. There would be benefit in progressively aligning the geographic boundaries of each of the agencies and seeking to co-locate their headquarters within those boundaries.

23. Legislative change may be needed to enable FESA to better manage fire-fighting resources across the state.

24. The role of district and local emergency management committees should be reviewed to ensure they are appropriately engaged in the active management of emergencies across the PPRR continuum.

The Effectiveness of Interagency Operations

Multi-agency responses present a number of challenges. These challenges include cultural, process and equipment issues. For operational agencies such as fire services, effective interagency operations demand the ability to communicate consistently. Although the establishment of voice radio communications is usually reliable (within the limitations of terrain, environment and technology) the absence of an ability to share data, such as maps and action plans, and a common set of reports and returns, unnecessarily complicates the work of the IMT and the organisation of a response.

A Common Operating Picture (COP) capable of being disseminated to fire fighting resources and divisional and sector commanders, regardless of their parent agency, would markedly enhance the flexibility and responsiveness of the fire suppression effort as well as contribute to fire fighter safety. Despite the goodwill and good intentions of all involved, the lack of a COP and a common communications platform in this fire proved to be an impediment to the establishment of an effective inter-agency effort. Maximum benefit was not

gained from the combination of the capabilities of the various agencies, in particular the fire agencies. Absence of a COP and good communications also meant that support agencies were often unable to access up to date or reliable information. It is noted that this is an area of focus for improvement since the *A Shared Responsibility: The report of the Perth Hills Bushfire February 2011 Review*.

Lessons

- 25. The state should progressively align on a shared platform, such as WebEOC¹⁶, to establish a COP.**
- 26. The state should converge on a single communications platform for all emergency management and support agencies.**

The effective response to a complex and demanding emergency requires well-coordinated action so that all elements act in unison. Unified action requires good interoperability and a single point of control. During the course of this fire it does not appear that fire agencies had unity of control. Individual fire agencies tended to organise themselves along agency lines rather than moving quickly to a single multi-agency chain of control. This was reflected in the number of reporting chains that were established during the event. This multiplicity of chains detracted from the effectiveness of the response.

Lesson

- 22. Reporting and control should be through the incident chain of command and not through agency chain of command.**

The Level of Resourcing

As noted earlier the ineffective risk assessment prior to the commencement of the burn meant that there were insufficient assets available (two fire trucks and a light unit) to prevent the fire breaking out of the prescribed burn. Once the fire did break out, there was a window of opportunity up until mid-morning 24 November during which it might have been possible to re-contain it. However, despite the provision from 1400hrs on 23 November of two bulldozers and a further six fire trucks, there were insufficient resources to re-establish containment. More resources were requested, but due to the fires at Margaret River and other areas of the south west, they were unavailable.

There is a likelihood that the provision of more resources before the fire's first run, leading up to the initial escape and then during efforts at re-containment, would have been able to prevent the fire from developing as it did. However, once the fire had broken out, additional resources would probably not have changed the eventual outcome due to difficulties with access, boggy ground and the fire behaviour.

In addition to the initial breakout in the south-west corner of BB125, there was a subsequent breakout at around midday on 24 November further to the east along the southern boundary of the prescription. This suggests that even if additional resources had been provided to strengthen the efforts at re-containment, it is likely that they would have needed to be several orders of magnitude greater before sufficient effort would have been available to resume patrolling and fire suppression along of the rest of the threatened boundary of

¹⁶ WebEOC is an online crisis information management system utilised by WAPOL and other emergency services.

BB125. Given the other demands on fire-fighting resources on 23 and 24 November this level of resourcing was not likely to have ever been feasible.

As activity at Margaret River reduced, additional resources were applied to the Milyeannup fire and from the evening of 24 November, nine light units and nineteen trucks were deployed. Given the weather conditions and forecast were favourable for fire suppression, the level of resourcing at that time appears reasonable.

As this fire occurred prior to the normal bushfire season, a number of resources (such as aviation, standing DEC IMT, multi-agency IMT) were not available for immediate mobilisation. Fortunately aviation contractors were preparing for the fire season at Busselton and were able to mobilise aircraft for fire suppression at short notice. Their flexibility and goodwill was useful in the subsequent operations.

Information Management and Effectiveness of Community Advice

Ensuring community safety during an emergency requires timely and relevant information to be disseminated through a number of channels. The complexity of doing this during a major bushfire should not be underestimated. For those undertaking the incident management role, there is often uncertainty about the location, intensity and direction of the fire, and the likelihood of success of their fire fighting and containment plans. The resulting poor situational awareness means providing effective community advice can be problematic.

