



**Government
of South Australia**

Rural Fire Hazard State Risk Assessment Report

Version 1.0

2014

Rural Fire Hazard Leader

SA Country Fire Service

Authority

This risk assessment document has been prepared by the South Australian Rural Fire Hazard Leader to form part of the State Emergency Risk Assessment System (SERAS). Refer also to the Rural Fire Hazard Plan and the State Risk Register V1.0

Issuing Agency

SA Country Fire Service

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Classifications:

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State Records Act Requirements:

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Approval:

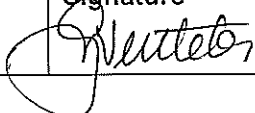
Name	Greg Nettleton Chief Officer	Signature 	Date: 00/07/2014
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EXECUTIVE SUMMARY

Introduction

The SA Country Fire Service has been assigned the role of Rural Fire Hazard Leader for South Australia by the State Emergency Management Committee. In accordance with the State Emergency Management Plan:

Hazard Leaders work with the various Advisory Groups and Functional Services in order to ensure that all aspects of the State's approach to a hazard, including mitigation, response and recovery measures are coordinated. This may include, but not be limited to areas such as risk assessments for the State relative to a particular hazard ...

In 2013 the Rural Fire Hazard Leader, assisted by the State Emergency Management Project Officer (SEMPO), undertook a risk assessment for the Rural Fire hazard in South Australia using the National Emergency Risk Assessment Guidelines (NERAG) as part of the State Emergency Risk Assessment System (SERAS). The State Emergency Management Committee (SEMC) gave carriage of the SERAS project to the South Australian Fire and Emergency Services Commission (SAFECOM).

National Emergency Risk Assessment Guidelines

The National Emergency Risk Assessment Guidelines (NERAG) were developed as part of the then National Emergency Management Committee's implementation of the National Risk Assessment Framework. In 2012 the Standing Council on Police and Emergency Management (SCPEM) directed that all jurisdictions must publish risk assessments by June 2013. This date has since been extended. SCPEM endorsed NERAG as the risk assessment system to be used in November 2011. The purpose of the NERAG was to improve the consistency and rigour of emergency risk assessments, increase the quality and comparability of information on risk and improve the national evidence base on emergency risks in Australia. The NERAG methodology uses a scenario based approach, samples risk across a range of credible consequence levels, identifies existing controls and their adequacy and allows risk evaluation at varying levels of confidence.

Risk Assessment Process

The risk assessment was prepared for and conducted by SA Country Fire Service and the South Australian Fire and Emergency Services Commission (SAFECOM) in mid-2013. The objective of this workshop was to identify and assess risks relating to Rural Fire within the State, in order to improve prevention, preparedness, response and recovery for those risks identified as priorities. In accordance with the NERAG the Rural Fire Hazard Leader and SAFECOM managed a risk assessment process which:

- obtained Rural Fire scenario information for a range of credible events;
- identified stakeholders and established a risk study group for the assessment;
- translated the relative consequences from the NERAG consequence table into absolute values for the State;
- produced documents which "established the context" for the State and the hazard;
- held a workshop with the risk study group to:
 - establish the context including the objective, scope risk, criteria, key elements and participant responsibilities;
 - identify risks;
 - identify and rate controls and assess risks.

Objective

Conduct an assessment of the risks to the State from Rural Fire in accordance with the NERAG in order to prioritise emergency management efforts through prevention, preparedness, response and recovery activities.

Scope

The assessment addressed the risks from Rural Fire to the State focussing on the impacts to people, environment, economy, public administration, social setting and infrastructure.

Stakeholders

Stakeholders participating in the risk assessment included Functional Services, industry representatives, State, Local Government and Commonwealth Government staff. For a full list refer to Appendix A.

Risk Evaluation Outcomes

A total of 195 individual risk statements relating to the Rural Fire Hazard were identified for the State, focusing on the NERAG impact categories of People, Environment, Economy, Public Administration, Social Setting and Infrastructure. Evaluation of the risks using the "As Low as Reasonably Practicable" (ALARP) process as required by NERAG found that most risks fell within the "Tolerable subject to ALARP" category. The initial assessment was that of the 195 risks considered 9 (4.6%) were assessed as intolerable, 171 (87.7%) as ALARP and 15 (7.7%) as broadly acceptable. (Refer Attachment 1: CFS Rural Fire Risk Assessment Statements).

The original risk assessment identified nine (9) intolerable risks requiring treatment to mitigate their impacts. The intolerable risks identified in the workshop were:

RF 1b: *There is the potential that a 1:20 yr Extreme Fire Danger Rating bushfire event will impact on the safety of residents in the State and may cause death and injury. (People).*

The levels ascribed to the various controls for this risk warranted the awarding of a Moderate level of confidence because of a lack of informed knowledge of some of the Preventative and Preparedness controls. On the Moderate Confidence scale, the Likelihood x Consequence x Confidence combination categorises this risk as Intolerable.

RF2b: *There is the potential that a 1:20 yr Extreme Fire Danger Rating bushfire event may impact on the capacity of the health system to treat injured people. (People).*

Whilst the levels ascribed to the various controls for this risk were largely in the median, a Low level of confidence was ascribed to the data because of a lack of informed knowledge of the success of some of the Preventative and Preparedness controls. On the Low Confidence scale, the Likelihood x Consequence x Confidence combination categorises this risk as Intolerable.

RF3b: *There is the potential that a 1:20 yr Extreme Fire Danger Rating bushfire event will lead to the displacement of people from buildings (homes, businesses, offices, workplaces). (People).*

The levels ascribed to the various controls for this risk were at the lower end and warranted the assessors awarded a Low level of confidence because of a lack of informed knowledge of some of the Preventative and Preparedness controls. On the Low Confidence scale, the Likelihood x Consequence x Confidence combination categorises this risk as Intolerable.

RF5b: *There is a potential that a 1:20 yr Extreme Fire Danger Rating bushfire event will make it difficult to provide medical services to large mass gathering events. (People).*

Whilst the levels ascribed to the various controls for this risk were largely in the higher range, the

potentially catastrophic consequence rating coupled with a Moderate level of confidence ascribed to the data resulted in a combination of Likelihood x Consequence x Confidence categorised as Intolerable.

RF18c: *There is the potential that a 1:300 yr Catastrophic Fire Danger Rating bushfire event will impact on vulnerable ecosystems and result in the extinction of threatened species. (Environment).*

Whilst the levels ascribed to the various controls for this risk were largely in the higher range, the potentially catastrophic consequence rating coupled with a Low level of confidence ascribed to the data resulted in a combination of Likelihood x Consequence x Confidence categorised as Intolerable.

RF26c: *There is the potential that a 1:300 yr Catastrophic Fire Danger Rating bushfire event will prevent people from attending their place of employment. (for example for more than a week). (Economy),*

The assignment of a potentially catastrophic consequence rating coupled with a possible likelihood on a moderate confidence basis resulted in an Intolerable risk category.

RF19c: *There is the potential that a 1:300 yr Catastrophic Fire Danger Rating bushfire event will impact on native vegetation communities and exacerbate weed and fungus such as *Phytophthora cinnamomi* invasion. (Environment).*

The combination of consequence and likelihood rating with a Low Confidence in the data resulted in a categorisation of this risk as Intolerable.

RF20c: *There is the potential that a 1:300 yr Catastrophic Fire Danger Rating bushfire event will impact on native vegetation communities and will leave them susceptible to significant erosion. (Environment).*

The combination of consequence and likelihood rating with a Low Confidence in the data resulted in a categorisation of this risk as Intolerable.

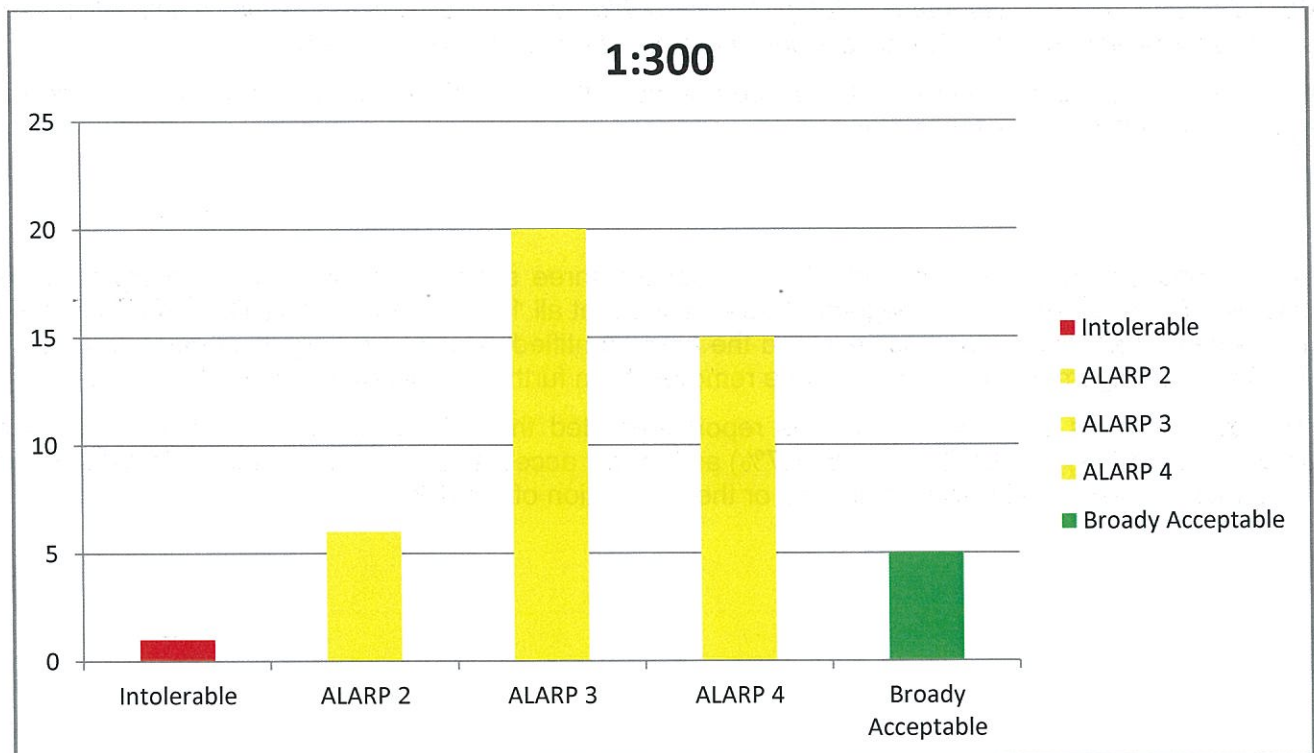
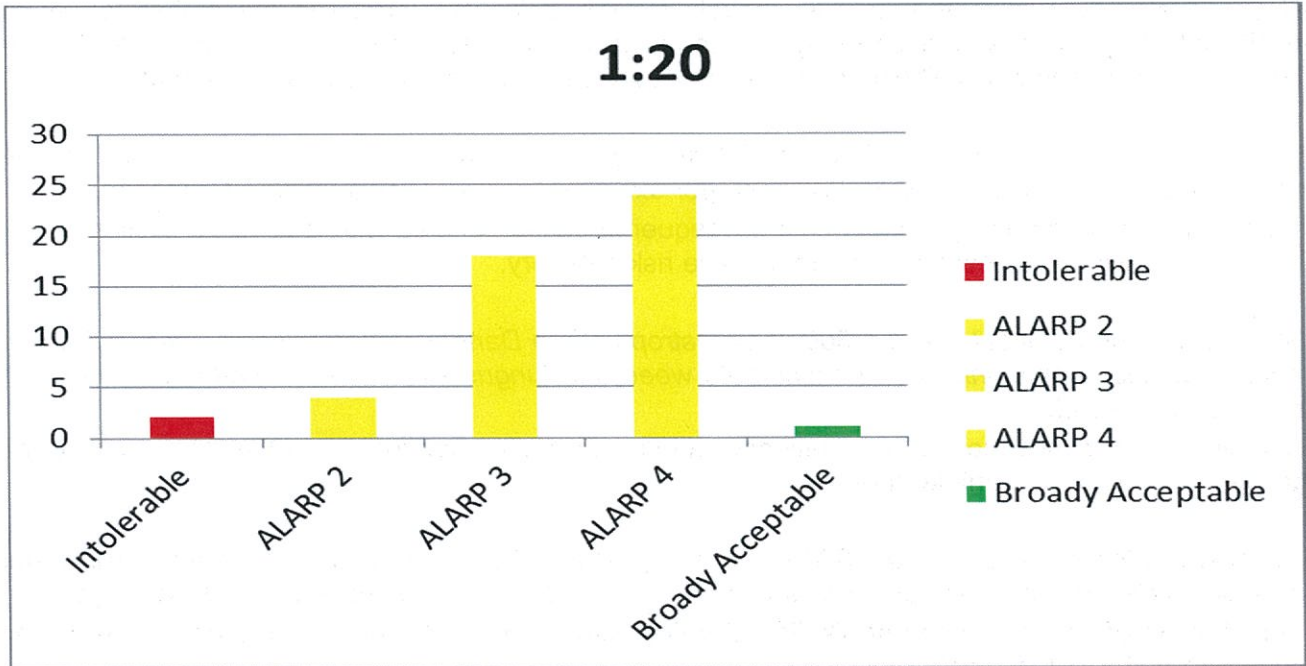
RF46c: *There is the potential that a 1:300 yr Catastrophic Fire Danger Rating bushfire event will cause a loss of economic earnings and impact the social morale of the State. (Social Setting).*

The combination of consequence and likelihood rating with a Low Confidence in the data resulted in a categorisation of this risk as Intolerable.

In further consideration of the risks identified under the three scenarios described to underpin the risk assessment process, the CFS management determined that all 1:2 year Severe Fire Danger rating events would be treated as day to day business and the risks identified, which were largely already captured by the CFS risk management program, would be removed from further deliberations under this process.

Further evaluation as described within this report amended the risk ratings to 3 (1.5%) assessed as intolerable, 180 (92%) as ALARP and 15 (7.7%) as broadly acceptable. Generally intolerable risks require risk treatment measures whatever their cost, or the elimination of the risk.

Figure 1 – Risk Evaluation Outcomes



The three (3) remaining intolerable risks are:

RF 1(b): *There is the potential that a 1:20 yr Extreme Fire Danger Rating bushfire event will impact on the safety of residents in the State and may cause death and injury. (People)*

RF2(b): *There is the potential that a 1:20 yr Extreme Fire Danger Rating bushfire event may impact on the capacity of the health system to treat injured people. (People)*

RF46(c): *There is the potential that a 1:300 yr Catastrophic Fire Danger Rating bushfire event will cause a loss of economic earnings and impact the social morale of the State. (Social Setting).*

Risk Treatment Process

Following the Risk Assessment Workshop, further research was conducted into a number of the controls with subject matter experts and specific issues discussed with targeted stakeholders.

CFS decided not to conduct a single Risk Treatment Workshop to further investigate the highest risks identified at the Risk Assessment Workshop, but to further validate the process through the medium of meetings with individual agencies that participated in the original Risk Assessment Workshop, and wherever possible, agencies that could not send representatives to attend the Risk Assessment Workshop. This decision was made to alleviate the problem of finding a suitable time for all participants to attend a joint session, and to facilitate discussion in the relevant agency's own environment with a range of agency participants and expertise that may have not been available at the time of the Risk Assessment Workshop. This allowed CFS to test the validity of each of the risk controls in an environment that encouraged direct participation and frank and open dialogue.

Each agency was asked to consider the risks identified in the Risk Assessment Workshops afresh, evaluate the existing risk controls in detail, and to identify improvements to these or propose additional treatments. This process proved to be highly effective and assisted the CFS to interpret the risk treatments and controls from a new perspective.

A report on this process was prepared by the State Rural Fire Hazard Planner for CFS.

The agencies engaged in these risk treatment discussions are identified at Appendix B.

Conclusions and Recommendations

Individual Risk Treatment Workshops helped significantly to determine options for mitigation of the risks.

One strong factor in the individual workshops was the identification of agency views that improving the confidence of the assessments through this process improved the tolerability for a number of the risks. This resulted in six of the original nine intolerable risks being downgraded, leaving just three in that category. This also had the outcome of reducing many other risks to a lower level in the categories of "as low as reasonably practicable". This suggests that further analysis and modelling post the original risk assessment phase and in conjunction with agencies on an individual basis is useful in assisting in improving confidence levels for these risks.

A decision was taken early by CFS management to consider risk identified as having an annual recurrence of 1:2 years as being representative of day to day business that requires active risk management at the local level as well as at strategic level. Analysis of these risks proved that current risk management strategies which had been in place for a significant period were satisfactory to maintain the

safety of the community, CFS staff and volunteer firefighting personnel. This decision resulted in the immediate reduction of the overall number of identified risks in the Risk Assessment Workshop from 195 to 130.

As a result of the individual risk assessment workshops and the decision to remove 1:2 year recurrence risks, a comprehensive re-rating of the risks was undertaken, enhancements to risk controls put in place and new risk treatments were developed.

The collated information was added to the CFS Risk Treatment Plan. (Refer Appendix H).

As a result of this work, the high level controls prioritised for improvement in order to mitigate the Rural Fire Hazard in the State are:

- CFS continues with the delivery of annual community education and awareness programs and continues to extend the development of partnerships with organisations that deal with vulnerable groups to aid the development of policy and procedures to support and protect their staff, clients and volunteers.

This control improvement will assist in reducing the following identified Intolerable risks;

- RF 1(b)
- RF46(c)

- CFS re-structure undertaken 2013-14 in will enhance the organisation's frontline service delivery and support role to the community.

This control improvement will assist in reducing the following identified Intolerable risks;

- RF 1(b)
- RF46(c)

- CFS continue to work closely with DEWNR to ensure that prescribed burning programs are undertaken for fuel reduction purposes and the community kept informed when these occur.

This Control Improvement will assist in reducing the following identified Intolerable risks;

- RF 1(b)
- RF2(b)
- RF46(c)

The strategic risk treatments prioritised for further investigation and possible implementation in order to mitigate the Rural Fire Hazard risks in the State are:

- CFS continues to support the State Bushfire Co-ordination Committee in undertaking work with local Government and communities to support the preparation of Bushfire Management Area Plans by Bushfire Management Committees for all Bushfire Management Areas by the end December 2017.

This treatment will assist in reducing the following identified Intolerable risks;

- RF 1(b)
- RF2(b)
- RF46(c)

- CFS and SA Health define a procedure prior to the 2014-15 Fire Danger Season to ensure that SA Health has contingencies in place for Extreme and Catastrophic Fire Danger Rating days to meet potentially extraordinary numbers of casualties from bushfire.

This treatment will assist in reducing the following identified Intolerable risks;

- **RF2(b)**

- Bushfire Management Committees will undertake an annual review prior to the Fire Danger Season of the implementation of bushfire risk treatments in their area of responsibility and provide assurance to relevant Zone Emergency Management Committees on the management of bushfire risk in their area.

This treatment will assist in reducing the following identified Intolerable risks;

- **RF 1(b)**
- **RF2(b)**
- **RF46(c)**

1 Introduction

The SA Country Fire Service has been assigned the role of Rural Fire Hazard Leader for South Australia by the State Emergency Management Committee. In accordance with the State Emergency Management Plan:

Hazard Leaders work with the various Advisory Groups and Functional Services in order to ensure that all aspects of the State's approach to a hazard, including mitigation, response and recovery measures are coordinated. This may include, but not be limited to areas such as risk assessments for the State relative to a particular hazard ...

The purpose of this report is to document:

- the risk assessment process;
- results of the risk assessment;
- recommendations arising from the risk assessment.

The State risk assessment has been undertaken using the National Emergency Risk Assessment Guidelines (NERAG) 2011 as directed by SCPEM in the National Partnership Agreement on Natural Disaster Resilience between the State of South Australia and Commonwealth of Australia.

1.1 Acknowledgements

The Rural Fire Hazard Leader acknowledges the valuable contributions of the Risk Study Group members and SA Fire and Emergency Services Commission (SAFECOM) and thanks them for providing their time and experience to assist this risk assessment to take place.

1.2 Limitations

The State Rural Fire Risk Assessment was limited by several factors:

- The difficulty in gathering all stakeholders in the one time and space, particularly since many of the stakeholders were invited to participate in risk assessment workshops around the same period for a number of other identified hazards.
- The lack of detailed understanding of the risk of rural fire by all stakeholders and at times, their perception of risk that was clearly different to the view of the Hazard Leader.
- The NERAG risk assessment process was relatively new to most stakeholders and in some cases their experience in risk assessment caused them to take issue with the elements within the NERAG process.
- It was not possible with the scope and timeframe of this risk assessment to consider the full range of complex inter-relations between impact categories. This means some complex interrelated risks may not have been identified for Rural Fire.

2 Risk Study Objective

The agreed objective was to conduct an assessment of the risks to the State from Rural Fire in accordance with the NERAG in order to prioritise emergency management efforts through prevention, preparedness, response and recovery activities. Risks already identified and new risks identified through this process would be reviewed and the existing risk controls assessed for adequacy in regard to both existing and newly identified risk. Shortfalls evident from this analysis would require new risk treatments to be identified, considered against the NERAG criteria for assessing risk treatment options.

2.1 Scope

The agreed scope of the risk assessment was to address the risks from Rural Fire to the State considering the impacts to people, environment, economy, public administration, social setting and infrastructure.

2.2 Stakeholders

Stakeholders invited to participate in the risk assessment included:

Primary Producers SA (formerly SA Farmers Federation)
Forest Owners Conference
Local Government Association of SA
SA Metropolitan Fire Service
Department for Environment, Water and Natural Resources
Wine Grape Council of SA
SA Health
SA Ambulance Service
Alert SA
SA CFS Information Operations Division
SA CFS Operations Capability Planning division
SA CFS Preparedness Operations
SAPOL Emergency and Major Event Section
Office of the Chief Information Officer
PIRSA
Australian Defence Force
Engineering Functional Service
ABC National Emergency Broadcaster
Bureau of Meteorology

The full list of stakeholders and their attendance at the workshops is provided in Appendix A.