For the Milyeannup fire, during the critical phase up to the evening of 24 November, communication with residents is judged as being only partially effective. Many community warnings and alerts were either absent, out of date or inaccurate. This was exacerbated by difficult communication conditions, such as limited mobile telephone coverage. The lack of a complete IMT for much of this period and a quickly changing situation meant that information management was handled reactively rather than proactively. For instance, information was only provided when requested by the Shire and information posted on web sites was often out of date.

Improving information, warnings and alerts to the community is an important and difficult task. The nature of fires and fire fighting means that even in the most favourable circumstances it is unlikely that all community information can be as accurate or as timely as desired. Nonetheless a range of lessons are identified by this report to improve this situation.

Lessons

- 23. Early in an incident, close and effective liaison needs to be established with local government agencies.**
- 24. Web sites need to be kept updated.**
- 25. A high level review of alerts, warnings and messaging is needed to match community expectations with what is practical and achievable.**
- 26. Further community education may be needed on how to interpret messages.**
- 27. The agencies need to develop techniques to ensure accuracy of information across all media.**

28. Local emergency management committees and planning should identify modes of community contact.

The Effectiveness of Evacuation Procedures

Arguably, evacuation is the most difficult emergency management operation to undertake¹⁷. Even where communities are well prepared and rehearsed evacuations do not always go according to plan. The unpredictable nature of fires (and therefore the locations of safe areas and routes) as compared to say a tsunami, means planning, communication and execution are challenging.

People in the vicinity of Lake Jasper and Lake Quitjup were directed to evacuate late in the afternoon on 24 November. Generally these evacuations were not as well managed as they could have been. A number of perspectives were reported to this review but there is a perception on the part of some local residents that there was little assistance provided to evacuees and little assurance that people were moving along secure routes to places of greater safety. These views are not shared by the fire-fighters involved. This disparity highlights the extent to which confusion and mixed messages can hamper effective emergency management particularly within evacuations where people, who may be scared and disoriented, are being faced with situations of great novelty for which they may be more or less unprepared. Emergency managers will sometimes need to take specific measures to re-assure and support evacuees. As noted earlier the lack of capacity in the still forming IMT was a major reason for the perceived deficiencies in these evacuations.

During the fire's north-west on the run on 2 December, residents of Molloy Island and in a nearby aged care facility were evacuated. These evacuations were well conducted and adequate warning was provided to residents and those responsible for the facility.

Both Molloy Island and the aged care facility highlight the importance of prior planning. Both of these evacuations presented unique difficulties that, in the absence of good existing plans, would have presented challenging situations for an IC.

Lesson

29. When people are being moved away from their homes it's important that they move to a place of greater safety and that their movement is relatively assured.

The Effectiveness of People Welfare and Recovery Actions

The support of people during and after a bushfire is critical. This can range from people whose homes were destroyed, to that of the fire fighters involved, to that of rebuilding key infrastructure. There are a number of assistance programs available to those in need in the event of an emergency. The conditions which must be satisfied in order to obtain the assistance are not always clear. Accurate and early communication of who will qualify for financial support, compensation or relief is important in managing the expectation of the affected community.

¹⁷ See the evacuation for Hurricane Katrina in the US.

For the Milyeannup bushfire, several properties were damaged. It is understood that in the immediate aftermath local representatives of DEC undertook to provide financial assistance to some affected residents. Although this was quickly corrected, the frustrated expectations remain the source of some discontent within the community. The outcome sought by good emergency management is a resilient community, and the time taken by government decision making can negatively impact on community resilience.

Lesson:

30. Early resolution and clear communication of the financial and other support measures that will be available to affected residents is an important contributor to community resilience.

CONCLUSION

The fire that resulted from the escape of DEC prescribed burn BB125 was one of the largest bushfires in the south-west region since 1961. This report provides a range of lessons for consideration by agencies responsible for fire management in Western Australia. The report does not provide a forensic analysis of the causes of the fire. Implementing all of the lessons will not be simple and will take time. There are also likely to be resource implications. The successful implementation of the lessons will result in improvements in the agencies' capability to prevent, prepare and respond to fire events. However, there is always uncertainty in dealing with fire and while risk can be reduced it cannot be eliminated.