2.3 Key Elements

The assessment considered the possible impact of a rural fire to:

- people;
- environment;
- economy;
- public administration;
- social setting; and
- infrastructure

2.4 Risk Criteria

The standard NERAG risk criteria were used in the risk assessment including the:

- consequence table;
- likelihood table;
- risk matrix;
- evaluation matrices.

These risk criteria are reproduced in the relevant sections of this document with absolute values inputted as applicable to the State.

2.5 Justification

It was agreed to consider Rural Fire occurring within the State as rural fire has been identified as one of the top ten hazards in South Australia and any significant fire in the rural areas could potentially have a severe impact in this State. A review of 1:2, 1:20 and 1:300 year recurrence events will allow consideration of the appropriateness of the control measures across prevention, preparedness, response and recovery and provide an opportunity to consider if the 1:2 year recurrence risks need to be subjected to the NERAG process or treated as day to day matters under general risk management treatment on an ongoing basis.

3 Background

Rural Fire is one of ten State Hazards identified in the South Australian State Emergency Management Plan (SEMP). The SA Country Fire Service was assigned the role of Hazard Leader for Rural Fire in 2007 by the State Emergency Management Committee (SEMC). The SEMP explains the role of Hazard Leader as:

“the agency, which because of its legislative responsibility or specialised knowledge, expertise and resources undertakes a leadership role for planning emergency management activities pertaining to the prevention of, preparedness for, response to and recovery from a specific hazard.

The role is to lead a multi-agency approach to planning for the identified hazard.

Each Hazard Leader is required to provide an oversight role to the total planning of all agencies relative to their particular hazard”.

As Hazard Leader, the SA Country Fire Service is required to undertake a number of tasks in the preparation and planning for the Rural Fire Hazard, including coordinating hazard management for Rural Fire in South Australia between all involved agencies and under SERAS and ZERMS undertaking and regularly reviewing Zone and State risk assessments, the State Rural Fire Hazard Plan and the relevant elements of the State Emergency Management Plan.

3.1 What is a Rural Fire?

In the State Rural Fire Hazard Plan, Rural Fire is defined as:

“the combination of environmental factors which influence fire behaviour in a non-urban setting and includes factors such as topography, aspect, vegetation constituting fuel, fuel quantity and arrangement, that in combination with human settlement may cause harm to people or damage to property or the environment”.

The underpinning climatic features of South Australia are hot, dry summers with relatively cool winters. The majority of annual rainfall occurs between the months of May to August, which influences the growth and curing of fire fuel and fire behaviour.

Rural fire is a natural part of the South Australian landscape and whilst it cannot be totally excluded through preventative measures, the impact can be significantly mitigated through a combination of effort made by organisations and individuals. The Hazard Leader is required under the State emergency management arrangements to assure Government that it has engaged with all identified stakeholders that might have a role in mitigating the risk of rural fire and is co-ordinating the actions and activities of these stakeholders to mitigate the risk to the highest degree reasonably possible.

This is best achieved when all stakeholders are conversant with the rural fire hazard and its mechanics and are cognisant of the methods to mitigate the attendant risks. To this end, the Hazard Leader must ensure that rural fire risk is identified, assessed and evaluated and be instrumental in identifying and encouraging the introduction of contemporary new treatments.

In recognition of the recent changes in emergency risk management philosophy from a focus on response and recovery to preparation and mitigation under the Natural Strategy for Disaster Resilience, the Hazard Leader Rural Fire has had to review and refine its role to incorporate significantly greater emphasis on identifying and communicating risk to the community to assist individuals and all sectors of communities to work in partnership in the reduction of community vulnerability to rural fire.

3.2 Methodology

The State Rural Fire hazard risk assessment applied the NERAG methodology which:

- uses a scenario based approach;
- samples risk across a range of credible consequence levels;
- identifies current risk under existing controls and residual risk assuming implementation of new risk treatments or control improvements;
- provides outputs that are comparable across hazards.

NERAG aligns with AS/NZS ISO 31000:2009 Risk Management Principles and Guidelines. The process comprises five main elements:

- establishing the context;
- identifying the risks;
- analysing the risks;
- evaluating the risks;
- treating the risks.

The process is supported by two enabling activities, communicating & consulting and monitoring & reviewing, which applies to each of the major elements of the process.

4 Risk Assessment Workshop

A risk assessment workshop was held on 23 April 2013 at the Glenelg Oval Conference facility. The workshop assessed the first four elements of the risk assessment process being, establishing the context, identifying the risks, analysing the risks and evaluating the risks using the As Low as Reasonably Practicable (ALARP) Principle. The ALARP principle helps to prioritise a risk hierarchy and determine which risks require action and which do not. Those that are broadly acceptable naturally require little, if any action while risks that are at an intolerable level require attention to bring them to a tolerable level. Risks in the tolerable subject to ALARP region have been further broken down so that ALARP 2 is next to the Intolerable risk level and ALARP 4 is next to the broadly acceptable risk level. This is illustrated in Appendix C. Risks rated as Intolerable or ALARP 2 have been prioritised for discussion of treatment options at a later workshop.

Treatment options will be designed to reduce the residual risk of those areas identified.

4.1 Preparing for the Workshop

In preparation for the workshop, the Hazard Leader, subject matter expert and SAFECOM State Emergency Management Project Officer (SEMPO) researched previous work on the hazard, prepared credible scenario and identified a number of risk statements relating to the scenarios. In addition Control Registers, Risk Registers and a Bow Tie Diagram were prepared for identified stakeholders (Appendix G).

4.2 Agenda

Table 1: Workshop Agenda

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Government
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- AGENDA -

Rural Fire Hazard Leader Risk Assessment Workshop

Date: 23rd April 2013

Venue: The Bay Function Centre – Cricket Club
64 Brighton Road
Glenelg SA 5045
(08) 8294 5333

Time: 9:00am – 4:30pm

No.	Item	Presenter	Time
1	Welcome	Greg Nettleton SACFS	09:00
2	Introduction and Responsibilities	Liz Connell SAFECOM	09:05
3	Rural Fire Hazard Context Vulnerabilities & Managing Impacts	Leigh Miller SACFS	09:20
4	Rural Fire Context Climate Change Impacts	Paul Lainio Bureau of Meteorology	10:00
5	Morning Tea		10:20
6	Activity 1 – Establish the Context & Agree Risk Assessment Parameters	Liz Connell SAFECOM	10:35
7	Presentation of Scenarios: 1:2 yr, 1:20 yr and 1:300 yr Annual Recurrence Intervals (ARI)	Leigh Miller SACFS	10:50
8	Activity 2 – Review the Bowtie Diagram, Controls and Ratings	Liz Connell SAFECOM	11:05
9	Activity 3 – Review & Identify State Vulnerabilities	Peter Heylen SAFECOM	11:45
10	Lunch		12:30
11	Activity 4 – Generate New Risk Statements and Review Prewritten Risk Statements	Peter Heylen SAFECOM	13:00
12	Activity 5 – Risk Analysis	Peter Heylen SAFECOM	14:15
13	Afternoon Tea		14:45
14	Activity 5 – Risk Analysis continued	Peter Heylen SAFECOM	15:00
15	Debrief & Evaluation	Liz Connell SAFECOM	16:25
16	Finish	Leigh Miller SACFS	16:30

4.3 Study Group Responsibilities

The State Mitigation Advisory Group (SMAG) endorsed the State Context which was agreed by participants at the commencement of the Risk Assessment workshop. All stakeholders in the risk study group need to assume responsibility for their involvement. Stakeholders are those who may be affected by the detrimental impacts of a Rural Fire, those who may contribute specialist knowledge to the risk assessment process and those who have jurisdictional authority for the Rural Fire hazard and/or the elements at risk.

Owner, Sponsor, Team Leader Responsibilities – Initiate, manage, coordinate and provide resources for the risk study;

- Hazard Leader / SAFECOM / SEMPO.

Subject Matter Expert Responsibilities – Provide relevant information, data and expert advice regarding the Rural Fire hazard:

- Rural Fire Hazard Leader (SA Country Fire Service);
- Rural Fire Control Agency (SA Country Fire Service).

It needs to be recognised that whilst in this case the SA Country Fire Service is both the Hazard leader and the Control Agency, these roles are separate and distinct and the agency reports differently on these aspects.

Facilitator Responsibilities – Provides advice on preparation of the risk assessment, facilitate the risk assessment workshops while remaining independent of the subject matter. Following the workshop collate all information for further discussion and analysis with the Hazard Leader. If required obtain additional information from subject matter experts and identified stakeholders prior to risk statements being returned to participants for further comment as part of the assurance process.

- Rural Fire Hazard Leader (SA Country Fire Service);
- SEMPO

Participant Responsibilities – engage actively in the risk assessment process and be available for the duration of the study.

5 Identifying the Risks

The scope of this risk assessment workshop was to assess the risk of Rural Fire to the State.

As risk assessments using NERAG rely upon impact scenario information, the workshop focused on a range of scenarios which varied in their Average Return Interval (ARI). The ARI is described by NERAG as the likelihood of occurrence of a given hazard event as once in a specified number of years.

5.1 Scenarios

Scenarios used in this risk assessment were:

1. A 1:2 year recurrence rural fire event typical of CFS day to day business. The example cited was the Coomunga fire of 20 November 2012, which started in light coastal mallee scrub. This fire involved several responding brigades, and assistance from other agencies including the SA Metropolitan Fire Service, tasked for asset protection. The fire changed direction after a wind change and threatened some residential property, but was extinguished in due course without significant property loss and with no injury to firefighters or the community.

2. A 1:20 year recurrence rural fire event that causes significant property loss, a number of injuries to members of the community, and possibly death. The example cited was the Wangary fire of 11 January 2005. In this fire, which started on agricultural land and before being extinguished caused the loss of some 200 residential properties, numerous sheds and agricultural equipment, cars and trucks, and most tragically, resulted in the deaths of 9 people, 2 of these being firefighters and the rest community members.
3. A 1:300 year recurrence event that caused significant property loss and multiple deaths and many injuries, and impacted significantly on the economic health of the State with long term ramifications. The example cited was the Ash Wednesday complex of fires of 16 February 1983, which covered three large geographical areas of the State, including the Clare Valley, the South East and the Mt Lofty Ranges. This series of fires killed over 25 people, including an entire CFS fire crew and injured scores of individuals. These fires destroyed hundreds of residential properties, business premises and countless agricultural stock, fencing and equipment, and razed a number of major plantation forests. The economy of the State was significantly impacted and the recovery took several years to achieve.

6 Analysing the Risks

The risk study group agreed the objective, scope, key elements and justification for the risk assessment as set out in the introduction to this report. The NERAG Consequence table specifies metrics for loss of life/injury and economic loss in terms of proportion to population of interest and Gross State Product. Utilising State data, the percentages were adjusted to real values based on the population and economic productivity. These included:

- a population of 1,648,000; and
- State Gross State Product (GSP) of \$80.4 billion forecast for the 2009/2010 financial year; and
- financial loss limits as set out in the NERAG.

The agreed risk criteria are shown in the following NERAG tables.

Table 2: NERAG – Consequence Table

Consequence Level	People ⁽¹⁾	Environment	Economy ⁽²⁾	Public Administration	Social Setting	Infrastructure
Catastrophic	Widespread loss of life (>160 deaths), health system unable to cope, displacement of people beyond ability to cope.	Widespread severe impairment or loss of ecosystem functions across species and landscapes, irrecoverable environmental damage.	Unrecoverable financial loss (>\$471 million), asset destruction across industry sectors leading to widespread business failures and loss of employment.	Governing body unable to manage the event, disordered public administration without effective functioning, Public unrest, media coverage beyond region or jurisdiction.	Widespread loss of objects of cultural significance, community unable to support itself, impacts beyond emotional and psychological capacity in all parts of the community.	Long term failure of significant infrastructure (repairs will take longer than 6 months) and service delivery affecting all parts of the community, ongoing external support at large scale required.
Major	Multiple loss of life (17 -160 deaths), health system over-stressed, large numbers of displaced people (more than 24 hours)	Severe impairment or loss of ecosystem functions affecting many species or landscapes, progressive environmental damage.	Financial loss (\$157-\$470 million) requiring major changes in business strategy to partly cover loss, significant disruptions across industry sectors leading to multiple business failures and loss of employment.	Governing body absorbed with managing the event, public administration struggles to provide merely critical services, loss of public confidence in governance, media coverage beyond region.	Significant loss or damage to objects of cultural significance, reduced quality of life within the community, impacts beyond emotional and psychological capacity in large parts of the community.	Mid to long term failure of significant infrastructure (repairs may be undertaken in 3-6 months) and service delivery affecting large parts of the community, initial external support required.
Moderate	Isolated cases of loss of life (1-16 deaths), health system operating at maximum capacity, isolated cases of displacement of people (less than 24 hours).	Isolated but significant cases of impairment or loss of ecosystem functions, intensive efforts for recovery required.	Financial loss (\$47-\$156 million) requiring adjustments to business strategy to cover loss, disruptions to selected industry sectors leading to isolated cases of business failure and multiple loss of employment.	Governing body manages the event with considerable diversion from policy, public administration functions limited by focus on critical services, widespread public protests, media coverage within region or jurisdiction.	Permanent damage to objects of cultural significance, ongoing reduced services within community, impacts beyond emotional and psychological capacity in some parts of the community.	Mid-term failure of (significant) infrastructure (repairs may be undertaken in 1-3 months) and service delivery affecting some parts of the community, widespread inconveniences.
Minor	Isolated cases of serious injuries, health system operating within normal parameters.	Isolated cases of environmental damage, one-off recovery efforts required.	Financial loss (\$15.7-\$46 million) requiring activation of reserves to cover loss, disruptions at business level leading to isolated cases of loss of employment.	Governing body manages the event under emergency regime, public administration functions with some disturbances, isolated expressions of public concern, media coverage within region or jurisdiction.	Repairable damage to objects of cultural significance, isolated and temporary cases of reduced services within the community, impacts within emotional and psychological capacity of the community.	Isolated cases of short to mid-term failure of infrastructure (repairs may be undertaken in 1 week to 1 month) and service delivery, localised inconveniences.

Insignificant	Near misses or minor injuries, no reliance on health system.	Near misses or incidents without environmental damage, no recovery efforts required.	Financial loss of < \$15.7million to be managed within standard financial provisions, inconsequential disruptions at business level.	Governing body manages the event within normal parameters, public administration functions without disturbances, public confidence in governance, no media attention.	No damages to objects of cultural significance. Inconsequential short-term reduction of services, no adverse emotional and psychological impacts.	Inconsequential short-term failure of infrastructure (repairs may be undertaken in less than 1 week) and service delivery, no disruption to the public services.
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1. Based upon State population of 1,648,000 as set out in the State Context and the mortality rates given in the National Emergency Risk Assessment Guidelines 2011.
2. Based upon a South Australian state government revenue of \$15.7 Billion as forecast the for 2011/12 financial year, the % financial loss limits as set out in the National Emergency Risk Assessment Guidelines 2011 and South Australia's Gross State Product of \$80.4 billion forecast for 2009/2010.

Table 3: NERAG Impact Category Definitions

Impact Category Definitions	
People	Relates to the direct impacts of the emergency on the physical health of people/individuals and emergency services (ie: health system) ability to manage.
Environment	Relates to the impact of the emergency and its effects on the ecosystem of the area, including fauna, flora, air, land and water.
Economy	Relates to the economic impact of the emergency on the governing body as reported in the annual operating statement for the relevant jurisdiction, and industry sectors as defined by the Australian Bureau of Statistics.
Public Administration	Relates to the impacts of the emergency on the governing body's ability to govern.
Social Setting	Relates to the impact of the emergency on society and its social fabric, including its cultural heritage, resilience of the community.
Infrastructure	Relates to the impacts of the emergency on the area's infrastructure/lifelines/utilities and its ability to service the community.

Table 4: NERAG Likelihood Table

Likelihood Level	Frequency	Average Recurrence Interval	Annual Exceedence Probability
Almost Certain	Once or more per year	< 3 years	> 0.3
Likely	Once per ten years	3 – 30 years	0.031 – 0.3
Possible	Once per hundred years	31 – 300 years	0.0031 – 0.03
Unlikely	Once per thousand years	301 – 3,000 years	0.00031 – 0.003
Rare	Once per ten thousand years	3,001 – 30,000 years	0.000031 – 0.0003
Very Rare	Once per hundred thousand years	30,001 – 300,000 years	0.0000031 – 0.00003
Almost Incredible	Less than once per million years	> 300,000 years	< 0.0000031

Table 5: NERAG Qualitative Risk Matrix

Likelihood Level	Consequence Level				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Medium	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	High	Extreme
Possible	Low	Low	Medium	High	High
Unlikely	Low	Low	Medium	Medium	High
Rare	Low	Low	Low	Medium	Medium
Very Rare	Low	Low	Low	Low	Medium
Almost Incredible	Low	Low	Low	Low	Low

6.1 Risk Statements

There were 192 hazard risk statements identified for the State (see Appendix F). The risk statements are located in the risk register. Risk statements were crafted independently of the consequence and outlined the source of risk, the impact category and the consequence of the interaction. As recommended by the NERAG each risk was given a unique identifier.

6.2 Bow Tie Diagram

A bow tie diagram for the Rural Fire hazard was drafted prior to the workshop and presented to the risk study group for comment. A copy of the final bow-tie diagram is provided along with the Risk Register in a separate document (See Appendix G). The purpose of producing the bow-tie diagram was to assist the risk study group in conceptualising the sources of risks, existing prevention, preparedness, response and recovery controls and impacts of a Rural Fire event. The controls were ranked using the NERAG Control

table 6.

Table 6: NERAG Control Table

Level of Control	Behavioural Controls <i>Reliance on human action initiated by individuals or groups based on their experience</i>	Procedural Controls <i>Reliance on human action in accordance with prescribed approaches within a management system</i>	Physical Controls <i>Passive/fixed controls or automatic execution of controls within a management system and without requiring human action</i>
1	Immature organisation High turnover of staff High proportion of new population within community History of control failure	Documented procedure (no document control) One-off competency assessment against procedure One-off conformance and outcome evaluation	Designed to specific performance criteria (availability, reliability) Implemented to design criteria
2	Organisation with well-understood roles and responsibilities Skilled and trained staff Community with communication and interaction between all population groups History of minor control failures Staff have holistic understanding of the impact of one control's failure on another	Document control system Periodic competency assessment against the procedure Defined performance outcomes Periodic conformance auditing including management reporting of audit outcomes	Designed in relation to the element at risk to be protected Managed as part of a preventative maintenance system System-generated notification in the event of activation and failure
3	Mature organisation with clear and documented roles and responsibilities Experienced and skilled staff Well-established community with high level of awareness and/or education involving all population groups No history of any control failures and demonstrated ability to learn from the past	Management system includes rules and protocols (access, authority levels, expected control range) Continuous performance checks Management reporting of conformance Documented management follow-up of deficiencies Management system subject to external accreditation and auditing	Control covered by a rigorous change management regime Deliberate actions required for disabling control Failures managed as part of maintenance system and given higher priority for resolution Maintenance system differentiates between critical and non-critical tasks Documented management follow-up of system deficiencies

6.3 State Specific Vulnerabilities

Prior to the workshop the Rural Fire Hazard Leader reviewed the Hazard Plan, researched previous Rural Fire studies and noted State specific vulnerabilities. Vulnerability is the set of prevailing conditions which adversely affect an individual, household or community's ability to mitigate, respond to or recover from a hazard, thereby contributing to the severity of its impact.

The Risk Study group reviewed, amended and added to the State vulnerabilities identified by the Hazard Leader for use in developing new risk statements later in the process.

6.4 Assess the Risks

Using the NERAG risk assessment criteria, including the consequence table, likelihood table, and risk matrix, the risk study group analysed each risk statement. At the end of the risk analysis, risks were determined as extreme, high, medium or low.

6.5 Assess Confidence in the Risk Assessment

As outputs of the risk assessment would be used to determine future actions for Rural Fire hazard mitigation, the risk study group also assessed their confidence in the risk analysis. Confidence assessment focused upon agreement amongst stakeholders, knowledge of stakeholders and the quality and availability of data and information as it related to the scenarios provided. The following NERAG confidence table was used to determine the level of confidence for each assessed risk.

Table 7: NERAG Confidence Table

Confidence Criteria	Low Confidence	Moderate Confidence	High Confidence
Data/Information	Neither community nor hazard specific; anecdotal only	Community or hazard specific; validated historical or scientific	Community and hazard specific; validated historical and scientific
Team knowledge	Neither hazard nor process (risk assessment) specific	Hazard or process specific	Hazard and process specific
Agreement	Neither on interpretations nor on ratings	On interpretations or ratings	On interpretations and ratings

6.6 Evaluate Risk Tolerability

The risk study group used the results of the risk analysis and NERAG risk tolerability matrices to determine whether risks were:

- tolerable;
- tolerable subject to being as low as reasonably practicable (ALARP); or
- intolerable.