ANNEXES

Annex A: Summary of Lessons

LESSON	COMMENT	ACTION	RESPONSIBILITY
<p>1. There should be clearly established criteria for burns which are specially challenging, and these criteria need to extend beyond the intended boundaries of the prescribed burn. The criteria should be clarified and adopted as agency SOPs.</p>		<p>Review and update red flag burn criteria</p>	
<p>2. A risk-management approach is needed which considers risks both inside the prescribed burn and the risks that will need to be managed if the fire escapes. The risk assessment should be organised and in line with the four and seven day weather</p>		<p>Review and update red flag burn criteria</p>	

<p>forecast.</p>			
<p>3. Prescriptions should mandate consideration of measures to retire risk.</p>		<p>Review and update red flag burn criteria</p>	
<p>4. Once a burn is ignited, it needs to be the subject of continuing risk assessment and appropriate mitigation.</p>		<p>Review existing risk management tools to ensure that processes exist to periodically re-confirm their results.</p>	
<p>5. Contingency plans for escaping burns should be prepared in advance.</p>		<p>Doctrine for contingency planning should be developed and should be triggered by decisions to ignite 'red flag' burns. The contingency plans that result offer a first cut IAP to an IMT that is assembling and coming into action under the pressure of events. The burn prescription should provide guidance on the contingency plans required.</p>	
<p>6. Prescriptions need to be interpreted by experienced and knowledgeable personnel to ensure risk is fully understood. It is important that the background and justification for these decisions are captured at each stage</p>		<p>Review burn prescription procedures to ensure that the appropriate staff are consulted on identified high risk burns and that their input and direction is attached to the burn prescription.</p>	

<p>and are visible to all levels in WA fire management hierarchy</p>			
<p>7. The burn prescription should capture the fuel characteristics and potential rate of spread for those areas outside the burn that will likely be critical during the initial attack on any escaping fire.</p>		<p>Amend the documentary requirements for burn prescription.</p>	
<p>8. Core ignition, particularly of red flag burns, should be informed by the 4 & 7 day forecasts (including a longer term perspective over 3 to 4 months)</p>		<p>Review existing risk management tools to ensure that processes exist to periodically re-confirm their results.</p>	
<p>9. DEC should investigate embedding an experienced forecaster in the state operations centre.</p>		<p>Establish procedures and doctrine to support an embedded forecaster to work alongside fire behaviour experts.</p>	
<p>10. A rolling risk assessment is required which captures the risks of the burn escaping and provides adequate resources.</p>		<p>Review existing risk management tools to ensure that processes exist to periodically re-confirm their results.</p>	
<p>11. Decisions taken on the basis of this risk assessment need to be captured and distributed across</p>		<p>Update procedures to reflect decisions upon risk management and establish a</p>	