The purpose of doing this was to assist decision-making on which risks required further detailed analysis and/or needed treatment, and the priority for implementation of measures to modify the risks. As the experience of previous risk assessments was that many risks were assessed as "tolerable subject to being as low as reasonably practicable" it was agreed that this region of the ALARP principle would be further broken down into three subsections. Refer to Appendix C for details on how this is determined. The basic NERAG ALARP Principle and risk tolerability matrices adopted were as follows:

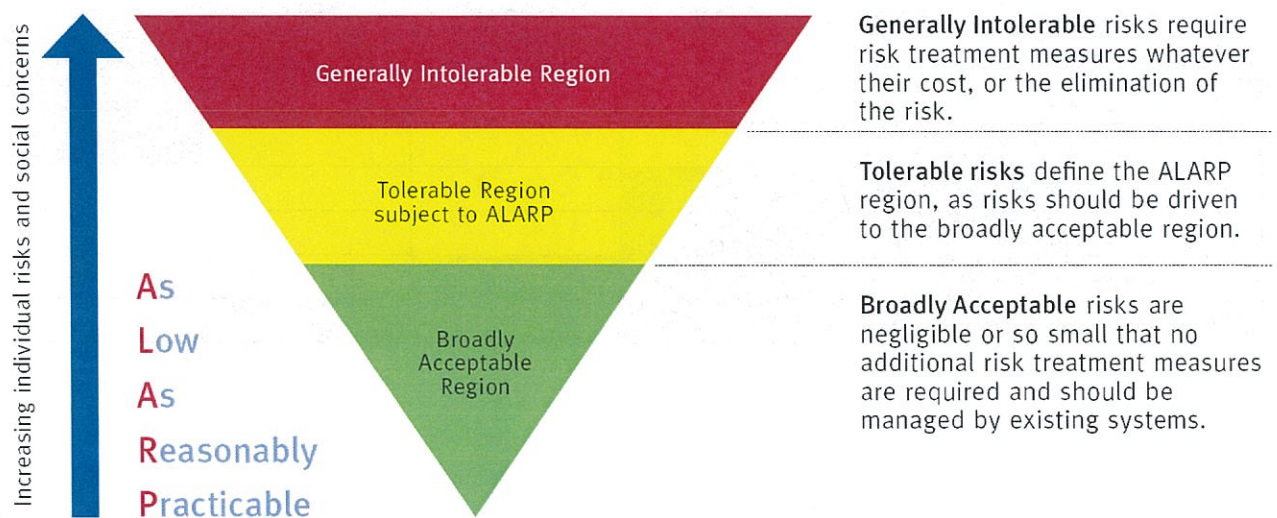


Figure 4: NERAG ALARP Principle

For a risk to be acceptable it needs to fall into the broadly acceptable region of the ALARP diagram above. Some risks may be tolerated subject to being as low as reasonably practicable, and these fall within the tolerable region (subject to ALARP). It is entirely appropriate and accepted practice that risks may be tolerated, provided that the risks are known and managed. Two factors to be considered when determining whether the risks are intolerable, tolerable subject to ALARP or broadly acceptable are the risk rating and confidence level. Their interrelationship is shown in the following tolerability matrices.

Table 8: NERAG Evaluation Table – High Confidence Level

Likelihood Level	Consequence Level				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain					
Likely					
Possible					
Unlikely					
Rare					
Very Rare					
Almost Incredible					

Table 9: NERAG Evaluation Table – Moderate Confidence Level

Likelihood Level	Consequence Level				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain					
Likely					
Possible					
Unlikely					
Rare					
Very Rare					
Almost Incredible					

Table 10: NERAG Evaluation Table – Low Confidence Level

Likelihood Level	Consequence Level				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain					
Likely					
Possible					
Unlikely					
Rare					
Very Rare					
Almost Incredible					

	Intolerable
	Tolerable subject to ALARP
	Broadly Acceptable

7 Risk Analysis Findings

The level of risks and tolerability for Rural Fire in the State, obtained from the risk analysis are depicted below by colour. Further detail can be found in the risk register.

Table 11: Risk Analysis Finding

Likelihood Level	Consequence Level				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	2a,3a,5a,7a,8a, 21a,22a,23a,25a, 36a,	1a,4a,6a,11a,13a, 16a,19a,20a,54c,			
Likely	9a,15b,17a,18a, 23b,	8b,9b,10b,19b,21b, 22b,23c,24a,24b, 25b,26b,45b,51a, 51b,52b,30b,30c, 33b,33c,44c,47c,48c	4b,6b,12b,16b,17b, 20b,44b,27b,28b, 31b,32b,34b,35b, 36b,	10b,30b,31b,	
Possible	7c,14b,15c,	5c,13b,22c,52a,42b, 42c,52c,55b,61c	2c,4c,7b,8c,9c, 10c,13c,14c,16c,18b 21c,24c,45c,51c,27c 29b,29c,31c,32c,35c 36c,53c,	1c,3c,6c,11c,12c 17c, 20c,26c,44c 28c,34c,36c	3b,15a,26c
Unlikely		58c,			
Rare					
Very Rare					
Almost Incredible					

Background Colour = Risk Level		Text Shading = Tolerability	
	Low		Broadly Acceptable
	Medium		ALARP
	High		Intolerable
	Extreme		

7.1 PRIORITY RISKS

The first pass risk evaluation for Rural Fire in the State led to the initial identification of nine intolerable risks. The intolerability was determined by the low level of confidence in the risk treatments identified, the catastrophic nature of impact, the probability of an impact of some magnitude being high, or because the risk was considered one which could lead to significant flow on effect to the reputation of the organisation if it occurred. These risks required early consideration and/or treatment to improve the confidence of the risk assessment improve existing controls or identify new treatment options. A summary of the priorities assigned to the nine risk statements assessed in the workshop is as follows:

Table 12: Evaluation of risks within the State

1: 1:2 ARI Scenario					
Intolerable Risks (Priority 1)	ALARP 2 (Priority 2)	ALARP 3 (Priority 3)	ALARP 4 (Priority 4)	Broadly Acceptable (Priority 5)	TOTAL
0	3	22	30	9	64
1: 1:20 ARI Scenario					
Intolerable Risks (Priority 1)	ALARP 2 (Priority 2)	ALARP 3 (Priority 3)	ALARP 4 (Priority 4)	Broadly Acceptable (Priority 5)	TOTAL
4	16	34	7	3	64
1: 1:300 ARI Scenario					
Intolerable Risks (Priority 1)	ALARP 2 (Priority 2)	ALARP 3 (Priority 3)	ALARP 4 (Priority 4)	Broadly Acceptable (Priority 5)	TOTAL
5	23	25	8	3	64

The risk assessment priorities are clearly dominated by the nine intolerable risks that have been identified. These are listed below:

Table 13: Top nine risks

No.	Risk Statement	Source	Impact Category	Consequence	Likelihood	Risk	Confidence Level	Tolerability
RF1b	There is a potential that a 1:20 yr Extreme Fire Danger rating bushfire event will impact upon the safety of residents in the State and may cause death and injury	Bushfire	People	Major	Likely	High	Mod	Intolerable
RF2b	There is a potential that a 1:20 yr Extreme Fire Danger Rating Bushfire event may impact on the capacity of the health system to treat injured people.	Bushfire	People	Major	Likely	High	Low	Intolerable
RF3b	There is the potential that a 1:20 yr Extreme Fire Danger Rating Bushfire event will lead to the displacement of people from buildings (homes, businesses, workplaces)	Bushfire	People	Major	Likely	High	Low	Intolerable
RF5b	There is a potential that a 1:20 yr Extreme Fire Danger rating bushfire event will make it difficult to provide medical services to a large mass gathering event.	Bushfire	People	Catastrophic	Possible	High	Mod	Intolerable
RF18c	There is a potential that a 1:300 yr Catastrophic Fire Danger Rating bushfire event will impact on vulnerable eco-systems and result in the extinction of threatened species.	Bushfire	Environment	Catastrophic	Possible	High	Low	Intolerable
RF26c	There is a potential that a 1:300 yr Catastrophic Fire Danger rating bushfire event will prevent people from attending their place of employment (for more than a week).	Bushfire	Economy	Catastrophic	Possible	High	Mod	Intolerable
RF19c	There is a potential that a 1:300 yr Catastrophic Fire Danger rating bushfire event will impact on native vegetation communities and exacerbate weed and fungus such as <i>Phytophthora Cinnamomi</i> invasion.	Bushfire	Environment	Major	Possible	High	Low	Intolerable
RF20c	There is a potential that a 1:300 yr Catastrophic Fire Danger rating bushfire event will impact on native vegetation communities and leave them subject to significant erosion.	Bushfire	Environment	Major	Possible	High	Low	Intolerable
RF46c	There is a potential that a 1:300 yr Catastrophic Fire danger rating bushfire event will cause a loss of economic earnings and impact on the social morale of the State.	Bushfire	Social Setting	Major	Likely	High	Mod	Intolerable

7.2 Further Detailed Analysis

Many risks are assigned a Priority 1 due to the low confidence of the risk analysis. This is often due to the low availability of evidence around individual risks.

The table below examines each of the original nine Priority 1 risks, and the effect on the priority if the confidence of the assessment/analysis is improved.

This analysis resulted in a reduction in the priority of some of the risks and could be further discussed with subject matter experts following the risk assessment process.

Table 14: Potential Priorities for Top 9 Risks

Risk No	Risk	Current Confidence	Potential Confidence	Potential Priority	Further Analysis?
RF1b		Mod	Moderate or High	2	No, this risk is self-evident, regardless of treatment options.
RF2b		Low	Moderate or High	2	Yes, SA health may have alternative view about confidence or treatments.
RF3b		Low	High	2	Yes, CFS may have a view that life safety is more important than residence.
RF5b		Mod	Moderate or High	3	Yes, SA Health may have alternative view.
RF18c		Low	High	2	Yes, DEWNR needs to comment.
RF26c		Mod	High	2	Yes, CFS would like to have view of State Recovery Committee.
RF19c		Low	Mod	3	Yes, DEWNR needs to comment
RF20c		Low	Mod	3	Yes, DEWNR needs to comment
RF46c		Mod	Moderate or High	2	Yes, State economist comment would be helpful

8 Develop Risk Treatment Strategies

Risk treatment aims to determine and implement the most appropriate actions in response to the identified need to treat risks. This process can include workshops. Once implemented, risk treatments become controls.

CFS elected not to conduct a Risk Treatment Workshop as a single event, instead it determined that the most appropriate course of action would be to have the State Rural Fire Hazard Planning Officer conduct single agency sessions in which the views of an assembled group of experts from

each agency would be asked for comment on the risk treatments and controls and which would facilitate concentrated effort on a single risk impact category. Several discussion meetings ensued. The list of meetings held by agency is included in Appendix B.

When formulating objectives for risk treatment needs, each risk 'expert reference group':

- reviewed the bow-tie diagram;
- considered existing controls needing improvement; and
- brainstormed possible new risk treatment opportunities.

In doing so the risk study group considered options including:

- avoiding the risk;
- reducing the consequence;
- sharing the risk; and
- retaining the risk by informed decision.

Having determined a range of possible risk treatments, the risk expert reference groups evaluated them to determine those most preferred, considering the criteria taken from Appendix B of the NERAG:

- cost;
- timing;
- leverage;
- administrative efficiency;
- continuity of effects;
- effects on the economy;
- effects on the environment;
- risk creation;
- equity;
- risk reduction potential;
- political acceptability; and
- public and pressure group reaction.

Considerable time was devoted to reviewing existing controls, some of which were able to be re-rated with justifications noted. It was agreed that for example many government agencies have invested heavily in the risk and potential impacts of rural fire resulting in these agencies being relatively well prepared. It was clear however that many agencies did not fully understand the risk they faced or were unsure about the level of threat posed by the risk, and there was a wide discrepancy between agencies rating of the same risk.

Through the expert reference groups established, it became clear that all of the identified risks needed to be re-rated either as a result of the agency confidence being amended, or the treatments and controls currently in place reviewed in the context of specialist advice.

Risk relating to the displacement of people was discussed with representatives of the State Recovery Committee and SAPOL and it was determined that displacement of people was in fact a desirable outcome in current public policy as the clearing of populations from a fire affected area prior to the impact of a major fire would result in a higher potential for life preservation, less risk to firefighters attempting to protect people in place, and allow for more effective and efficient protection of community assets. The effect of a consequential increase in property loss resulting from the vacating of property whereby residents do not stay and defend has not yet been proven through proper empirical studies and therefore until further work is undertaken, the rating of risk RF3b was maintained although this may change within a short time as further research on this topic is currently being undertaken.

Risks pertaining to environmental impacts of the rural fire hazard had generally been over-rated due to the risk assessment workshop not having adequate representation from environmentally focussed agencies. As a consequence, the rating for risks RF18c, RF19c and RF20c were re-rated with a higher level of confidence and the likelihood and consequence categories re-visited. This ultimately led to a downgrading of these risks with RF18c being downgraded to ALARP 2 and 19c and 20c to ALARP 3 and 4 respectively.

Risks pertaining to health issues were also re-rated in the context of expert health service practitioners and administrators. As a consequence, risk RF2b was retained as an intolerable risk due to the fact that despite any realistic improvements to health services, treatment and controls, it was considered highly likely that at some instances the health services would find it extremely difficult to attend the site of injured people because of the ongoing bushfire risk that would prevent access to the fireground.

However, risk RF5b was downgraded to ALARP 2 as a result of the CFS and SA Health agencies confidence in the systems of work and public safety initiatives developed in the planning for mass gathering events which would preclude accessibility problems, and the conclusion that a major bushfire would not impact on these initiatives.

Some potential treatments were suggested and assessed at the meetings by the expert reference group for each agency albeit that none were of such innovation that they caused a re-rating of the risks to below ALARP 2.

These included better communication between CFS and the agencies that have a requirement to consider the hazard of rural fire in their business models, and better communication to the community on the potential threats of bushfire, particularly the risk to life in remaining in a residence during a fire with the intent to defend what might in fact be an indefensible property.

8.1 Evaluating Residual Risks

The final stage of the risk treatment process was to assume that the risk treatments identified by the risk study group have been implemented and existing controls improved. The highest risks are then re-assessed to determine the level of residual risk. This hypothetical residual risk rating is then recorded in the risk register.

The three remaining risks rated as intolerable after the individual agency expert reference group meetings were similarly reviewed in this manner. All retained the intolerable rating.

RF1(b): *There is the potential that a 1:20 yr Extreme Fire Danger Rating bushfire event will impact on the safety of residents in the State and may cause death and injury. (People)*

Risk RF1b appeared to be irrefutable. In some circumstances a 1:20 yr Extreme Fire Danger rating bushfire event will take the community by surprise with its speed and intensity and people will be unprepared at that moment, or will be unaware of the fire until escape is not an option, and will suffer death or injury. No amount of preparedness actions in these circumstances will preclude this consequence at some time. However, the likelihood can be reduced through the faster delivery of improved information to the community identifying the risk and what the community should do in preparedness and response, and how those with responsibilities for the infant, aged and infirm can be protected, as suggested through this process.

RF2(b): *There is the potential that a 1:20 yr Extreme Fire Danger Rating bushfire event may impact on the capacity of the health system to treat injured people. (People)*

Risk RF2b similarly is a risk which has limited scope for elimination as the nature of bushfire prevents access to some locations by even firefighters, let alone other emergency services, until the fire has moved on and consumed the fuel in its path and it is safe to access locations. Consequently, the risk rating was retained at intolerable, with the added risk treatment of better communication between CFS and the health services to provide as much pro-active information as possible to allow time for the health services to ramp up additional service capability if required as a result of a major incident causing injury on a wide scale.

RF46(c): *There is the potential that a 1:300 yr Catastrophic Fire Danger Rating bushfire event will cause a loss of economic earnings and impact the social morale of the State. (Social Setting).*

Risk RF46c also is a risk for which little can be pro-actively done to ameliorate the consequences. The loss of major State government or business assets that assist in the economic health of the State cannot be directly controlled, but the CFS has worked with agencies such as SAPOL and increasingly with Business SA to identify risk of rural fire to important assets and to seek the support of the owners to develop contingency plans around the protection and/or consequential loss of major infrastructure, to reduce the likelihood and consequence of an impacting rural fire.

9 Conclusions and Recommendations

Analysis of risks using the NERAG risk criteria found that the remaining three intolerable risks for the State all related to either physical threat to individuals or financial loss to the economy. Of the financial losses the potential impact to the tourism, commercial and industry sectors are significant. Risk analysis and evaluation identified three Priority 1: Intolerable Risks which, according to NERAG, need immediate treatment regardless of the cost.

RF1b: *"There is a potential risk that a 1:20 yr Extreme Fire Danger rating bushfire event will impact on the safety of residents in the State and may cause death and injury".*

This risk will be mitigated through application of the following Control Improvements;

- CFS continues with the delivery of annual community education and awareness programs and continues to extend the development of partnerships with organisations that deal with vulnerable groups to aid the development of policy and procedures to support and protect their staff, clients and volunteers.
- CFS re-structure undertaken 2013-14 in will enhance the organisation's frontline service delivery and support role to the community.
- CFS continue to work closely with DEWNR to ensure that prescribed burning programs are undertaken for fuel reduction purposes and the community kept informed when these occur.

The strategic risk treatments for implementation to mitigate this risk in the State are;

- CFS continues to support the State Bushfire Co-ordination Committee in undertaking work with local Government and communities to support the preparation of Bushfire Management Area Plans by Bushfire Management Committees for all Bushfire Management Areas by the end December 2017.
- Bushfire Management Committees will undertake an annual review prior to the Fire Danger Season of the implementation of bushfire risk treatments in their area of responsibility and provide assurance to relevant Zone Emergency Management Committees on the management of bushfire risk in their area.

RF2b: *"There is a potential that a 1:20 yr Extreme Fire Danger rating bushfire event may impact on the capacity of the health system to treat injured people".*

This risk will be mitigated through application of the following Control Improvement;

- CFS continue to work closely with DEWNR to ensure that prescribed burning programs are undertaken for fuel reduction purposes and the community kept informed when these occur.

The strategic risk treatments for implementation to mitigate this risk in the State are;

- CFS continues to support the State Bushfire Co-ordination Committee in undertaking work with local Government and communities to support the preparation of Bushfire Management Area Plans by Bushfire Management Committees for all Bushfire Management Areas by the end December 2017.
- CFS and SA Health define a procedure prior to the 2014-15 Fire Danger Season to ensure that SA Health has contingencies in place for Extreme and Catastrophic Fire Danger Rating days to meet potentially extraordinary numbers of casualties from bushfire.
- Bushfire Management Committees will undertake an annual review prior to the Fire Danger Season of the implementation of bushfire risk treatments in their area of responsibility and provide assurance to relevant Zone Emergency Management Committees on the management of bushfire risk in their area.

RF46c: *"There is a potential that a 1:300 yr Catastrophic Fire Danger rating bushfire event will cause a loss of economic earnings and impact the social morale of the State".*

This risk will be mitigated through application of the following Control Improvements;

- CFS continues with the delivery of annual community education and awareness programs and continues to extend the development of partnerships with organisations that deal with vulnerable groups to aid the development of policy and procedures to support and protect their staff, clients and volunteers.
- CFS re-structure undertaken 2013-14 in will enhance the organisation's frontline service delivery and support role to the community.
- CFS continue to work closely with DEWNR to ensure that prescribed burning programs are undertaken for fuel reduction purposes and the community kept informed when these occur.

The strategic risk treatments for implementation to mitigate this risk in the State are;

- CFS continues to support the State Bushfire Co-ordination Committee in undertaking work with local Government and communities to support the preparation of Bushfire Management Area Plans by Bushfire Management Committees for all Bushfire Management Areas by the end December 2017.
- Bushfire Management Committees will undertake an annual review prior to the Fire Danger Season of the implementation of bushfire risk treatments in their area of responsibility and provide assurance to relevant Zone Emergency Management Committees on the management of bushfire risk in their area.

It is recommended that further analysis be completed on these risk statements to improve confidence around the analysis. For the latter of these intolerable risks further data collection that improves confidence could improve the tolerability of the risk. This will assist with resource allocation. However, improving confidence will not result in a change in risk analysis for the risk of death and injury or impact on the delivery of health services in specific incidents despite any amount of prevention and preparedness actions by the community. It is however recommended that potential treatment options improvements for this risk be considered as a priority as the reduction in either likelihood or consequence may reduce the degree of human suffering.

In addition to further analysis, other risk treatment options will continue to be considered for the individual risks identified as the resourcing required of the CFS and the agencies with a responsibility to manage threat emanating from rural fire events are developed. These options will need to be discussed with relevant agencies and stakeholders to determine the most appropriate course of action for mitigating each risk. Scoping of relevant additional and innovative controls to determine where improvements could be made or where gaps exist could also highlight where future treatments may lie.

Appendix A

Risk Assessment Study Group - Workshop 1

Name	Organisation	Position
Alan Graham	Aged Community Services	
Paul Lainio	Bureau of Meteorology	
Donna Bagshaw	SA Country Fire Service	Project Officer
Ann de Piaz	SA Country Fire Service	Executive Director, Frontline Support Services
Tracey Devine	SA Country Fire Service	Regional Commander, Region 4
Chris Martin	SA Country Fire Service	Regional Commander, Region 1
Greg Nettleton	SA Country Fire Service	Chief Officer
John Hutchins	SA Country Fire Service	Regional Commander, Region 2
Kevin May	SA Country Fire Service	Regional Commander, Region 6
Leigh Miller	SA Country Fire Service	Director, Preparedness Operations
Mal Watts	SA Country Fire Service	Director, Operational Capability and Planning
Richard Coombe	SA Country Fire Service	Regional Commander, Region 3
Rob Sandford	SA Country Fire Service	Director, State Operations
Peta O'Donohue	SA Country Fire Service	Project Manager, Partners in Bushfire Safety
John Bannister	Telstra Corp	Emergency Management Officer
Mark Stratton	DCSI Emergency relief	National Consultant, Disaster Recovery
Michael Malavazos	DMITRE	Director, Engineering Operations
Peter Hackworth	Wine Grape Council of SA	Executive Officer
Ronnie Faggotter	DCSI	Director, State Recovery Office
Simon Treloar	PIRSA	Principal Policy Officer
Bill McIntosh	Outback Communities Authority	Senior Project Officer
Frank Crisci	SA Power Networks	Director, Emergency Management
Daniel Snodgrass	SA Power Networks	Senior Project Officer
Katherine Stanley-Murray	Alexandrina Council	Emergency Management Project Officer
Stephen Pascale	DPTI	Manager, Traffic and Access
Bob Stevenson	SES	Emergency Management Officer
David Harmon	SES	Emergency Management Officer
Jai O'Toole	Red Cross	
Val Smythe	SA Health	Manager, Emergency Management
Liz Connell	SAFECOM	Project Manager, State Emergency Management Systems
Peter Heylen	SAFECOM	State Emergency Management Planning Officer
Desiree Beekharry	SAFECOM	ZWMC Project Officer Adelaide and Barossa
Andre Simmonds	SAFECOM	ZEMC Project Officer Western and Southern
Beth Reid	SAFECOM	ZEMC Project Officer North and Mid Yorke

APPENDIX B

Risk Treatment Study Group - Workshop 2

As noted at Section 8, a risk treatment study group was not established. Instead, CFS engaged a contracted Rural Fire Hazard Project Officer to provide expertise and advice on emergency management and to conduct a workshop process with various participants on a single agency basis.