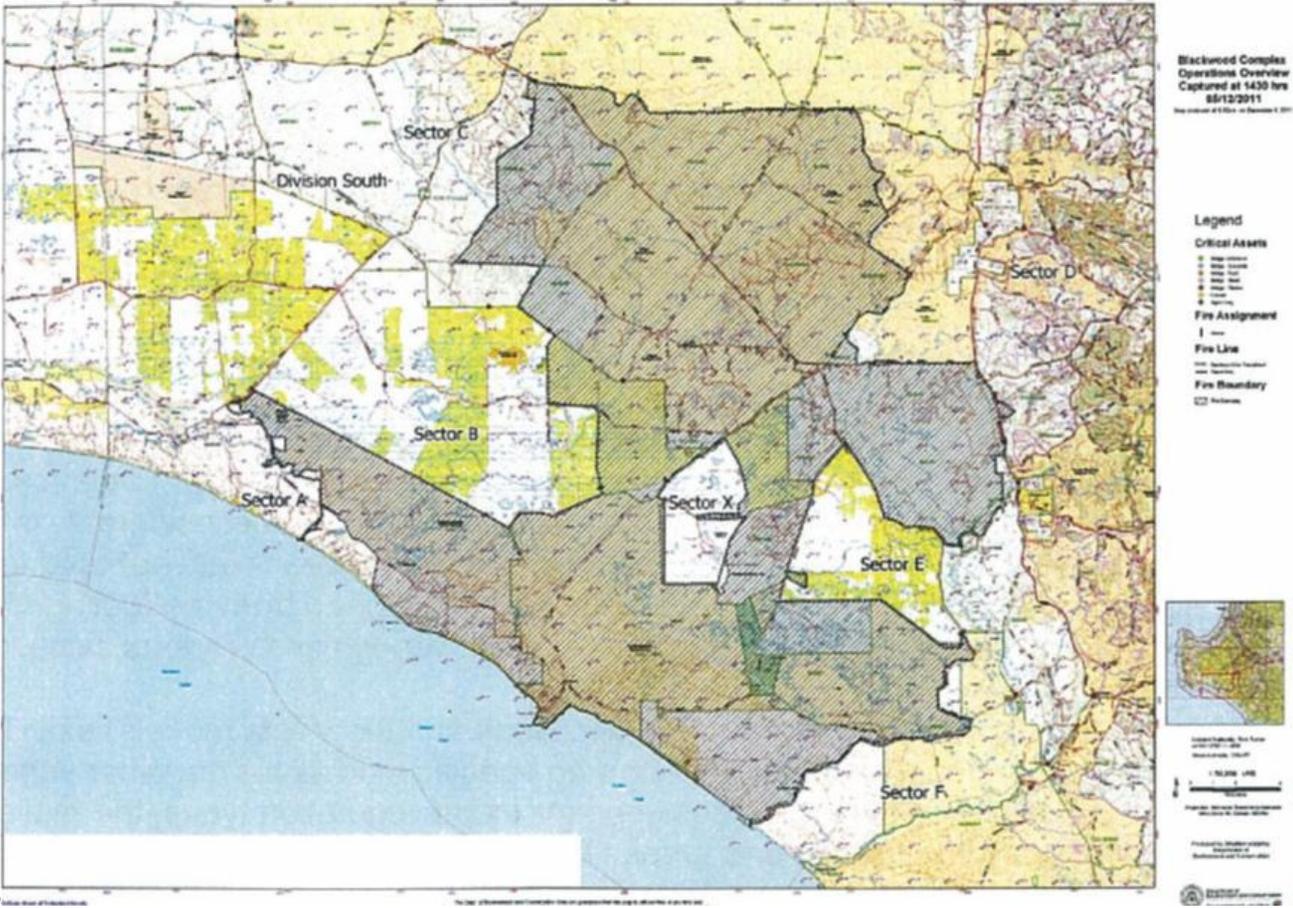
<p>district and state.</p>		<p>distribution network.</p>	
<p>12. On a regional basis there would be value in closer working relationship between DEC crews and VBFBS to build mutual trust and confidence. This could be done by opportunity engagement of VBFBS in DEC fire management or through exercises.</p>		<p>Update doctrine and procedures to capture VBFBS in fire management exercises and in appropriate emergencies.</p>	
<p>13. The State Duty Officer from DEC and the State Duty Director, FESA need to confer whenever a Level 2 or 3 incident is declared to satisfy themselves that they have appropriate incident management structures and resources across the state are at an appropriate level of preparedness.</p>		<p>Develop appropriate doctrine to support inter-agency communication prior to ignition of a prescribed burn.</p>	
<p>14. There needs to be a better appreciation of the role of VCPs and how they are managed in bushfire emergencies by all key agencies and the community</p>		<p>Review role of VCPs and establish agreed doctrine for deployment. Ensure community awareness of VCP role is well communicated.</p>	

<p>15. VCPs are one of the instruments by which the Incident Controller manages the emergency. VCPs without communications cannot be fully effective in their role.</p>		<p>Determine and implement an appropriate communications platform for emergency management</p>	
<p>16. Local knowledge should be accessed to inform the placement and operation of VCPs.</p>		<p>Develop or update doctrine and procedures to include early and sustained contact with the LGA.</p>	
<p>17. There is a need for community education on how road-blocks and VCPs operate in the event of an emergency.</p>		<p>Ensure community awareness of VCP role is well communicated.</p>	
<p>18. Suitably experienced personnel with local knowledge should be connected to the Operations and Planning section in all Level 3 incidents in the vicinity of substantial settlements.</p>		<p>Develop or update doctrine to identify and include local representatives at the earliest possible stage.</p>	
<p>19. Opportunities should be sought to embed other local government representatives in other areas of the IMT particularly in public information</p>		<p>Review IMT roles and identify roles where local government representatives can be employed effectively.</p>	