The following agencies were engaged as subject matter experts and consulted in a series of individual discussion meetings over a three week period in June 2013. These meetings variously ranged from one-on-one meetings with individual subject matter experts over a 30 minute time span to full scale team meetings with departmental groups over a two hour session. All were valuable in assessing the level of risk rated at the risk assessment workshop and re-evaluating the likelihood and consequences in the context of the specific agency's business environment.

Primary Producers SA (formerly SA Farmers Federation)
Forest Owners Conference
Local Government Association of SA
SA Metropolitan Fire Service
Department for Environment, Water and Natural Resources
Wine Grape Council of SA
SA Health
SA Ambulance Service
Alert SA
SA CFS Information Operations Division
SA CFS Operations Capability Planning division
SA CFS Preparedness Operations
SAPOL Emergency and Major Event Section
Office of the Chief Information Officer
PIRSA
Australian Defence Force
Engineering Functional Service
ABC National Emergency Broadcaster

APPENDIX C - RANKING WITHIN ALARP

NERAG Risk and Risk Tolerability Matrices Earthquake Hazard (1 - 5 levels added)

Likelihood

Almost Certain (< 3 years)
Likely (3-30 years)
Possible (31-300 years)
Unlikely (301-3,000 years)
Rare (3,001-30,000 years)
Very Rare (30,001-300,000 years)
Almost Incredible (>300,000 years)

Insignificant	Minor	Moderate	Major	Catastrophic
Medium	Medium	High	Extreme	Extreme
Low	Medium	High	High	Extreme
Low	Low	Medium	High	High
Low	Low	Medium	Medium	High
Low	Low	Low	Medium	Medium
Low	Low	Low	Low	Medium
Low	Low	Low	Low	Low

Evaluation Tables - Risk Tolerability

High Confidence Level

Almost Certain (< 3 years)
Likely (3-30 years)
Possible (31-300 years)
Unlikely (301-3,000 years)
Rare (3,001-30,000 years)
Very Rare (30,001-300,000 years)
Almost Incredible (>300,000 years)

Insignificant	Minor	Moderate	Major	Catastrophic
4	3	2	1	1
5	4	3	2	1
5	5	4	3	2
5	5	4	3	3
5	5	5	4	3
5	5	5	5	4
5	5	5	5	5

Moderate Confidence Level

Almost Certain (< 3 years)
Likely (3-30 years)
Possible (31-300 years)
Unlikely (301-3,000 years)
Rare (3,001-30,000 years)
Very Rare (30,001-300,000 years)
Almost Incredible (>300,000 years)

Insignificant	Minor	Moderate	Major	Catastrophic
3	2	1	1	1
4	3	2	1	1
5	4	3	2	1
5	5	4	3	2
5	5	4	3	3
5	5	5	4	3
5	5	5	5	4

Low Confidence Level

Almost Certain (< 3 years)
Likely (3-30 years)
Possible (31-300 years)
Unlikely (301-3,000 years)
Rare (3,001-30,000 years)
Very Rare (30,001-300,000 years)
Almost Incredible (>300,000 years)

Insignificant	Minor	Moderate	Major	Catastrophic
3	2	1	1	1
3	2	1	1	1
4	3	2	1	1
5	4	3	2	1
5	5	4	3	2
5	5	4	3	3
5	5	5	4	3

Intolerable (1)	Risks require treatment measures whatever their cost or elimination of the risk.
Tolerable Subject to ALARP (2)	Risk tolerable only if reduction cost is grossly disproportionate to gain achieved.
Tolerable Subject to ALARP (3)	Risk tolerable only if reduction cost is disproportionate to gain achieved.
Tolerable Subject to ALARP (4)	Risk tolerable only if reduction cost exceeds gain achieved.
Broadly Acceptable Region (5)	Risks are negligible or so small that <u>no</u> additional risk treatment measures are req'd.

10 Appendix D - Acronyms

COAG	Council of Australian Governments
COMDISPLAN	Commonwealth Government Disaster Response Plan
DCSI	Department for Communities and Social Inclusion
DECD	Department of Education and Child Development
DEWNR	Department of Environment, Water and Natural Resources
DHA	Department of Health and Ageing
DoH	Department of Health
DPC	Department of Premier and Cabinet
DPTI	Department of Planning, Transport, and Infrastructure
EMA	Emergency Management Australia
FS	Functional Service
HAZMAT	Hazardous materials
ICA	Insurance Council of Australia
ISO	International Standards Organisation
LGA	Local Government Association
NDRP	Natural Disaster Resilience Program
NEMC	National Emergency Management Committee
NERAG	National Emergency Risk Assessment Guidelines
NSDR	National Strategy for Disaster Resilience
PPRR	Prevention, Preparedness, Response and Recovery
RAMMS	Risk Assessment, Measurement and Mitigation Sub-Committee
SAFECOM	South Australian Fire and Emergency Services Commission
SAICORP	South Australian Government Insurance Corporation
SAPOL	South Australian Police
SEC	State Emergency Centre
SEMC	State Emergency Management Committee
SEMP	State Emergency Management Plan
SEMPO	State Emergency Management Project Officer
USAR	Urban Search & Rescue
VERIS	Volunteer Emergency Recovery Information System
ZEMC	Zone Emergency Management Committee
ZEMPO	Zone Emergency Management Project Officer

11 Appendix E – Rural Fire Hazard Glossary

Business Continuity Planning – The strategies, plans and procedures for how an organisation will recover and restore partially or completely interrupted critical functions within a predetermined time after a disaster or extended disruption.

Community – A group of people with a commonality of association and generally defined by location, shared experience or function

Consequence – Outcome of an event affecting objectives.

- An event can lead to a range of consequences.
- A consequence can be certain or uncertain and can have positive or negative effects on objectives.
- Consequences can be expressed qualitatively or quantitatively.
- Initial consequences can escalate through knock-on effects. (*Source: ISO, Guide 73: Risk Management – Vocabulary, 2009 p7*)

Control – Measure that is modifying risk.

- Controls include any process, policy, device, practice or other actions which modify risk.
- Controls may not always exert the intended or assumed modifying effect.

Emergency Management Act, 2004 (SA) - An Act to establish strategies and systems for the management of emergencies in the State.

Emergency Management Australia (EMA) - EMA is a division of the Attorney General's Department. It administers the Australian Government Disaster Response Plan (COMDISPLAN).

Emergency Management Zones – South Australia is divided into eleven zones for emergency management.

Establishing the Context – Defining the external and internal parameters to be taken into account when managing risk, and setting the scope of the risk criteria for the risk management policy.

External Context – External environment in which the organisation seeks to achieve its objectives.

External context can include:

- The cultural, social, political, legal, regulatory, financial, technological, economic, natural and competitive environment, whether international, national, regional or local
- Key drivers and trends having impacts on the objectives of the organisation; and
- Relationships with, and perceptions and values of external stakeholders.

Evacuation (directed) – The controlled and managed movement of people from a threatened area to a place of safety in accordance with the provisions of the SEMP and relevant legislation.

Evacuation (self) – The self-initiated movement of people from a threatened area to a place of safety.

Event – Occurrence or change of a particular set of circumstances.

- An event can be one or more occurrences, and can have several causes.
- An event can consist of something not happening.
- An event can sometimes be referred to as an 'incident' or 'accident'.
- An event without consequences can also be referred to as a 'near miss', 'incident', 'near hit' or 'close call'. (*Source: ISO, Guide 73: Risk Management – Vocabulary, 2009 p6*).

Functional Services – A group of agencies that perform functional roles that support response and recovery activities during an emergency.

Governance – Management or leadership processes that define expectations, grants power, or verifies performance. Good governance is characterised by:

- accountability, where the roles and responsibilities of parties are clearly understood,

- participation, the involvement and agreement among affected parties of the governance arrangements,
- predictability, the occurrence governance processes can be anticipated, and
- transparency, the underlying logic of decisions that are made is subject to outside scrutiny.

Hazard – a potential or existing condition that may cause harm to people or damage to property or the environment.

Hazard Leader

Hazard leaders are appointed by SEMC and are agencies with '...the knowledge, expertise and resources to undertake a leadership role for the planning of emergency management activities pertaining to the prevention of, preparedness for, response to and recovery from its appointed hazard. It has the authority of the SEMC to bring together all agencies of government and any required Commonwealth, local or non-government entities to undertake this planning role' (*State Emergency Management Plan June 2013 version 2.10*).

Internal Context – Internal environment in which the organisation seeks to achieve its objectives. Internal context can include:

- governance, organisational structure, roles and responsibilities;
- policies, objectives and the strategies that are in place to achieve them
- the capabilities, understood in terms of resources and knowledge (e.g. capital, time, people, processes, systems and technologies)
- information systems, information flows and decision-making processes (both formal and informal)
- relationships with, and perceptions and values of, internal stakeholders;
- the organisation's culture;
- standards, guidelines and models adopted by the organisation; and
- form and extent of contractual relationships.

Likelihood – Used as a general description of the probability or frequency. In risk management terminology, the word 'likelihood' is used to refer to the chance of something happening, whether defined, measured or determined objectively or subjectively, qualitatively or quantitatively, and described using general terms or mathematically (such as a probability or a frequency over a given time period).

Mitigation – Measures taken in advance of a disaster aimed at decreasing or eliminating its impact on society and environment.

Prevention – The identification of hazards, assessment of threats and taking of measures to reduce or eliminate the adverse impact of potential natural hazard events.

Preparedness – Includes the identification of hazards, the assessment of threats to life and property, and the taking of measures to reduce or eliminate potential loss to life or property and protect economic development. Measures taken to eliminate or reduce the incidence or severity of emergencies.

Recovery – Measures taken during and/or after an emergency to assist the reestablishment of the normal pattern of life on individuals, families and communities affected by the emergency and includes - the restoration of essential facilities and services, the restoration of other facilities, services and social networks necessary for the normal functioning of a community, the provision material and personal needs, the provision of means of emotional support.

Resilience – A measure of how quickly a system recovers from failures

Residual Risk – the risk remaining after implementation of risk treatments

Response – Activities that combat the adverse effects of a hazard event, provide emergency assistance for casualties, and help reduce further injury or damage and facilitate effective recovery operations for and in the local community.

Risk – A concept used to describe the likelihood of harmful consequences, arising from the interaction of hazards, communities and the environment.

Risk Analysis – A systematic use of available information to determine how often specified events may occur and the magnitude of their likely consequences on a community.

Risk Assessment – The process used to determine risk management priorities by evaluating and comparing the level of risk against predetermined standards, target risk levels or other criteria.

Risk Evaluation – The process in which judgements are made on the tolerability of the risk on the basis of risk analysis and taking into account factors such as socio-economic and environmental aspects.