<p>20. There would be benefit in progressively aligning the geographic boundaries of each of the agencies and seeking to co-locate their headquarters within those boundaries.</p>		<p>Undertake a strategic review of geographic boundaries of each agency and locations and identify opportunities to align and co-locate.</p>	
<p>21. Legislative change may be needed to enable FESA to manage fire-fighting resources across the state.</p>		<p>Review current legislation to ensure FESA is able to effectively allocate fire fighting resources.</p>	
<p>22. The role of district and local emergency management committees should be reviewed to ensure they are appropriately engaged in the active management of emergencies across the PPRR continuum</p>		<p>Develop or update doctrine and procedures to include early and sustained contact with the LGA.</p>	
<p>23. The state should progressively align on a shared platform, such as WebEOC , to establish a COP.</p>		<p>Determine and implement an appropriate communications platform for emergency management.</p>	
<p>24. The state should converge on a single communications platform for all emergency management and support agencies.</p>		<p>Determine and implement an appropriate communications platform for emergency management.</p>	

<p>25. Reporting and control should be through the incident chain of command, and not through agency chain of command.</p>		<p>Develop agency processes to support IMT chain of command reporting.</p>	
<p>26. Early in an incident, close and effective liaison needs to be established with local government agencies.</p>		<p>Develop or update doctrine and procedures to include early and sustained contact with the LGA possibly including enhancing the role of the Local Emergency Management Committee.</p>	
<p>27. Web sites need to be kept updated.</p>		<p>Review and update doctrine regarding community information management, including time stamping radio bulletins and social media/websites.</p>	
<p>28. A high level review of alerts, warnings and messaging is needed to match community expectations with what is practical and achievable.</p>		<p>Undertake a review of current state alert and warning procedures and incorporate social media use and graphical content. Ensure community consultation is included.</p>	
<p>29. Further community education may be needed on how to interpret messages.</p>		<p>Provide workshops within the community around community information management procedures.</p>	

<p>30. The agencies need to develop techniques to ensure accuracy of information across all media.</p>		<p>Undertake a review of current state alert and warning procedures and incorporate social media use and graphical content. Ensure community consultation is included.</p>	
<p>31. Local emergency management committees and planning should identify modes of community contact</p>		<p>Update planning doctrine in the local emergency management committees to include collecting information around means of contact for members of the community.</p>	
<p>32. When people are being moved away from their homes it's important that they move to a place of greater safety and that their movement is relatively assured.</p>		<p>Review doctrine to ensure decisions on evacuation are given the highest priority.</p>	
<p>33. Early resolution and clear communication of the financial and other support measures that will be available to affected residents is an important contributor to community resilience.</p>			



Annex C - Interviews

Interviews were conducted with:

- + Peter Keppel – DEC (Regional Manager Warren Region)
- + David Meehan – DEC (Parks and Visitor Services Coordinator Donnelly District)
- + Keith Low – DEC (Senior Policy Officer Fire Management Services Branch)
- + Peter Gibson – DEC (Regional Fire Coordinator South West Region)
- + John Tillman – FESA
- + Chris Wade – Shire of Nannup (Manager Infrastructure)
- + Louise Stokes – Shire of Nannup (Community Recovery Officer)
- + Terese Levick-Godwin – Shire of Nannup (Community Emergency Services Manager)
- + John Patman – Shire of Nannup (Acting Chief Bush Fire Control Officer)
- + Robert Jennings – Shire of Nannup (CEO)
- + Mark Emmett - WAPOL

Annex D - Documentation

- + DEC – Burn Complexity and Risk Matrix
- + DEC – Burn Complexity and Risk Matrix – Guide
- + DEC – Burn Complexity and Risk Matrix - Summary
- + DEC – CLM-269
- + DEC – Fire Management Policy
- + DEC - Fire Operations Guidelines 3, 7, 12, 18, 22, 24, 38, 66, 75, 77, 79, 80, 82, 83, 87, 88, 89, 91, 93
- + DEC - Fire Protection Instruction 14, 23, 39a, 41, 45
- + DEC- Glossary of Acronyms
- + DEC – Milyeannup Collation of Fire Diary Entries
- + DEC – Milyeannup Debrief Collection Draft
- + DEC – Milyeannup IMT Structure by Shift
- + DEC – Milyeannup Operational Maps
- + DEC – Milyeannup Summary of Bushfire Alert Notifications
- + DEC – Milyeannup Summary of Meetings by Shift
- + DEC – Milyeannup Summary of Resources by Shift
- + DEC – Policy Statement 21
- + DEC Fire Management Checklists 203, 228, 236, 237, 282, 289, 386
- + DEC/FESA – Public Information DEC/FESA agreement 2012
- + FESA – 2011-12 Seasonal Operational Changes Handout
- + FESA – FESA review Margaret River/Milyeannup Fire 2012
- + FESA – Aerial Suppression Operation Procedure 2009-10
- + Bush Fires Act 1954 incl. Bush Fires Regulations 1954
- + FESA – Command Control and Coordination of Major Incidents
- + FESA Directives – 0.0, 3.1, 3.2, 3.5
- + FESA – Emergency Turnout Procedures SOP 3
- + FESA- FG3.2 Incident Control
- + FESA – FG3.11 Air Operations
- + FESA – First Hour
- + FESA – Four Hour
- + FESA – Operation Coordination Management Structure
- + FESA – Operations Deployment Guidelines Ver4
- + FESA – Procedure OP23
- + FESA Standard Operating Procedures 3.2.4, 3.2.5, 3.5.1, 3.5.2, 3.5.10
- + Appreciating the Risk – Report into the Margaret River Bushfires 2011 – Michael Keelty
- + A Shared Responsibility – The Report of the Perth Hills Bushfire February 2011 Review - Michael Keelty
- + Shire of Nannup – Fire Incident Log
- + Shire of Nannup – Preparedness and Prevention Plan parts A and B
- + Shire of Nannup - Welfare Plan 2012