Risk Identification – Process of finding, recognising and describing risks. It involves the identification of risk sources, events, their causes and their potential consequences and can involve historical data, theoretical analysis, informed and expert opinions, and stakeholder's needs.

Risk Management – The systematic application of management policies, procedures and practices to the task of identifying, analyzing, evaluating, treating and monitoring risk.

Risk Management Framework – Set of components that provide the foundations and organisational arrangements for designing, implementing, monitoring, reviewing and continually improving risk management throughout the organisation.

Risk Register – a listing of risk statements describing sources of risk and elements at risk with assigned consequences, likelihoods and levels of risk

Risk Statement – Structured statement of risk usually containing four elements:

- Sources;
- Events;
- Causes; and
- Consequences.

Risk Treatment – The process of selection and implementation of measures to modify risk.

Rural Fire/Bushfire -- The combination of environmental factors which influence fire behaviour in a non-urban setting and includes factors such as topography, aspect, vegetation constituting fuel, fuel quantity and arrangement, that in combination with human settlement may cause harm to people or damage to property or the environment.

Source of Risk – A source of potential harm

State Coordinator – The South Australian Emergency Management Act 2004, Part 3, appoints the person holding or acting in the position of Commissioner of Police at the time of a declared emergency or disaster as the State Co-ordinator.

State Emergency Management Committee (SEMC) – 'The SEMC is a strategic planning committee that reports to the Emergency Management Council on matters that relate to the preparedness of the State against identified hazards or protective security matters. The SEMC is chaired by the Chief Executive, Department of the Premier and Cabinet ...' (*State Emergency Management Plan June 2013 version 2.10*).

State Emergency Management Plan (SEMP) – A plan '... prepared by SEMC ... and comprising strategies for the prevention of emergencies in the State and for ensuring that the State is adequately prepared for emergencies, including strategies for the containment of emergencies, the coordination of response and recovery operations and the orderly and efficient deployment of resources and services in connection with response and recovery operations. (*Emergency Management Act 2004*)

State Emergency Centre (SEC) – 'The State Emergency Centre is established to coordinate the response to an incident that is beyond the capability of day-to-day resources. It is the role of the SEC to meet the information needs of the State Coordinator and facilitate liaison with other agencies through the Functional Services.' (*State Emergency Management Plan June 2013 version 2.10*).

Vulnerability – The susceptibility and resilience of the community and environment to hazards. Resilience is related to ‘existing controls’ and the capacity to reduce or sustain harm or loss. Susceptibility is related to the degree of exposure.

Zone Emergency Management Committee (ZEMC) – ‘The ZEMC is responsible for the Zone-level planning to support the SEMP. The ZEMC will use an all hazards approach across the full PPRR spectrum to conduct emergency risk assessments compliant with the approved risk management process; identify and evaluate risk treatment options and develop Risk Treatment Plans; and develop a ZEMP, and other plans, as required. (*State Emergency Management Plan December 2013 version 2.11*).

APPENDIX F: Rural Fire Risk Statements for the State Rural Fire Risk Assessment Workshop.

Each of these statements was assessed against 3 rural fire scenarios of 1 in 2, 1 in 20 and 1 in 300 year recurrence intervals.

No.	Risk Statement
People	
RF1	There is the potential that a bushfire event will impact on the safety of residents in the State and may cause death and injury.
RF2	There is the potential that a bushfire event may impact on the capacity of the health system to treat injured people.
RF3	There is the potential that a bushfire event will lead to the displacement of people from buildings (homes, businesses, offices, workplaces)
RF4	There is the potential that a bushfire event may impact the health of more vulnerable residents (e.g. aged, ill, infants) and cause death or injury.
RF5	There is a potential that a bushfire event will make it difficult to provide medical services to large mass gathering events.
RF6	There is a potential that a bushfire event will cause interruption/damage to essential services and affect the day to day functionality of facilities of vulnerable people (aged, childcare, disability services etc).
RF7	There is a potential that a bushfire event will affect the structural integrity of trees which may result in branch drop causing injury and possibly death to people.
RF8	There is a potential that bushfire event will impact on transient populations including tourists and campers throughout the State.
RF9	There is the potential that a bushfire event will cause business interruptions to Health care sector (RDNS, HACC, SAAS, GP's, hospitals - public and private, home care provisions) and this will impact on people
RF10	There is a potential that a bushfire event will significantly impact upon indigenous communities because of their geographic isolation and general disengagement.
RF11	There is a potential that a bushfire will impact on those residents who evacuate at the last minute, when planned official evacuation cannot be conducted, possibly causing death and injury.
RF12	There is a potential that a bushfire will impact on those residents who stay back to defend their property and care for their animals (pets and/or stock), potentially resulting in injury or death.
RF13	There is a potential that a bushfire event will cause interruption/damage to essential services resulting in disruption to the whole community and possibly resulting in injury or death.
RF14	There is a potential that a bushfire will damage/destroy buildings that aren't built to AS 3959 (Bushfire Standard) and therefore are potentially more susceptible to structural failure potentially resulting in injury or death.

- RF15 There is a potential that a bushfire event will impact on CALD communities
- RF16 There is potential that a bushfire will put emergency service personnel at greater risk of death or injury (fire fighters, Ambulance, SES, Police etc.)
- RF17 There is the potential that a bushfire with cause both long term and short term negative psychological affects stressing health system.

Environment

- RF18 There is the potential that a event will impact on vulnerable ecosystems and result in the extinction of threatened species.
- RF19 There is the potential that a bushfire event will impact on native vegetation communities and exacerbate weed and fungus such as *Phytophthora cinnamomi* invasion.
- RF20 There is the potential that a bushfire event will impact on native vegetation communities and will leave them susceptible to significant erosion.
- RF21 There is the potential that a bushfire event will impact on native vegetation communities and result in native animal welfare issues.
- RF22 There is the potential that a bushfire event will impact on native vegetation communities and result long-term degradation of aesthetics in the area.
- RF23 There is the potential that a bushfire event will result in death/illness to wildlife, stock and domestic animals causing environmental damage (due to decay of carcasses etc).
- RF24 There is the potential that a bushfire event will create conditions that can lead to drinking water quality issues.
- RF25 There is the potential that a bushfire event will result in wide scale injury/death of native animals

Economy

- RF26 There is the potential that a bushfire event will prevent people from attending their place of employment (for example for more than a week).
- RF27 There is the potential that a bushfire event will prevent commercial and small businesses from functioning.
- RF28 There is the potential that a bushfire event will cause damage to business premises and/or stock losses for which the costs of repair/replacement exceed insured amounts.
- RF29 There is the potential that a bushfire event will cause damage to State Government infrastructure which will in turn cause unrecoverable financial losses, negatively impacting on the state budget.
- RF30 There is the potential that a bushfire event will cause damage to Local Government infrastructure which will in turn cause unrecoverable financial losses, negatively impacting on the council's budget.
- RF31 There is the potential that a bushfire event will cause damage to the branding of the state, detracting visitors and impacting on the revenue of the State.

- RF32 There is the potential that a bushfire event will impact on the primary industry production thereby impacting on the economic health of the State
- RF33 There is the potential that a bushfire event will result in increased cost for essential services impacting on state and councils budgets.
- RF34 There is the potential that a bushfire event may impact on businesses resulting in an inability of businesses to maintain existing financial commitments.
- RF35 There is the potential that a bushfire event may impact on business continuity regardless of Insurance coverage resulting in loss of employment and impacts to the economy.
- RF36 There is the potential that a bushfire event may cause smoke taint to vineyards reducing the quality and economic value of the wine.

Public Administration

- RF37 There is the potential that a Bushfire event will increase demand on SA Health services (surge) across the State.
- RF38 There is the potential that a bushfire event will cause an increase in demand upon public facilities, shopping centres, etc.
- RF39 There is the potential that a bushfire event will impact Commonwealth Government facilities which will in turn affect service delivery.
- RF40 There is the potential that a bushfire event will impact State Government facilities which will in turn affect service delivery.
- RF41 There is the potential that a bushfire event will impact Local Government facilities which will in turn affect service delivery.
- RF42 There is the potential that a bushfire event will impact the public broadcast infrastructure which will in turn affect the ability to issue public safety warnings and messages.
- RF43 There is the potential that a bushfire event will impact emergency management facilities and equipment of emergency services to manage bushfires and other emergencies.

Social Setting

- RF44 There is the potential that a Rating bushfire event and consequential life and property loss will lead to stress and anxiety in people across the State
- RF45 There is the potential that a bushfire event will disrupt social interactions at sporting events and other mass gatherings.
- RF46 There is the potential that a bushfire event will cause a loss of economic earnings and impact the social morale of the State.
- RF47 There is the potential that a bushfire event will lead to a decrease in tourism and damage the brand image of the State.
- RF48 There is the potential that a bushfire event will impact on the community and may result in the breakdown of social networks and peer group support.
- RF49 There is the potential that a bushfire event will lead to social unrest.

RF50 There is the potential that a bushfire event will cause the closure of schools, health and aged care facilities placing additional stress on parents, care-givers and their families.

Infrastructure

RF51 There is the potential that a bushfire event will cause damage to electricity transmission and distribution infrastructure which will result in the failure of water and waste water (including sewer) provision.

RF52 There is the potential that a bushfire event will impact on reservoir water catchments and result in reservoir siltation, reduced water quality and water shortages.

RF53 There is the potential that a bushfire event will cause damage to electricity transmission and distribution (source to storage Inc. Substations and to end user) infrastructure which in turn will cause failure of service delivery.

RF54 There is the potential that a bushfire event will lead to deliberate interruptions to electricity transmission on fire danger days which in turn will cause failure of service delivery.

RF55 There is the potential that a bushfire will negatively affect water supply and distribution (source to storage to end user) infrastructure which in turn will cause failure of service delivery.

RF56 There is the potential that a bushfire event will result in damage to road infrastructure (such as road surfaces, road side furniture etc).

RF57 There is the potential that a bushfire event will result in damage to rail lines and services.

RF58 There is the potential that a bushfire event will cause damage to hospitals and health care facilities impacting on service delivery.

RF59 There is the potential that a bushfire event will cause an increase demand upon ICT services resulting in overload / failures (eg: emergency services and critical Government services websites etc).

RF60 There is a potential that a bushfire event will cause disruption/damage to major arterial and major freight routes in turn causing traffic delays and reduced services. (disruption might be due to smoke or damage to roads)

RF61 There is a potential that a bushfire event will disrupt / damage the information and communication infrastructure including NBN, private internet providers causing failure of service delivery.

RF62 There is the potential that a bushfire event will cause damage / disruption to the GRN communications infrastructure.

RF63 There is the potential that a bushfire event will result in damage / disrupt to airport and airstrip infrastructure which in turn will cause failure of service delivery.

RF64 There is the potential that a bushfire event will result in damage / disrupt to gas infrastructure which in turn will cause failure of service delivery.

Objective: Conduct an assessment of the risks to the community from a bushfire in order to prioritise the state's emergency management activities through PPRR.

Objective: Conduct an assessment of the risks to the community from a bushfire in order

Objective: Conduct an

[illegible]