Annex E – Workshop Participants

The following people attended the Validation Workshop on the 1/05/12

- + Peter Keppel – DEC (Regional Manager Warren Region)
- + Bob Chandler - DEC
- + Kelly Gillen – DEC (Assistant Director Regional Services)
- + Peter Gibson – DEC
- + John Tillman – FESA
- + Darren Klemm – FESA
- + Mark Platt – FESA
- + Terri Kurtis - FESA
- + Mark Webb – FESA
- + Chris Wade – Shire of Nannup (Manager Infrastructure)
- + Louise Stokes – Shire of Nannup (Community Recovery Office)r
- + Terese Levick-Godwin – Shire of Nannup (Community Emergency Services Manager)
- + John Patman – Shire of Nannup (Acting Chief Bush Fire Control Officer)
- + Robert Jennings – Shire of Nannup (CEO)
- + Mark Emmett – WAPOL
- + Kellie Taylor - WAPOL
- + Andrew Grono – Department of Education
- + Brett Belstead – MRWA
- + Jeremy Higgins – WA County Health Service
- + Bob Hay – Department of Premier and Cabinet

Annex F -Terms of Reference

1. Context of the burn in relation to land tenure and burn history
2. Review of the planning process for the prescribed burn
3. Burn Prescription
4. Implementation of the burn prescription
5. Weather conditions leading up to and during the fire escape
6. Factors contributing to the escape
7. Effectiveness of pre suppression and bushfire mitigation strategies including resourcing
8. Effectiveness of suppression strategies and tactics during the fire
9. Effectiveness of incident management
10. Level of resourcing
11. Information management and effectiveness of community advice
12. Effectiveness of evacuation procedures
13. Effectiveness of people welfare
14. Effectiveness of aerial suppression
15. Effectiveness of interagency operations
16. Effectiveness of emergency management procedures
17. Effectiveness of recovery actions
18. Recommendations

Annex G - Public Submissions

- + Jess Beckerling
- + John and Barbara Dunnet
- + Harry Barriskill
- + Wendy Hinchcliff
- + Anne Drummond
- + Beth Schultz
- + Phill Schultz
- + Lauren Aspland
- + Neil Hawkins
- + Paul Matthews
- + E/Prof. Don Bradshaw
- + David Hunt
- + Jennifer Della-Vedova
- + Duncan Gardner
- + Nigel Morgan
- + Helen Dilkes
- + Michael O'Neill
- + Ric Gath
- + Matthews Family
- + Michael Chaney
- + James Ross
- + Mary Elton
- + Robert Elton
- + Phil and Joy Sparrow
- + Michael Lochore
- + Peter McGann
- + Natalie Muir
- + Mark Westlake
- + Stewart and Alison Scott
- + Kim and Ingrid Goodridge
- + John Bradbury
- + Stephen Enright
- + Nick Katona
- + Marcus Troake and Rachel McMahon-Troake
- + Deborah Jane Barber
- + Denise and Paul Wilkinson
- + Mark and Leslie Heussenstamm
- + Gilbert Rowan-Robinson
- + Antoinette Atkinson
- + Enzo Donisi
- + Ian Zlatnik
- + Jasper Grugeon

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- + Jenny Colquhoun
- + Gavin and Bev Hartley
- + David Gossage (two submissions)
- + Christine and Lyndon Rowe
- + Robert Dunnet
- + Jocilyn Marita Gratto
- + Sharon, Joerg and Matthew Jordi
- + Greg Grist